



Elisabeth Epping

Exploring the Institutionalisation of Science Diplomacy

A Comparison of German and Swiss Science and Innovation Centres



Nomos



Institut für
Auslandsbeziehungen

Kultur und Außenpolitik

Edited by
Institut für Auslandsbeziehungen (ifa)

Volume 2

Elisabeth Epping

Exploring the Institutionalisation of Science Diplomacy

A Comparison of German and Swiss Science
and Innovation Centres



Nomos



**Institut für
Auslandsbeziehungen**

Coverpicture: „Ausstellung Weltreise im ZKM“. Eine Besucherin des Zentrums für Kunst und Medientechnologie (ZKM) in Karlsruhe (Baden-Württemberg) betrachtet am 23.10.2013 das Werk *Uqbar I* von der Künstlerin Corinne Wasmuth aus dem Jahr 2011. Photographie von Uli Deck.
© dpa.

The Deutsche Nationalbibliothek lists this publication in the Deutsche Nationalbibliografie; detailed bibliographic data are available on the Internet at <http://dnb.d-nb.de>

ISBN 978-3-7560-0436-2 (Print)
978-3-7489-3798-2 (ePDF)

British Library Cataloguing-in-Publication Data

A catalogue record for this book is available from the British Library.

ISBN 978-3-7560-0436-2 (Print)
978-3-7489-3798-2 (ePDF)

Library of Congress Cataloging-in-Publication Data

Epping, Elisabeth

Exploring the Institutionalisation of Science Diplomacy

A Comparison of German and Swiss Science and Innovation Centres

Elisabeth Epping

360 pp.

Includes bibliographic references.

ISBN 978-3-7560-0436-2 (Print)
978-3-7489-3798-2 (ePDF)

1st Edition 2023

© The Authors

Published by

Nomos Verlagsgesellschaft mbH & Co. KG
Waldseestraße 3–5 | 76530 Baden-Baden
www.nomos.de

Production of the printed version:

Nomos Verlagsgesellschaft mbH & Co. KG
Waldseestraße 3–5 | 76530 Baden-Baden

ISBN 978-3-7560-0436-2 (Print)
ISBN 978-3-7489-3798-2 (ePDF)

DOI <https://doi.org/10.5771/9783748937982>



Online Version
Nomos eLibrary



This work is licensed under a Creative Commons Attribution – ShareAlike 4.0 International License.

To my parents, and to Jochen, Johann Anton and Hugo

Acknowledgements

The last five years have been an exciting and challenging journey for me. Now that this journey has come to an end, I would like to express my gratitude to the University of Luxembourg for funding this research project and to thank the many people who have accompanied and supported me along the way. First and foremost, I am extremely grateful to my supervisor, Prof. Dr Robert Harmsen. Early on in my research, he advised me that “*A PhD is a marathon, not a sprint*” and this has certainly proved to be true! Although this five-year marathon has sometimes felt like a steeplechase, I was always able to count on his continued guidance, support and encouragement. His advice, patience (despite two longer breaks during my research) and pragmatism have been indispensable. Additionally, I could not have undertaken this journey without the support of my *CET*, who generously provided their knowledge and expertise, and helped me to look at my research from new angles. I would particularly like to thank Prof. Dr Justin Powell for providing inspiration and advice on publication opportunities, and Dr Jennifer Dusdal for always having an open door. I also wish to extend special thanks to Prof. Dr David Howarth for his academic guidance and for the valuable points he raised in our discussions. Furthermore, I am indebted to my interview partners for taking the time to share their experiences with me and for their openness. It was a true pleasure meeting them, and this dissertation would have been far less insightful without them. Special thanks also go to Prof. Dr Lukas Graf and this team for hosting me at Hertie School and providing me with an excellent research stay and feedback opportunities, which were valuable to this dissertation. I am also grateful for the many peer-to-peer discussions and feedback sessions with the *Berlin Science Diplomacy Bubble*. I would also like to thank my dear colleagues at the University of Luxembourg, in particular Igor, Alexander, Martin, Anna-Lena and Sarah, who provided valuable feedback and were also great company. Finally, words cannot express how grateful I am for the encouragement and support of my friends and family. This dissertation project has been a great lesson in family support, and I could not have done it without you! I dedicate this thesis to my parents, and to Jochen, Johann Anton and Hugo. Now, let’s go out and enjoy the summer!

Steinfurt, May 2022

Elisabeth Epping

Table of Contents

List of Figures	17
List of Tables	19
Abstract	21
Abbreviations	23
1. Introduction	25
1.1. Research Focus	27
1.2. Research Design	29
1.3. Research Structure	32
2. Science Diplomacy Is en Vogue	35
2.1. Science Diplomacy and the Obama Administration	35
2.2. Definitions	37
2.2.1. Conceptualisation by the Royal Society and AAAS	37
2.2.2. Contemporary Understanding of Science Diplomacy	40
2.2.3. The Long History of Science Diplomacy	43
2.3. Science Diplomacy Actors	44
2.4. Rationales for Countries to Engage in Science Diplomacy	46
2.5. The Science Diplomacy Toolbox	47
2.6. Challenges to Science Diplomacy Research	49
2.7. Conclusion	52
3. Science and Innovation Centres: Definitions and Concepts	55
3.1. A New Instrument—Challenges in Researching SICs	55
3.2. Defining SICs	58

Table of Contents

3.3. Conceptualising and Comparing SICs	60
3.3.1. Operating Countries (Sending Countries)	60
3.3.2. Target Countries (Receiving Countries)	62
3.3.3. Links to Diplomacy	64
3.3.4. Core Activities and Key Stakeholders	65
3.3.5. Governance Arrangements	70
3.3.5.1. Organisational Set-Up	70
3.3.5.2. Funding	71
3.3.6. Demarcations to Similar Institutions	72
3.4. Typologising SICs	73
3.4.1. Service-Oriented SICs	75
3.4.2. Representational SICs	76
3.4.3. Policy-Led SICs	78
3.4.4. Synthesis of the Typology	79
3.5. Conclusion	81
4. Towards a Conceptual Framework	83
4.1. Policy Instruments: A Functional Understanding	84
4.1.1. Definition	84
4.1.2. Taxonomies	85
4.1.3. Instruments and Policy Design	88
4.2. A Renewed Focus on Policy Instruments	90
4.2.1. Instruments as Institutions	91
4.2.2. Instrumentation and Institutionalisation	94
4.2.3. A Heuristic Framework	96
4.2.3.1. Step 1: Analysing the Careers of SICs	96
4.2.3.2. Step 2: Use of SICs by Actors	97
4.3. Conceptualising Actor Rationales	98
4.3.1. Creating and Sustaining SICs	99
4.3.2. Rationales for Joining SICs	100
4.4. Conclusion and Discussion	104
5. Methodology	107
5.1. Research Questions	107

5.2. Research Design	108
5.2.1. Typology Building	109
5.2.2. Comparative Research	110
5.2.3. Case Study Research	111
5.2.4. Selection Criteria	112
5.2.4.1. Similarities Between Germany and Switzerland	113
5.2.4.2. Differences Between Germany and Switzerland	114
5.3. Data Sources	116
5.3.1. Interviews and Personal Communications	118
5.3.2. Interview Sampling Method	119
5.3.2.1. Exploratory Phase (Phase I)	119
5.3.2.2. Consolidation Phase (Phase II)	120
5.3.3. Interview Processing	122
5.3.4. Documents	122
5.4. Data Analysis (Multi-Method)	123
5.4.1. Content Analysis	124
5.4.2. Open Coding: Gioia Methodology	125
5.5. Conclusion and Reflection	127
Case Study (I): Representational Model—The DWIH, Germany	129
6. Description of the Current DWIH Network	131
6.1. Principal Actors	132
6.2. Hybrid and Nested Governance Structure	134
6.2.1. Central Governance	135
6.2.2. On-Site Governance	136
6.3. Funding	138
6.4. Political Embeddedness	139
7. (Gradual) Institutionalisation of the DWIH	141
7.1. Genesis of the DWIH	141
7.1.1. Launch of the Initiative Außenwissenschaftspolitik	141
7.1.2. Policy Entrepreneurs	142

Table of Contents

7.1.3. Early Deliberations	144
7.2. Struggles Over the Institutional Set-Up	148
7.2.1. Ministerial Struggles Over Competence and Design	148
7.2.2. Agreeing on a Model (Format, Themes and Goals)	152
7.2.3. The Network	154
7.2.4. Debates on the Governance Structure	155
7.3. Critical Junctures in the Instrument's Development	158
7.3.1. Closing the Cairo Office	159
7.3.2. The DWIH Revisited: Reorganisation in Response to an Audit	160
7.3.3. Expanding the Network	162
7.4. Findings and Discussion	164
8. Analysis of Actor Rationales for Participation (DWIH)	167
8.1. Political Objectives	167
8.1.1. Branding and Visibility	168
8.1.2. Cooperation and Competition: Internationalisation	170
8.1.3. Economic Considerations and Innovation	170
8.1.4. Consolidating Science Diplomacy	171
8.1.5. Discussion	172
8.2. Key Stakeholder Rationales	173
8.3. Strategic Considerations: Maximising Impact	175
8.3.1. Increasing International Visibility	176
8.3.2. Access to Resources	177
8.3.3. Opportunities for Strategic (Re-)Positioning	179
8.3.4. Thematic Fit and Synergies	181
8.3.5. Precautionary Reasons	183
8.4. Sense of Collectivity	186
8.4.1. Support for the General Idea	187
8.4.2. Maximising the Impact of the Wider (Science) Landscape	190
8.4.3. Responsibility	192
8.5. Systemic Aspects	192
8.6. Limits to Participation	194
8.6.1. Concerns about Visibility	195

8.6.2. Cost-Benefit Considerations	196
8.6.3. Different Priorities	198
8.7. Findings and Discussion	199
8.7.1. Interim Analysis of Case Study (I): Instrumentation Effects	201
8.7.1.1. Aggregation Effects	202
8.7.1.2. Representation Effects	203
8.7.1.3. Appropriation Effects	204
Case Study (II): Service-Oriented Model—Swissnex, Switzerland	207
9. Description of the Current Swissnex Network	209
9.1. Principal Actors	210
9.2. Governance Architecture	212
9.3. Funding	213
9.4. Contextualisation	215
9.4.1. Bottom-Up Principle for Policy-making	215
9.4.2. Demarcations to Similar Institutions	216
10. (Gradual) Institutionalisation of Swissnex	219
10.1. Genesis of Swissnex	219
10.1.1. Societal Developments	220
10.1.1.1. Globalisation and Internationalisation	220
10.1.1.2. Brain Drain	221
10.1.2. Political Momentum	221
10.1.3. Policy Entrepreneurs	222
10.1.3.1. Boston	223
10.1.3.2. San Francisco	225
10.1.4. Private Funding	226
10.1.5. Anticipation of the Model	227
10.1.5.1. Struggles With the FDFA	228
10.1.5.2. Reception Among Other Actors	229
10.2. Critical Junctures in the Instrument’s Development	230
10.2.1. Launch Phase (2000–2005): The Policy Entrepreneurs Era	232

Table of Contents

10.2.2. Politically Initiated Expansion (2007–2014)	233
10.2.2.1. The Swissnex Committee	234
10.2.3. Consolidating the Network: Closure, Evaluation and New Formats	235
10.2.3.1. Closing the Singapore Location	235
10.2.3.2. Evaluation	237
10.2.3.3. Outlook and New Formats	238
10.2.4. Expansion and Reinvention	239
10.3. Findings and Discussion	241
11. Analysis of Actor Rationales for Participation (Swissnex)	245
11.1. Political Objectives	245
11.1.1. International Branding and Positioning	246
11.1.2. Knowledge Transfer and Innovation	246
11.1.3. Internationalisation Efforts	247
11.1.4. Foreign Policy Goals	247
11.1.5. Conclusions	248
11.2. Key Stakeholder Rationales	250
11.3. Strategic Considerations: Maximising Impact	251
11.3.1. Access to Resources	252
11.3.2. Thematic Fit and Synergies	255
11.3.3. Precautionary Reasons	257
11.4. Sense of Collectivity	257
11.5. Systemic Aspects to Participation	259
11.6. Limits to Participation	259
11.6.1. Strategic Considerations	260
11.6.2. Cost-Benefit Considerations	261
11.6.3. Different Priorities	263
11.7. Findings and Discussion	264
11.7.1. Interim Analysis of Case Study (II): Instrumentation Effects	268

12. Comparative Analysis and Discussion	271
12.1. Institutionalisation Patterns	272
12.1.1. Genesis: Patterns of Difference	273
12.1.1.1. Temporality and Different (Initial) Objectives	274
12.1.1.2. Timing: (Delayed) Policy Transfer	274
12.1.1.3. Design Processes: Bottom-Up vs. Top-Down Logic	275
12.1.1.4. Institutional Environment (Domestic and International)	276
12.1.1.5. Ministerial Struggles	278
12.1.1.6. Incremental vs. Simultaneous Opening of SICs	278
12.1.1.7. Sub-Conclusion	279
12.1.2. Evolution of the Instrument and Critical Junctures: Patterns of Alignment	280
12.1.2.1. Increased Political Steering	280
12.1.2.2. Audit Exercises	281
12.1.2.3. Renewed Political Focus	282
12.1.2.4. Stakeholder Support	283
12.1.2.5. Sub-Conclusion: Comparing the Institutionalisation	283
12.2. Actor Structures and Key Stakeholder Rationales	286
12.2.1. Patterns of Difference: Actor Structures and Involvement	287
12.2.2. Political Rationales	288
12.2.3. Patterns of Sense-Making: Rationales for Participation	288
12.2.4. Strategic Considerations	290
12.2.5. Sense of Collectivity	292
12.2.6. Systemic Aspects of Participation	294
12.2.7. Limits to Participation	295
12.2.8. Sub-Conclusion: Comparing Rationales for Participation	296
12.3. Conclusion	299

Table of Contents

13. Conclusion and Reflection	301
13.1. Key Findings	302
13.1.1. Characterisation of SICs (Sub-Question 1)	303
13.1.2. Longitudinal Analysis of Two SICs (Sub- Question 2)	304
13.1.3. Actor-Centred Perspective: Stakeholder Rationales (Sub-Question 3)	305
13.2. Contributions to Scholarship	306
13.3. Reflections on Science Diplomacy (Sub-Question 4)	309
13.3.1. A New Focus on Science Diplomacy Instruments	310
13.3.2. Science Diplomacy is National	311
13.3.3. Science Diplomacy Actors	313
13.3.4. Science Diplomacy Is Used by (Key) Stakeholders as a Platform to Convey Their Goals	315
13.3.5. Science Diplomacy Creates a Sense of Collectivity (in Research Ecosystems)	315
13.4. Reflections and Limitations	316
13.5. Avenues for Further Research	319
13.6. Conclusion	322
Appendix	325
1. Data Sources: Case Study (I)—The DWIH, Germany	325
1.1. Overview: Interviews and Personal Communication	325
1.2. Overview: Documents (used in Section 8.1)	327
2. Data Sources: Case Study (II)—Swissnex, Switzerland	329
2.1. Overview: Interviews and Personal Communication	329
2.2. Overview: Documents (used in Section 11.1)	330
References	331

List of Figures

Figure 1	Service-Oriented SIC	76
Figure 2	Representational SIC	78
Figure 3	Policy-Led SIC	79
Figure 4	Research Steps	109
Figure 5	Analytical Framework	124
Figure 6	Milestones in the Development of the DWIH	163
Figure 7	Rationales for Actor Participation (DWIH)	174
Figure 8	Actor Rationales: Maximising and Reinforcing Impact	175
Figure 9	Actor Rationales: Sense of Collectivity	187
Figure 10	Actor Rationales: Systemic Aspects	193
Figure 11	Actor Rationales: Limits to Participation	195
Figure 12	Milestones in the Development of Swissnex	241
Figure 13	Rationales for Actor Participation (Swissnex)	251
Figure 14	Actor Rationales: Maximising Impact	252
Figure 15	Actor Rationales: Sense of Collectivity	257
Figure 16	Actor Rationales: Systemic Aspects	259
Figure 17	Actor Rationales: Limits to Participation	260

List of Tables

Table 1	Overview: Science and Innovation Centres (SICs)	61
Table 2	Target Countries SICs	63
Table 3	Dimensions for Comparison I: Tasks and Thematic Focus	68
Table 4	SICs' Core Missions	69
Table 5	Dimensions for Comparison II: Organisational Set-Up and Funding	72
Table 6	Typology of Science and Innovation Centres	74
Table 7	Rationales for Joining Meta-Organisations	101
Table 8	Overview: Data Sources	117
Table 9	Overview: Interview Sample	121
Table 10	Organisational Structure: DWIH Network	136
Table 11	DWIH Network: Initial Composition and Leadership Arrangements (until 2016)	157
Table 12	Key Findings for the DWIH's Institutionalisation	164
Table 13	Main Themes and Objectives Tied to the DWIH	169
Table 14	Increasing International Visibility	176
Table 15	Access to Resources	178
Table 16	Opportunity for Strategic (Re-) Positioning	179
Table 17	Thematic Fit and Synergies	181
Table 18	Precautionary Reasons	184
Table 19	Support for the General Idea	188
Table 20	Maximising the Impact of the Wider (Science) Landscape	191
Table 21	Responsibility	192
Table 22	Systemic Aspects	194

List of Tables

Table 23	Concerns about Visibility	196
Table 24	Cost-Benefit Considerations	197
Table 25	Different Priorities	198
Table 26	Overview: Rationales for Participation	201
Table 27	Instrumentation Effects: DWIH, Germany	202
Table 28	Organisational Structure: Swissnex	213
Table 29	Evolution of the Swissnex Network	231
Table 30	Key Findings for Swissnex's Institutionalisation	242
Table 31	Core Themes and Objectives tied to Swissnex	249
Table 32	Actor Rationales: Access to Resources	253
Table 33	Thematic Fit and Synergies	255
Table 34	Precautionary Reasons	257
Table 35	Sense of Collectivity	258
Table 36	Systemic Aspects	259
Table 37	Strategic Considerations	261
Table 38	Cost-Benefit Considerations	262
Table 39	Different Priorities	263
Table 40	Overview: Rationales for Participation	265
Table 41	Instrumentation Effects: Swissnex, Switzerland	269
Table 42	Comparison: Institutionalisation of DWIH and Swissnex	273
Table 43	Comparing the Instrumentation	286
Table 44	Comparison: Rationales for Participation	290
Table 45	Alignment of Findings to Meta-Organisation Considerations	298

Abstract

This thesis explains and investigates the development and the institutionalisation of *Science and Innovation Centres* (SICs) as being distinct instruments of science diplomacy. SICs are a unique and underexplored instrument in the science diplomacy toolbox, and they are increasingly being adopted by highly innovative countries. This study responds to a growing interest in the field. Science diplomacy is commonly understood as a distinct governmental approach that mobilises science for wider foreign policy goals, such as improving international relations. However, science diplomacy discourse is characterised by a weak empirical basis and driven by normative perspectives. This study responds to these shortcomings and aims to lift the smokescreen of science diplomacy by providing an insight into its governance, while also establishing a distinctly actor-centred perspective. In order to achieve this, two distinct SICs, Germany's *Deutsche Wissenschafts- und Innovationshäuser* (DWIH) and Switzerland's *Swissnex*, are closely analysed in an original comparative and longitudinal study. While SICs are just one instrument in the governmental toolbox for promoting international collaboration and competition, they are distinct due to their holistic set-up and their role as a nucleus for the wider research and innovation system they represent. Moreover, SICs appear to have the potential to create a significant impact, despite their limited financial resources.

This thesis adopts a historical development perspective to outline how these two SICs were designed as well as their gradual development and institutionalisation. The thesis further probes why actors participate in SICs by unpacking their differing rationales, developing a distinctly actor-centred perspective on science diplomacy. This study has been designed in an inductive and exploratory way to account for the novelty of the topic; the research findings are based on an analysis of 41 interviews and a substantial collection of documents. The study finds evidence that SICs developed as a response to wider societal trends, although these trends differed for the two case studies. Moreover, the development of SICs has been characterised by aspects such as timing, contingency and critical junctures. SICs are inextricably connected to their national contexts and mirror distinct system characteristics, such as governance arrangements or degree of actor involvement. These aspects were also seen as explaining

Abstract

the exact shape that SICs take. Furthermore, this study finds evidence of an appropriation of SICs by key actors, in line with their organisational interests. In the case of the DWIH, this impacted and even limited its (potential) design and ways of operating. However, the analysis of SICs' appropriation also revealed a distinct sense of collectivity, which developed among actors in the national research and innovation ecosystem due to this joint instrument. The research findings reaffirm that science diplomacy is clearly driven by national interests, while further highlighting that the notion of science diplomacy and its governance (actors, rationales and instruments) can only be fully understood by analysing the national context.

Abbreviations

AA	Auswärtiges Amt (Federal Foreign Office)
AAAS	American Association for the Advancement of Science
AiF	Arbeitsgemeinschaft industrieller Forschungsvereinigungen (The German Federation of Industrial Research Associations)
AvH	Alexander von Humboldt Stiftung (Alexander von Humboldt Foundation)
AHK	Außenhandelskammer (Chamber of Industry and Commerce)
AKBP	Auswärtige Kultur- und Bildungspolitik (Cultural Relations and Education Policy)
AWP	Außenwissenschaftspolitik (Research and Academic Relations Policy)
BDI	Bundesverband der deutschen Industrie e.V. (The Federation of German Industries)
BFI	Bildung, Forschung und Innovation (Education, Research and Innovation)
BMBF	Bundesministerium für Bildung und Forschung (Federal Ministry for Education and Research)
BMWi	Bundesministerium für Wirtschaft und Energie (Federal Ministry for Economic Affairs and Energy)
BRH	Bundesrechnungshof (Federal Audit Office)
CDU	Christlich Demokratische Union Deutschland (Christian Democratic Party)
CERN	European Organization for Nuclear Research
CNRS	National Centre for Scientific Research
DAAD	Deutscher Akademischer Austauschdienst (German Academic Exchange Service)
DFG	Deutsche Forschungsgemeinschaft (German Research Foundation)
DIHK	Deutscher Industrie- und Handelskammertag e. V. (Association of German Chambers of Industry and Commerce)
DWIH	Deutsche Wissenschafts- und Innovationshäuser /Deutsches Wissenschafts- und Innovationshaus (German Centres for Research and Innovation)
EFK	Eidgenössische Finanzkontrolle (Swiss Federal Audit Office)

Abbreviations

ETH	Eidgenössische Technische Hochschule (Federal Institutes of Technology)
FDFA	Federal Department of Foreign Affairs (Eidgenössisches Departement für auswärtige Angelegenheiten)
FhG	Fraunhofer-Gesellschaft (Fraunhofer Association)
FIGF	Forschungs- und Innovationsförderungsgesetz (Swiss Research and Innovation Law)
HGF	Helmholtz-Gemeinschaft deutscher Forschungszentren (Helmholtz Association of German Research Centres)
HRK	Hochschulrektorenkonferenz (German Rectors' Conference)
ICDK	Innovation Centre Denmark
MPG	Max-Planck-Gesellschaft (Max Planck Society)
SERI	State Secretariat for Education, Research and Innovation (Staatssekretariat für Bildung, Forschung und Innovation)
SESAME	Synchrotron-light for Experimental Science and Applications in the Middle East
SIC	Science and Innovation Centre
SIN	Science and Innovation Network
SNF	Schweizer Nationalfonds (Swiss National Science Foundation)
SPD	Sozialdemokratische Partei Deutschlands (Social Democratic Party)
TNB	Transnationale Bildung (Transnational Education)
RPA	Rechnungsprüfungsausschuss (Budget Committee)
RPM	Resource Pooling Model
UK	United Kingdom
USA	United States of America
WR	Wissenschaftsrat (German Council of Science and Humanities)

1. Introduction

In recent years, the notion of science diplomacy has gained momentum among policy-makers and practitioners alike. Drawing on science and diplomacy as two distinct elements, it is commonly considered to be a distinct governmental response which strengthens “*the symbiosis between the interests and motivations of the scientific and foreign policy communities*” (The Royal Society & AAAS, 2010, p. vi). More specifically, science diplomacy is seen to be a manifestation of a new path of diplomacy which transcends national borders and draws on collaboration and exchange to keep communication channels open (Epping, 2020; Flink, 2020a; Flink & Schreiterer, 2010). This is particularly relevant in those cases where political and diplomatic ties are weak or, even worse, have reached a standstill between antagonistic countries (The Royal Society & AAAS, 2010). What is more, science diplomacy is seen as an instrument of soft power (cf. Almeida Domingues & Ribeiro Neto, 2017; Nye, 1990, 2008) that aims to convey a national image. More specifically, it is assumed to draw on scientific networks and distinct reputations to ultimately exert (political) influence and improve international relations. Therefore, science diplomacy is regarded as a promising new paradigm for public policy, potentially even a new approach to the governance of spaces (such as the Arctic, see Bertelsen, 2018). These assumptions mirror the richness of themes and suppositions which are tied to the prevailing science diplomacy discourse. While science diplomacy has great potential as a vehicle for facilitating and improving international relations (although expectations may be somewhat over-optimistic), the contemporary debate on science diplomacy remains largely hypothetical and the concept is often used in an ambiguous way, mostly inspired by normative considerations.

In response, this study aims for a more tailor-made approach and positions science diplomacy as a distinct governmental response to international dynamics of cooperation and competition (Flink & Schreiterer, 2010; Ruffini, 2020a; Schütte, 2008), which are characteristic of the knowledge society (Välimaa & Hoffman, 2008). To explicate, governments find themselves increasingly exposed to and situated in these dynamics, while even system competition is assumed (Kuhlmann, 2008; Schütte, 2008). Given that natural resources are scarce, countries seek to secure their competitive

advantage and partake in international markets in the global knowledge economy (Zapp, 2022) and need to formulate responses to these goals (Chou & Ulnicane, 2015). These responses arguably also include science diplomacy. Pursuing this further, scholarly literature highlights the relevance of science, technology and innovation in securing societal growth and tackling broad societal challenges (Boon & Edler, 2018; Kuhlmann & Rip, 2018). What is more, knowledge (and its forms of production) are becoming increasingly international. This is because the topics themselves are increasingly global in nature (such as “*grand challenges*” (Keenan et al., 2012)), but shrinking spaces are also being encountered. More specifically an increased interconnectedness and interdependence can be observed among countries given their specialised knowledge or distinct research infrastructures.

Moreover, it is argued that science is becoming more and more global (Kwiek, 2021) and denationalisation of science is being encountered (Crawford, Shinn, & Sörlin, 1993). In a similar vein, the importance of science, also for other domains, has been highlighted (Drori, Meyer, Ramirez, & Schofer, 2002) in the sense that scholars argue for (an ongoing) scientific revolution and a race for knowledge (Schütte, 2008): for the “*century of science*” (J. J. W. Powell, Baker, & Fernandez, 2017). Expressions of this are seen, for instance, in increasingly internationalised environments in higher education and research domains (Huisman & van der Wende, 2005; van den Besselaar, Hemlin, & van der Weijden, 2012) but also in intensified international research collaborations (Ulnicane, 2021; Wagner & Leydesdorff, 2005), which aim for scholarly exchange and to produce new knowledge (Dusdal & Powell, 2021; J. J. W. Powell, 2018; Wuchty, Jones, & Uzzi, 2007) or international mobility patterns.

In line with these developments, governments are increasingly concerned with securing their positions in the competitive market and deploying different strategies to that end. Among the more specific responses to this are instruments which are intended to work within the system, such as research excellence policies (Cremonini, Horlings, & Hessels, 2018), while internationalisation is also being promoted as a way of attracting talent (Lepori, Seeber, & Bonaccorsi, 2015) or of entering new (emerging) markets. Science diplomacy can be situated as a governmental response alongside these forms of logic (Epping, 2020; Flink & Schreiterer, 2010; Ruffini, 2020a) as a way of creating capacity for the national (science) system, securing talent or gaining access to (emerging) markets. More specifically, it is seen as a way of promoting national branding and reputation which

aims to differentiate countries from other direct competitors in the global market (Flink & Schreiterer, 2010).

While science diplomacy can be positioned as a distinct governmental response to the dynamics of cooperation and competition, this has been studied to a lesser degree: science diplomacy scholarship is still in its infancy, and there is also a lack of empirical insights to supplement core claims or ways of working, which was pointed out at the beginning of this chapter (Epping, 2020; Ruffini, 2020b). This opens up distinct windows for research because for scholarly literature it seems to be most pressing to understand this phenomenon in more specific ways and beyond normative claims. To illustrate this, if science diplomacy is seen as a governmental response, it is relevant to generate an insight into how this translates into practice. More specifically, this links to several questions: What kind of distinct policy instruments are applied to that end? Moreover, do they advance scholarly understanding of specific tools which also aim to promote cooperation and competition? In which ways do they differ? What is more, given the normative claims which characterise the use of science diplomacy, it is relevant to identify the underlying new governance arrangements which are in place. More specifically, the analysis of science diplomacy might reveal an insight into new strategies that countries can adopt regarding their international positioning and also show if and how they deploy science to that end (in line with its core assumptions). These questions clearly advance scholarly understanding of governmental responses to competition and collaboration. In addition, they contribute to the conceptual understanding of the study of science diplomacy. The next section discusses the research focus and puts forward the leading questions.

1.1. Research Focus

This thesis¹ contributes to the body of knowledge on science diplomacy, which has to a large degree been identified as normatively coloured (Ruffini, 2020b; Rungius & Flink, 2020). To overcome this shortcoming and, nevertheless, find a meaningful way to analyse science diplomacy, this study adopts an instrument-centred perspective, which makes it possible to translate specific findings from case study analysis to the wider discourse

1 This thesis draws to a large extent on an earlier study by the author, see Epping (2020).

of science diplomacy and the dynamics of cooperation and competition. So far, scholarship has largely neglected to analyse the instruments of science diplomacy and their ways of working, which is notable given that policy instruments are (traditionally) viewed as techniques to implement governmental objectives (Howlett, 1991) and essential elements of public policy (Linder & Peters, 1989, p. 43). This thesis responds to this knowledge gap and analyses Science and Innovation Centres (SICs) in more detail. SICs constitute a distinct and underexplored institutional response in the governmental toolbox; however, they are increasingly being adopted by highly innovative countries². In essence, this work aims to gain an insight into why countries are increasingly adopting SICs as well as why and how organisational actors use these instruments. More specifically, this refers to key organisational stakeholders rather than individuals. Drawing on earlier contributions, this study defines a SIC as follows:

distinct unit or satellite institute which has been established in another country by a government and which operates at the nexus of higher education, research, innovation and diplomacy. SICs have further been characterised as operating within a network structure (cf. Epping, 2018, 2020).

Rather than taking a snapshot of an instrument, this thesis aims to conduct a longitudinal analysis to understand SICs from their emergence and their development over time, and to ultimately allow for a detailed, contextualised explanation of the current shape of SICs. This approach constitutes an advancement to present scholarship. A longitudinal analysis is seen to be beneficial as scholarly literature refers to a re-labelling of certain practices, which are not new in their essence, in favour of science diplomacy (Epping, 2020; Flink, 2020b; Ruffini, 2020a). In addition to understanding how SICs developed historically, a complementary element of this study aims to identify the perceived added value and the use of the instrument by key actors³. In other words, this work probes why actors participate in SICs, unpacking their differing rationales, which develops a distinctively

2 The Global Innovation Index (WIPO (2021)) ranks highly innovative countries. This ranking facilitates our understanding of innovative countries.

3 Please note, in this study the focus is not on individual actors but rather on organisations which participate in SICs.

actor-centred perspective on science diplomacy. These objectives translate into the following key research question:

How can the development and the institutionalisation of SICs as distinct policy instruments of science diplomacy be explained?

This question can be divided into four sub-questions which help to answer the main question:

- (1) What are SICs and how can they be characterised?
- (2) Why did SICs emerge and how have they developed since their genesis? How can the current model be explained?
- (3) Which actor groups are involved in SICs and what explains their participation?
- (4) How can the study of SICs be used to further understand and advance the concept of science diplomacy?

Therefore, this study positions itself in such a way that it generates an insight into SICs and more generally into the rising field of science diplomacy. The findings of this study allow us to further understand and advance the normatively coloured concept of science diplomacy by drawing on novel empirical insights, which have the potential to structure ongoing debates in more rigorously grounded and policy relevant terms. In addition, the findings shed light on a distinctly actor-centred perspective of science diplomacy and its governance. The design that this thesis applies is outlined in the next section.

1.2. Research Design

In light of the growing momentum of science diplomacy (also due to recent geopolitical events) and evidence of a (growing) isomorphic trend towards establishing SICs among highly innovative countries, this work is set up in an inductive and exploratory way. The analysis follows four distinct steps in order to investigate the overall research question: a) characterise SICs and propose a typology-building exercise, b) examine the (gradual and historical) institutionalisation of SICs, c) analyse stakeholders' use of SICs and d) contribute to the scholarship on science diplomacy. These steps are outlined in more detail in the following.

Firstly, characterisation of SICs according to their organisational set-up and method of operation is provided, which has so far constituted a gap

in scholarly literature. More specifically, a typology is developed which identifies three types of SICs and characterises them in an ideal-typical way to underline their distinctness: a) *the representational model*, which has an irreducible bureaucratic core and a way of operating that is largely determined by key stakeholders, b) *the service-oriented model*, which offers services and caters to the needs of stakeholders on an ad hoc contractual basis and also responds to market developments, c) *the policy-led model*, which is closely tied to political goals and primarily responds to these (political) needs. In fact, policy-led models are an integral part of a country's diplomatic representation and presumably operate within this (bureaucratic) framework. This typology structures the SIC landscape and serves as an entry point for further research. Furthermore, this thesis conducts an in-depth comparison of two SICs in their national contexts. The representational model and the service-oriented model have been selected for comparison. The German *Deutsche Wissenschafts- und Innovationshäuser* (DWIH) exemplifies the representational model and Switzerland's *Swissnex* embodies the service-oriented model. Both models constitute distinct cases in the SIC universe and provide an insight into the governance of science diplomacy and potentially reveal distinctly new structures. Studying a representational model and a service-oriented model enables a high level of innovation in the findings due to the network-based structures of these SIC types and their stronger detachment from political goals in comparison to the policy-led model. What is more, both SICs have established distinct organisational units, which largely operate outside the diplomatic umbrella (thus, they are less hierarchically organised) and are hybrid concepts in terms of their actors, themes and set-up. Therefore, studying these two cases can be expected to reveal a higher degree of institutional innovation. This ultimately generates novel insights into the governance of science diplomacy and enables unique patterns of interactions to be identified.

Secondly, these two case studies are subject to closer analysis. This thesis deploys a two-step heuristic framework based on the theoretical considerations of Lascoumes and Le Galès (2007), which helps to explain how SICs developed and institutionalised. This framework works as a structure for the empirical analysis and specifies the analytical path of this study. More specifically, a conceptual framework is modelled which traces the trajectory of the instruments, i.e., their careers over time within their national contexts (Lascoumes & Le Galès, 2004, 2007). This approach advances present scholarship because of its long-term and detailed approach. Specific aspects which deserve attention include contextual factors, the actors

involved, the discourses that accompanied the instruments' design and launch, and events which impacted the instruments' subsequent development (Lascoumes & Le Galès, 2007). The work of Lascoumes & Le Galès can be situated in the wider literature on policy instruments, while it also adopts a distinct understanding of policy instruments as institutions in a sociological sense. Specific implications derive from this understanding in the sense that instruments are defined as being carriers of meanings and norms which structure interactions and have the potential to reinforce institutionalisation dynamics. Moreover, the authors argue that instruments might develop a life of their own which differs from what was initially politically anticipated (Kassim & Le Galès, 2010). A strategy to account for this is the analysis of the long-term career of instruments. Hence, this framework can capture changing notions of science diplomacy as manifested in SICs and is able to evaluate whether re-labelling occurs. A complementary component of the framework argues for focusing on the use and interpretation of the instrument by key actors since their use of it is seen to reinforce institutionalisation dynamics and create distinct effects. In other words, the use of the instrument by key actors might create distinct (instrumentation) effects which might, in turn, promote institutionalisation dynamics (Lascoumes & Simard, 2011). This thesis hence contributes to scholarly literature on institutionalisation processes of (organisational) instruments.

Accordingly, as a third step, this study develops a distinctly actor-centred perspective on science diplomacy and analyses the way that SICs are used by their key actors. This helps to shed light on their interpretation of SICs and makes it possible to identify distinct effects and institutionalisation dynamics which might have impacted the development of the two instruments. To provide an understanding of how and why actors might use these instruments, this study mobilises the work of Ahrne and Brunsson (2005, 2008) on meta-organisations to the extent that it conceptualises considerations which explain why actors (i.e., organisations) agree to participate in collective action. Since SICs aim to foster collective action, these considerations constitute a meaningful entry point (leaving aside the question of whether SICs are themselves meta-organisations, which is not germane for the present study).

In the fourth step, the findings of these sections are merged to reflect on scholarship regarding science diplomacy. The study's instrument-centred approach enables the transfer of these key findings to the wider discourse

1. Introduction

and illuminates the governance of science diplomacy (actors, rationales and instruments) while developing a distinctly actor-centred perspective.

This study is set up in an inductive way to account for the novelty of the phenomenon. It draws on a combination of qualitative data sources (interviews and documents) to answer the main research question and create a rich and comprehensive data set, which informs the analysis. Expert interviews (Bogner & Menz, 2001), which gave scope to narrative elements (Bevir, 2006; Helfferich, 2011), inform this study, while documents (Bowen, 2009) are also used as a key source. These two sources facilitate tracing the instruments' development and provide an insight into stakeholders' rationales behind using SICs in an unprecedented way. The long-term focus and the nuanced analysis which will be provided in this study advance scholarship in this field, in particular the governance of science diplomacy. The use of these two data sources allows for triangulation (Flick, 2011) and is seen as a meaningful strategy to compensate for each other's limitations such as the availability of and access to data. The next section presents the thesis' structure.

1.3. Research Structure

In line with the research objective of explaining the development and the institutionalisation of SICs, as distinct instruments of science diplomacy, this study is structured as follows:

Chapter 2 provides an introduction to science diplomacy, the key topic of this study. Scholarly literature is critically reviewed to establish an in-depth understanding of the concept and to reveal how it is analytically framed. An attempt is made to define science diplomacy and identify the key assumptions that guide the concept. Furthermore, this chapter critically reflects on the prevailing use of science diplomacy as a concept. The discourse is characterised by weak empirical insights and normative colouring, which ultimately weaken the meaningfulness of the concept. In light of these shortcomings, a meaningful way to analyse science diplomacy is selected by focusing on a practical example, i.e., a selected instrument.

Chapter 3 introduces Science and Innovation Centres (SICs), the instrument which is central to this work. SICs are a distinct and novel policy instrument and are among the few institutional responses in the science diplomacy toolbox. Whilst SICs are notable and unique instruments, they are largely neglected in academic scholarship. A solid definition of SICs

is provided and is underpinned by a systematic comparison of SICs. Furthermore, an attempt is made to structure the observed empirical data by proposing a SIC typology. Three SIC models are classified in order to facilitate the analysis and study of this novel institutional development: service-oriented SICs, representational SICs and policy-led SICs. In the course of this study, two of these models (the service-oriented SIC and the representational SIC) are analysed in depth to provide a scholarly assessment of this novel instrument since the level of institutional innovation expected to be revealed by studying these models is considered to be higher.

Chapter 4 puts forward the conceptual framework, which facilitates the instrument-centred approach to the analysis of science diplomacy. The chapter develops the generic notions and key characteristics of policy instruments and specifically adopts an understanding of instruments as institutions in a sociological sense (Lascoumes & Le Galès, 2007). This understanding suggests a distinct analytical approach and provides a two-step heuristic framework: firstly, an analysis of the trajectory of the instruments i.e., their careers over time; secondly, the use of the instrument by key actors and the distinct effects, known as instrumentation effects, this creates. These effects consolidate and institutionalise the instruments and hence provide a valuable way of understanding the development and institutionalisation of SICs as distinct science diplomacy instruments. This conceptual framework mobilises the theoretical considerations of meta-organisations in a selective way to facilitate the development of a distinctly actor-centred perspective (leaving aside the question of whether SICs are themselves meta-organisations, which is not germane for this study).

Chapter 5 specifies the methodological choices that are made. Due to the comparatively weak empirical basis and normative colouring of much previous work, this study follows inductive and exploratory logic, which allows for the detailed comparative analysis of two meaningful SICs in more detail (a service-oriented SIC and a representational SIC). Interviews and documents serve as the main sources that generate evidence.

Chapters 6–11 present the two case studies. *Chapters 6–8* describe the results and insights into the representational SIC (German case study: DWIH). First, the DWIH network is introduced, which is followed by an analysis of the DWIH's trajectory and its appropriation by key actors. *Chapters 9–11* provide the empirical material for the service-oriented SIC (the Swiss case study: Swissnex). First, Swissnex is introduced, followed by an analysis of its trajectory and its appropriation by key actors.

1. Introduction

Chapter 12 merges the empirical cases and provides a comparative analysis in line with the conceptual architecture that guides this study. The comparative analysis reveals key factors which explain the development of SICs in their respective settings and their current forms. In addition, the appropriation of the SICs by their key actors is discussed comparatively. This sheds light on the aspect of instrumentation, which has also been identified as critical in explaining the shape of SICs.

Finally, *Chapter 13* presents the overall conclusions of the study. It completes the circle of the instrument-centred approach by applying the key findings of this study to the wider science diplomacy discourse. Drawing on the findings of this study, conceptual refinements to the notions of science diplomacy are suggested. Most prominently, it is argued that science diplomacy must be understood in its national context, as this explains the shape that science diplomacy instruments may take or the actors which can be classified as actors of science diplomacy. Furthermore, this chapter summarises this study's contributions to scholarly literature and identifies the limitations that were encountered. Finally, suggestions are made regarding distinct avenues for further research to advance the science diplomacy discourse and the body of knowledge on SICs.

2. Science Diplomacy Is en Vogue

This chapter provides an introduction to science diplomacy, the key topic of this study, by critically reviewing literature on the subject to establish an in-depth understanding of the concept and identify how it is analytically framed. This helps to identify gaps in the literature and creates an entry point for this work. This chapter first traces the development of the notion of science diplomacy as it stands (section 2.1). Next, there is an attempt to define science diplomacy and identify the key assumptions that guide the concept. In addition, the widespread contemporary use of this instrument is outlined, thereby revealing that it draws strongly on normative claims (section 2.2). Furthermore, to shed light on the governance of science diplomacy, this chapter unveils key actors in science diplomacy (section 2.3) and their rationales behind adopting this concept (section 2.4), as well as the governmental toolbox used to accommodate science diplomacy (section 2.5). In combination, these three aspects characterise and focus attention on the body of knowledge on the governance of science diplomacy, while also identifying its limits and blind spots. Finally, this chapter critically reflects on the prevailing use of science diplomacy as a concept (section 2.6). The main points of critique relate to the lack of empirical evidence for its claims and boundary aspects. As a consequence, the discourse seems to be normatively coloured and ultimately weakens the meaningfulness of the concept. In conclusion, this chapter underpins the current science diplomacy discourse; despite identifying apparent weaknesses, it proposes a meaningful way to analyse science diplomacy by focusing on a practical example, i.e., a selected instrument.

2.1. Science Diplomacy and the Obama Administration

In recent years, the notion of science diplomacy has increasingly gained momentum. Drawing on science and diplomacy as two distinct elements⁴,

4 Diplomacy is defined as follows: “Diplomacy at its essence is the conduct of relationships, using peaceful means, by and among international actors, at least one of whom is usually governmental” (Cooper, Heine and Thakur (2013, p. 2)).

this concept is commonly considered a distinct governmental approach based on the assumption that the potential of science to be a vehicle to facilitate international relations is unrealised or under-realised (Flink & Ruffin, 2019), although these two domains seem to have “*have very different dynamics*” (Wagner, 2002, p. 409). The current discourse on science diplomacy appears to be strongly connected to the Obama administration in the USA in 2008/2009. Different sources point to Barack Obama’s famous Cairo speech (he was President at that time), which called for a range of measures to strengthen the *science in diplomacy* (Alberts, 2010; Burkhalter, D., 2010; Turekian, 2018). This event is commonly considered to have set the ball rolling and signalled the dawn of science diplomacy discourse as it stands⁵. Although, this interconnectedness of science and foreign affairs is not entirely new (see section 2.2.3, and cf. Turchetti, 2020), the Obama administration seemed to have triggered a process that reinvented this mutually beneficial relationship and enabled science diplomacy to gain momentum.

In response, a body of literature evolved at that time which mirrored these assumptions (although systematic accounts on reconstructing the development of the term are missing from scholarly literature, apart from the work by Ruffini (2017)⁶). One of the first contributions that explicitly refers to science diplomacy stems from Lord and Turekian (2007, p. 769). While the authors do not explicitly define science diplomacy, they refer to the pivotal role of science and technology as a) an asset to national development and b) responding to global competition. Furthermore, the authors elaborate that science diplomacy has always played a role in US foreign policy. Responding to a certain global scepticism towards US (foreign policy and) governmental institutions, the authors consider science to be a useful vehicle since “*science is, and should remain, outside the realm of politics*” (2007, *ibid.*). What is more, they argue that “[s]cientists are among America’s most effective diplomats” (2007, *ibid.*). Accordingly, science diplomacy is seen as a meaningful tool with which to contribute to image-building that improves the international perception of the USA.

5 The interconnectedness of science and foreign affairs is, however, not entirely new. On the contrary, it has proven to be a distinct element, for instance during the Cold War era; science became a key asset for foreign affairs, both despite and because of immense diplomatic tensions, certain instances of scientific cooperation were maintained to keep channels of dialogue in international relations open (cf. Turchetti (2020)).

6 For illustration purposes, see the Google insight developments for the term *science diplomacy* published by T. C. Wang (2013, p. 3).

In a later text, the authors reaffirm these objectives and define science diplomacy as “*scientific cooperation and engagement with the explicit intent of building positive relationships with foreign governments and societies*” (Lord & Turekian, 2009). The potential of science diplomacy is harnessed because science “*provides the common language to build bridges between cultures*” (Fedoroff, 2009, p. 10).

These early contributions set the scene for the notion of science diplomacy to develop and consider it to be a useful tool which serves as a bridge-building element and facilitates the initiation and maintenance of international partnerships. Besides fostering international cooperation, Fedoroff (2009) explicitly assigns a decisive role to science diplomacy in tackling global challenges, i.e., problems of the 21st century. To some extent, this constitutes, a shift in or a broadening of the concept from initial objectives, such as image-building, to tackling global challenges. In 2010, the discourse on science diplomacy was consolidated due to the potential of science diplomacy. The American Association for the Advancement of Science (AAAS) and the Royal Society took a systematic approach to advancing and structuring this emerging notion; they provided a cohesive definition and conceptualisation of science diplomacy that (still) serves as a “*landmark*” (Van Langenhove, 2016, 2017) in the study of science diplomacy and which will be introduced in the next section.

2.2. Definitions

2.2.1. Conceptualisation by the Royal Society and AAAS

In an attempt to systematise activities at the intersection of science and diplomacy (although they were not new), the Royal Society and the AAAS (2009; 2010) developed a science diplomacy triad. In essence, this triad aims to conceptualise science diplomacy activities, which are understood as “*the symbiosis between the interests and motivations of the scientific and foreign policy communities*” (The Royal Society & AAAS, 2010, p. vi). This triad still serves as a sine qua non starting point in the conceptualisation of science diplomacy among scholars and practitioners alike. In fact, since 2010, almost every contribution to this debate has referred to this triad as a point of departure and has applied its basic characteristics when categorising science diplomacy activities. Three dimensions were proposed,

which describe and classify interaction between science and diplomacy and which are typically viewed as *science diplomacy*: science in diplomacy, diplomacy for science and science for diplomacy activities (The Royal Society & AAAS, 2010):

- *Science in diplomacy* is understood as providing scientific advice in relation to foreign policy. More specifically, this comprises the provision of up-to-date scientific information to allow for better-informed policy-making. National academies are viewed as playing a significant role in this process.
- *Diplomacy for science* involves facilitating and promoting international research and science cooperation; this encompasses strategic top-down and bottom-up approaches, which in essence draw on the idea that science has bridge-building characteristics. A prominent example of such a (joint) strategic international endeavour is the establishment of large-scale research infrastructures, such as the Large Hadron Collider at the European Organization for Nuclear Research (CERN)^{7 8 9}.
- *Science for diplomacy* assumes that science increases potential impact and operates as an element of soft power in international relations, as characterised by Nye (2008). This potential is particularly realised in those situations where traditional diplomacy tools, such as negotiating (Constantinou & Sharp, 2016, p. 14), have reached a standstill. Soft power, in relation to science for diplomacy, relies on “*its attractiveness and influence both as a national asset, and as a universal activity that transcends national interests*” (The Royal Society & AAAS, 2010, p. 11). Due to its neutral and non-political character, science can function as a tool for soft power¹⁰, which, “*if aligned with wider foreign policy goals [...] can contribute to coalition-building and conflict resolution*” (ibid.).

7 For an overview of the development of CERN, see Strasser (2009).

8 Large-scale research infrastructures are a distinct case in academic scholarship given the involvement of multiple countries. For more information, see Cramer and Halonsten (2020).

9 A more recent example, which is also subsumed under the diplomacy for science category, is the *SESAME* project (Synchrotron-light for Experimental Science and Applications in the Middle East). It was designed to promote international collaboration between countries that have a history characterised by conflicts. *SESAME* is often viewed as a response that aims to overcome these tensions. For more information, see Rungius (2020).

10 Although this is a key assumption, which drives science diplomacy dialogue and reflects a Mertonian understanding of science (see Merton (1974)), this neutrality is

Whilst the potential of science in foreign affairs is acknowledged, politicisation of science should be avoided (The Royal Society & AAAS, 2010, p. 15)¹¹. Despite their contributions to structuring and thus advancing the field of science diplomacy, the analytical sharpness of the three dimensions is contested (and has not significantly progressed during evolving scholarly discourse). While this typology provides a structure to describe certain activities, it lacks precision. To give an example, there is no specification of the extent to which science in diplomacy differs from other forms of scientific advice to policy-makers (cf. Maasen & Weingart, 2005a, 2005b)¹². It remains unclear which conditions are required for such scientific advice to be considered science diplomacy. Another aspect relates to the inclusion of individual international scientific cooperation as being an explicit science diplomacy activity, subsumed by the science for diplomacy dimension.

Again, the question of boundaries is relevant: is any kind of international scientific cooperation automatically an expression of science diplomacy? More specifically, this raises questions regarding intentionality and strategic action: Is science diplomacy intentional or a by-product and does it ultimately respond to a wider (national) agenda? Is a degree of diplomacy/foreign affairs/policy involvement necessary in order to label an activity as science diplomacy? These considerations are raised again in a further question: Who are the actors of (modern) diplomacy¹³ and what is the role of politics? Finally, it seems that diplomacy for science activities and

contested and relates to debate on the very altruistic understanding of science and its governance. While science is primarily driven by *Erkenntnisgewinn* (i.e. generating new knowledge) and academic freedom (Altbach (2001)), a certain degree of politicisation, in terms of specifying the framework conditions, cannot be out ruled (cf. Mayntz (1996); D. Braun (1993); Sartori (1960)). This is evident, for instance, in increased competitive third-party research funding (Hornbostel (2001); Gläser and Velarde (2018)) or the definition of thematic, societally relevant research priorities. Therefore, the assumption of the neutrality of science is contested (Ball (2021)). Despite this, contributions to this debate, such as Strasser (2009), show how Switzerland managed to neutralise (i.e. depoliticise) scientific institutions such as CERN.

- 11 This is a sensitive issue within the scientific community and there are some scholars who oppose the 'instrumentalisation' of their cooperation for political purposes (cf. Fähnrich (2015); Moro-Martín (2017)). This seems to be a question of boundaries and definitions: where does instrumentalisation begin and where are its limits?
- 12 The pivotal role of scientific expertise in international negotiations has, for instance, been pointed out by Skodvin (1994) and labelled as scientific diplomacy.
- 13 While some (practitioner-driven) scholarship assigns a great potential to scientists as diplomats (cf. Melchor (2020)), other scholars view this development critically, since diplomats have distinct skills and training, a certain habitus, that scientists do not typically possess (cf. Kaplan (2011)).

science in diplomacy activities impact each other, although this is not conceptualised in the framework. It can be assumed that, in order to increase their impact, diplomacy for science activities have not been carried out in a vacuum but were preceded by interaction within the scientific realm (which again suggests that science in diplomacy has taken place). The frequent use of the AAAS and Royal Society's definition of science diplomacy can be seen to reflect the success of this definition, at least in terms of classifying activities. Yet, for analytical purposes, it is vital to acknowledge the limitations of this framework and its potential pitfalls.

2.2.2. Contemporary Understanding of Science Diplomacy

Since 2010, inspired by the AAAS and Royal Society definition, the body of literature on science diplomacy has mushroomed and an increasing number of countries have jumped on the bandwagon and directed their attention towards science diplomacy activities (cf. Flink & Schreiterer, 2010; Turekian & Wang, 2012)¹⁴. As a response, new, and at times divergent, interpretations of science diplomacy emerged¹⁵. While science diplomacy is, in line with the AAAS and Royal Society, defined as “*the ways in which countries incorporate science into their foreign policy*” (Turekian & Wang, 2012, p. 4), other interpretations have emphasised the role of international positing and national branding¹⁶: “*the process by which states represent themselves and their interests in the international arena when it comes to areas of knowledge—their acquisition, utilization and communication—acquired by the scientific method*” (Turekian et al., 2015, p. 4). Compared to

14 To illustrate this, countries which adopted this approach early on include: Canada (cf. Copeland (2015, 2011)), France (Directorate-General of Global Affairs, Development and Partnerships (2013)), Germany (cf. Schütte (2006); Stiftung Wissenschaft und Politik and Alexander von Humboldt Stiftung (2007)), Spain (Government of Spain (2016)), Switzerland (cf. Cassis, I. (2019); Schlegel, Jacot, and Fetscherin (2011)), the United Kingdom (cf. Swire (2014)), to name a few. In addition, the European Union focused on this topic (cf. Moedas (01.06.15, 2016)) and funded three main research projects in this field. While these countries constitute the Global North, this topic also emerged in countries that are considered as belonging to the Global South, such as Brazil (cf. Almeida Domingues and Ribeiro Neto (2017); Ferreira and Oliveira (2020)), as well as in India, Pakistan and Iran (for an overview, see the *Science & Diplomacy* online volumes).

15 Witjes and Sigl (2015) even hypothesise that a new policy field is evolving at the intersection of research policy and foreign affairs.

16 See Raev and Minkman (2020), on branding as a tool for science diplomacy.

international science cooperation, science diplomacy should have an influencing and altering effect. In the view of Wang (2013, p. 5), “*the motivation for Science Diplomacy is to affect relationships*”.

Another recent yet less prominent attempt to structure, categorise and explain a country’s science diplomacy activities stems from Gluckman et al. and aims to advance prevailing typologies. The authors suggest distinguishing between science diplomacy activities according to their key rationales and focal activities. Three categories are revealed to that end: activities that focus on (1) a country’s domestic needs, (2) cross-border activities and (3) activities that are directed towards tackling global challenges (Gluckmann, Turekian, Grimes, & Kishi, 2017, p. 3). Gluckman et al. stress that engaging in science diplomacy activities must be understood as aiming to advance national interests (cf. Epping, 2020). In a similar vein, science diplomacy has also been defined

“as a multi-faceted series of processes and outcomes that bring science and diplomacy together in ways that recognize and seek to enhance the internationalized and collaborative nature of science and do so by engaging a wide range of science, policy, and non-governmental actors” (Sabzalieva, Sá, Martinez, & Kachynska, 2021, p. 152).

This quote summarises the dual aspirations of science diplomacy: to promote and enhance scientific collaboration, while also using science as a deliberate tool for international positioning. In other words, science diplomacy considers scientific collaboration to be a relevant vehicle and a non-traditional channel of communication that creates a novel path for diplomacy if political ties are weak (Flink & Schreiterer, 2010). The main discourse relies on the assumption that science is a universal language, that it draws on established and accepted methods and common objects of investigation, which are increasingly of a global nature, such as global warming (Fedoroff, 2009; Milkoreit, 2015; The Royal Society & AAAS, 2010). In even stronger terms, it is assumed that science diplomacy can facilitate relations between countries which have an otherwise antagonistic relationship and that it can build bridges when other channels of communication remain closed (Flink & Schreiterer, 2010; Hajjar, 2016; Turekian & Neureiter, 2012; Goodsite et al., 2016;).

Science diplomacy thus has the potential to improve international relations and might also revive traditional diplomatic practices that have run dry (Lord & Turekian, 2007) by facilitating (individual and structural)

science cooperation. The latter assumption in particular is coupled with the idea that science diplomacy has the ability to operate as an element of soft power (Nye, 2008; The Royal Society & AAAS, 2010). Consequently, some scholars suggest viewing science diplomacy as an explicit element of public diplomacy (Copeland, 2011; Fähnrich, 2013; Lord & Turekian, 2007)¹⁷. Various (advocacy) sources have claimed that scientists and scientific cooperation can have transformative powers and deescalate situations in highly politicised fields, as well as pave the way for (political) relations in pre-political spaces (Goodsite et al., 2016; Keerawella, 2016). This line of argument serves as the dominant explanatory pattern in the use of science diplomacy and appears to be its driving force¹⁸. Additionally, science diplomacy refers to scientific advice as being crucial in the contemporary world and as informing foreign affairs, while also presenting a new form of governance to tackle common global challenges and transmit shared values, such as academic freedom.

In line with these (normative) assumptions, notions of science diplomacy have found their way into a range of different fields;¹⁹ these include tackling the huge challenges of climate change (Milkoreit, 2015; Ruffini, 2018), arctic governance (Berkman, Lang, Michael, A., Walton, & Young, Oran, R., 2011; Goodsite et al., 2016) and the governance of the internet (Mansell, 2018). More recently, science diplomacy was considered crucial to managing the Covid-19 pandemic and there was a focus on intense exchange between scientists and policy-makers and the way that scientific insights informed the implementation of specific measures. One could even argue that the Covid-19 pandemic constituted an exogenous shock for science diplomacy since it highlighted the role of science to politics in an unprecedented way. (However, to play devil's advocate, this has also raised questions about its differences from other forms of scientific policy advice).

The widespread use of the notion of scientific diplomacy has led to increased reflection and discourse on the demarcation of science diplomacy

17 Public diplomacy is thereby understood to address “*the general public in foreign societies*” (Melissen (2005, p. 5)) with the aim of “*resolving international difficulties peacefully*” (ibid.). This quote reflects a mere glimpse of the complexity of prevailing discussions surrounding public diplomacy. Further scholarly contributions to the extensive and complex debate on this multifaceted phenomenon can be found in Melissen (2005b), Gilboa (2008), Gregory (2008) and J. Wang (2006).

18 Without being too detailed at this stage (see section 13.5 for a more elaborated discussion), this normative view has been strongly shaken up and disrupted by recent geopolitical events as a result of the Ukraine–Russia conflict (February 2022).

19 Davis & Patman (2015) provide an overview of other fields of application.

in relation to a range of different fields. What is more, recent geopolitical events can be seen as constituting an exogenous shock to the functioning of science diplomacy: they acted as a caesura for the concept's promises (cf. Schütte, 2022) (see also section 13.5). More specifically, the role of science diplomacy needs to be critically examined and possibly newly defined (by governments and their key actors). This relates to the limits and possibilities of science diplomacy activities as well as considering whether there need to be minimum conditions for science diplomacy to operate (institutionally). Apart from these conceptual implications, it remains to be seen whether these geopolitical events will also have financial implications for science diplomacy activities. Given increased public spending on hard power, the question arises of how (soft power) science diplomacy activities will be evaluated in this light.

2.2.3. The Long History of Science Diplomacy

The previous sections have demonstrated how the current understanding of science diplomacy developed and how this term is a new label that has been applied to practices which are by no means new (Ruffini, 2020a). In the past, the practice of science diplomacy, i.e., the interplay between science and foreign affairs, has in fact been intensely interwoven with countries' histories and foreign affairs. To illustrate this, advancements in science (and technology) have been intertwined with international politics, as manifested in the Cold War era (Turchetti, 2020). The Cold War was particularly characterised by a race for technological advances alongside ideological clashes, which impacted both national and foreign policies. In retrospect, Turchetti (2020) considers these developments to be science diplomacy and, more specifically, also wartime diplomacy. In addition, scholarly literature has drawn attention to the role that science has played in international affairs. Skodvin (1994) examined the pivotal role of scientific expertise in international negotiations drawing on the example of climate change; she refers to "*scientific diplomacy*" and reaffirms the crucial role of scientific advisory bodies in international politics.

Similar examples of interactions between science and (foreign) policy can be found in the work of Adamson and Lalli (2021), who apply a

2. Science Diplomacy Is en Vogue

historical perspective²⁰. Hence, the interaction between matters of science and technology and foreign affairs has a long tradition in terms of establishing frameworks for scientific activity (Wagner, 2002), providing expertise (Skodvin, 1994) or serving as a bridging element, as in the case of the Cold War. Some studies suggest that since the Cold War era, scientists role in and ability to influence foreign affairs has diminished (Skolnikoff, 2001); however, other research highlights the recent pivotal role of science and technology in the light of globalisation trends (Stein, 2002), and the rise of new communication technologies (C. Weiss, 2005). Wagner (2002, p. 409) supports this argument: “*Science represents a potentially powerful tool for improving international relations, and learning to use it may benefit both science and international affairs.*” Hence, what is now considered to be science diplomacy did not emerge in a vacuum but instead has its roots in a tradition of science and foreign affairs interaction. However, this discourse seems to have been revitalised by the Obama administration.

2.3. Science Diplomacy Actors

Now that the prevailing understanding of science diplomacy has been outlined, attention should be paid to the actors of science diplomacy and their rationales. The previous section identified two key actor groups: governments and scientists. However, scholarly literature suggests that the scope of actors is wider: “*today, science diplomacy occurs via a fragmented, complex and networked cast of non-state actors, agencies and institutions*” (Legrand & Stone, 2018, p. 394). This is confirmed by Fähnrich, who characterises science diplomacy as being shaped by “*a complex interplay of government, academia, and other societal actors*” (2015, p. 1), while other sources refer generally to a broad array of actors (Sabzalieva et al., 2021). More specifically, there are references to traditional governmental actors in the realm of foreign policy²¹, such as ministries of foreign affairs. Flink (2009, p. 69) explicitly acknowledges that science diplomacy refers to foreign affairs governmental action in relation to science, research and development that is conducted by ministries of education and research, as well as ministries of foreign affairs. Thereby, science diplomacy is aligned

20 There are also studies which claim that science diplomacy dates back to the early 18th century (cf. Özkaragöz Dogan (2015)).

21 For more information, please see Axworthy (2013).

with purposive governmental action and refers to a multitude of goals and areas of activity, which sometimes even contradict each other (*ibid.*). Flink (2009) also suggests that a broader definition of actors would include intermediary organisations that act on behalf of ministries.

In the past, academies of science were also identified as actors in science diplomacy (cf. AAAS Center for Science Diplomacy, 2009; Hassan, ter Meulen, McGrath, & Fears, 2015; The Royal Society & AAAS, 2010), thus emphasising their role of providing scientific advice to policy-makers and international research organisations. What is more, academies of science were viewed as nuclei for science diplomacy (Quevedo, 2013). In line with the definition of the AAAS and the Royal Society, other sources have expanded the scope of actors of science diplomacy to include non-traditional actors of diplomacy (cf. Cooper et al., 2013), such as individual scientists (cf. Carosso, Ferreira, & Mostajo-Radji, 2019; Fähnrich, 2015; Melchor, 2020); this idea has been contested since it raises the question of intentionality and the capability of an individual scientist to act on behalf of a state or, in other words, to be an agent operating in the national interests. This leads to further questions about how far scientists can (and wish to) operate according to a political agenda (cf. Van Langenhove, 2017)²² and whether or not they consider themselves to be agents of science diplomacy. Despite a proliferation of actors on the science diplomacy stage, traditional diplomacy scholars (Cooper et al., 2013) would be critical of this since they argue that individuals and members of civil society cannot be considered diplomats due to their lack of specific skills.

In a broader context, considering who should be regarded as actors of science diplomacy raises several conceptual questions that remain largely unanswered: Who do policy-makers consider to be actors of science diplomacy? Do these actors consider themselves to be actors of science diplomacy? Have they internalised this role? Or are there discrepancies in how such roles are viewed? Furthermore, there are questions about how non-state actors regard science diplomacy (individual understanding vs. political/national understanding) and whether these approaches converge

22 Van Langenhove (2017) distinguishes between explicit and implicit science diplomacy to grasp this complex and fluid concept. In doing so, he argues that only explicit forms should be regarded as science diplomacy rather than sporadic exchange outside interaction frameworks. Explicit science diplomacy encompasses activities and policies which are labelled by the actors themselves as science diplomacy or as diplomatic practices involving foreign affairs and science and technology policies.

2. Science Diplomacy Is en Vogue

in a coherent (national) science diplomacy strategy (and whether there is even a need for a coherent strategy)²³. These questions exemplify the potential implications of defining non-state actors. It has been observed, for instance, that science diplomacy definitions vary between actors in a national policy context (Flink, 2020b), which is reflected in the use of different framings (Schütte, 2007). To sum up, scholarly literature points to a range of stakeholders who may be key actors in science diplomacy, despite the fact that the criteria that qualify non-state actors as being actors of science diplomacy are rather vague. In addition, the rationales for non-state actors participating in science diplomacy have not yet been fully explored, except for the perspective of individual scholars (Fähnrich, 2013, 2015). This gap in scholarly research thus merits further study to explore and develop a distinctively actor-centred perspective on science diplomacy.

2.4. Rationales for Countries to Engage in Science Diplomacy

While there are few insights into the rationales for actors to participate in science diplomacy, scholarly literature sheds more light on the considerations that drive countries to engage in science diplomacy: national considerations constitute the principal motivation (Epping, 2020; Flink & Schreiterer, 2010; Gluckmann et al., 2017). More specifically, three goals that drive a country's science diplomacy activities have been identified²⁴ (Flink & Schreiterer, 2010, pp. 669–670):

- *Access* to resources in order to raise national capacities,
- *Promotion* of research and development attainments, i.e., national marketing in order to attract talent and therefore ensure high performance of national research and innovation systems,
- *Influence* on other political leaders, as well as public opinion.

Other authors propose slight adaptations to these rationales. For example, van Langenhove (2017, p. 9) refers to the different motivations for countries

23 Drawing on Schütte (2010), this constitutes a distinct characteristic of a successful science diplomacy strategy: a common understanding among all relevant actors that results in joint action.

24 These findings are largely based on empirical evidence gathered by looking at the Global North, i.e., developed countries. However, science diplomacy has also become a leading paradigm in politics in the Global South (Ferreira and Oliveira (2020)), which requires a reassessment of these rationales.

to engage in science diplomacy as: *attraction and access, cooperation, promotion and influencing*—this differs only to a marginal degree from the previous distinction. Attraction and access also aim to increase national capacities and attract foreign talent. Cooperation aims to foster international collaboration between researchers and establish joint research outputs. Finally, promotion and influence aim to influence public opinion and/or decision-makers. There is a widespread assumption (in practitioners' literature) that science diplomacy activities create a win-win situation. Science for diplomacy is praised for "*its attractiveness and influence both as a national asset, and as a universal activity that transcends national interests*" (The Royal Society & AAAS, 2010, p. 11), thereby affirming its soft power role.

The idea of transcending national interests is also reinforced since science diplomacy activities are often considered to be tackling global challenges. This understanding, however, has increasingly been challenged in recent studies and considers only one side of the argument (Epping, 2020; Ruffini, 2020a). Ruffini (2020a), for example, locates science diplomacy activities between the poles of collaboration and competition and asserts the national dimension as being the dominant focus. He argues that while science diplomacy may on the one hand tackle (global) challenges, it must on the other hand be considered to clearly advance national interests. From a more empirical perspective, science diplomacy strategies can be considered to deal increasingly with transnational norms and values, and to promote values such as academic freedom (cf. Auswärtiges Amt, 2020c) (see also section 8.1.4).

2.5. The Science Diplomacy Toolbox

When it comes to governmental instruments in the science diplomacy toolbox, the picture is less distinct. As with the definitions of science diplomacy, the range of instruments that are considered to be instruments of science diplomacy have mushroomed in recent years. While previous taxonomies (Gluckmann et al., 2017; The Royal Society & AAAS, 2010) might serve as an element to also structure governmental instruments, attention should be paid to whether individual instruments are directed towards science diplomacy, or whether a holistic approach is followed. While the former seems rather selective, the latter points to a new policy initiative that is designed to approach science diplomacy strategically, thereby relying

on a mix of instruments (Epping, 2020). Scholarly literature refers to several instruments in the toolbox that are at the disposal of governments, although not all of them are new. For example, mobility grants, programmes facilitating research cooperation or measures to improve technology transfer and country promotion are all viewed as distinct tools (Flink, 2009). In a similar vein, bi- and multilateral (cooperation) agreements (Sabzalieva et al., 2021) that facilitate exchange between host and home countries or selected funding programmes (cf. Fähnrich, 2013), as well as science and technology agreements, have been referred to as instruments in the toolbox (Rüffin & Schreiterer, 2017a).

While these instruments are largely financial ones, which offer incentives to the academic community, countries also draw on institutionalised responses. As mentioned earlier, large-scale research infrastructures and projects, such as CERN and SESAME, are intended to bring together scientists from different countries to advance their fields of knowledge by creating a distinct organisation. Such institutions are often considered to be instruments of science diplomacy par excellence (Dohjoka, Campbell, & Hill, 2017; Rungius, 2020; UNESCO, 2021). In addition, new positions have been created within governments; for example, in 2021, Switzerland appointed a representative for science diplomacy (*Sonderbeauftragter für Science Diplomacy*) (FDFA, 2021), and Germany created a similar post (*Außenwissenschaftsbeauftragter*) even earlier in the 2010s. There have also been other unique national and institutionalised responses to science diplomacy, such as dedicated posts at the diplomatic representations, such as science attachés or, more recently, innovation attachés (this will be discussed further in chapter 3) (Flink & Schreiterer, 2010). In addition, new units have been created at the nexus of science, innovation and diplomacy, such as the Science and Innovation Centres (SICs) that are central to this research and which will be introduced in more detail in the next chapter (Epping, 2020). Lastly, awards have been granted for special science diplomacy activities, as in the case of Germany (BMBF, 2020a). The list of instruments could be expanded. As Flink and Schreiterer point out, there is no “one size fits all” approach to science diplomacy (2010, p. 675); instead a mixed picture emerges of approaches and instruments deployed by different countries.

The list of instruments, however, does not include lines of demarcation or a refined analysis (exceptions are the works by Epping, 2020; Sabzalieva et al., 2021). Boundary aspects are significant, and it is essential to ascertain what makes such science diplomacy instruments unique, for example, in

comparison to instruments that facilitate internationalisation efforts (cf. (De Wit, Hunter, Howard, & Egron-Polak, 2015; Huisman & van der Wende, 2005). With regard to science diplomacy instruments, the following questions remain open: Is it the strategic focus that makes such instruments unique? Or is it the actors involved, or the alignment towards wider science diplomacy goals? Are these instruments indeed novel and meaningful strategic (science diplomacy) instruments? It is particularly vital to consider these questions in relation to the practice of re-labelling certain activities to demonstrate responsiveness and engagement (cf. Epping, 2020; Flink, 2020b), rather than designing something new. In other words, although instruments might be labelled as science diplomacy, a substantial number of them are not new (in terms of their form and design); they may instead be subject to new framing. Scholarly literature, however, often seems to turn a blind eye to this aspect and provides few answers to the above questions. This ultimately calls for a clearer definition of instruments of science diplomacy to strengthen the body of knowledge on this concept and prevent it from losing its distinctness.

2.6. Challenges to Science Diplomacy Research

While the notion of science diplomacy has experienced a stellar rise among policy-makers and practitioners over the past 10 years, there are three key interconnected challenges regarding this concept, which have been partially addressed earlier in this chapter. To start with, although the previous sections might suggest otherwise, science diplomacy has not received widespread attention from academic scholarship. While an epistemic community seems to have formed around the study of science diplomacy, the notion has largely been driven by a strong advocacy group, which promotes a normatively coloured view of science diplomacy due to the lack of empirical evidence. For example, the majority of contributions to science diplomacy discourse opt for, what Sending et al. consider to be, an “*explanation by naming*” approach (2011, p. 534); this is a typical pattern of new forms of diplomacy; however, it is a misleading one. Sending et al. elaborate that for the study of (seemingly) new forms of diplomacy²⁵, solid analytical categories are needed to capture change compared to traditional

25 For an overview of new forms of diplomacy, see the work by Constantinou, Kerr, and Sharp (2016).

diplomacy as opposed to “*hanging the causal story to be told*” (ibid.). However, there appears to be a lack of analytical studies in academic scholarship on science diplomacy, as illustrated earlier regarding questions of actors and instruments; instead, there is a focus on an explanation by naming approach.

Notwithstanding the promising role that science can play in international relations, the vast majority of literature on science diplomacy parrots the leading narrative that science serves as a panacea to daily and international politics, although this is largely decoupled from empirical evidence. Accordingly, this discourse and body of knowledge has not advanced in an academic sense. There is, for the most part, a lack of solid conceptualisation, theoretical embeddedness (drawing on neighbouring fields and concepts) and robust empirical insights outlining explanatory mechanisms (Aukes, Ordonez-Matamoros, & Kuhlmann, 2019, pp. 829–830). Therefore, there is no element of predictability tied to science diplomacy discourse. Most literature only refers to the workings of science diplomacy in retrospective terms and there is a tendency to label situations as successful science diplomacy in hindsight. These retrospective contributions hence lack analytical depth and fail to identify explanatory factors and patterns to show how science diplomacy might function as an element that reduces conflict. Accordingly, the mechanisms associated with successful science diplomacy remain undisclosed.

Given the lack of critical attention that scholarly literature pays to science diplomacy²⁶ for many practitioners, the mere existence of this discourse seems to provide legitimacy. Science diplomacy appears to have become self-referential within the (practitioner) community since it creates a certain (cognitive) understanding and transmits an explanatory framework

26 There are limited critical discussions on the notion of science diplomacy. The works by Darby (2015) and Smith III (2014) are among the few publications that engage more critically with this topic, in addition to Flink (2020a); Epping (2020); Ruffini (2020b). Smith III argues that in scholarly literature, “*science diplomacy is assumed to be at worst ineffective but never harmful*” (Smith III 2014, p. 828). He critically assesses the conflict over NAMRU-2 (NAMRU-2 refers to the US Naval Medical Research Unit that was stationed in Indonesia and accused of espionage) and demonstrates in his case study that science diplomacy efforts can also backfire and lead to new conflict situations. This aspect is, however, largely neglected in scholarly literature as science diplomacy is generally assumed to be a win-win situation. Smith III considers “*strategic communication and exchange [...] elite influence and material incentives*” (p.825) to be crucial accompanying factors for a successful science diplomacy strategy.

that actors seemingly adhere to. Thus, the concept is normatively coloured, and characterised by a “*fervid perspective*” (Leese, 2018, p. 49); its prospects seem to spur the discourse and may explain its expansion to multiple domains.

Science diplomacy is often regarded as a silver bullet providing a potential solution to all sorts of problems and mobilising soft power; at the same time, there is a lack of empirical insights into the actual workings of this type of diplomacy. Flink (2020a) is among the more critical scholars in the field; he refers to sensationalist discourse and the “*romancing*” narrative of science diplomacy (Rungius & Flink, 2020). This lack of empirical evidence thereby leads to a rather paradoxical situation; the importance of science to international relations is highlighted while “*the scientific method is rarely applied to study science diplomacy*” (Smith III, 2014, pp. 829–830). In other words, “*the prevailing view that science diplomacy increases international trust and transparency rests on poor theory and weak evidence*” (ibid.).

This lack of evidence reveals a second weakness: there is no common understanding of science diplomacy leading to boundary issues. Science diplomacy serves as an umbrella term for a set of distinct policies and instruments (Epping, 2020; Flink & Schreiterer, 2010) at the intersection of science and foreign affairs. Likewise, it refers to a set of practices²⁷ which assign a particular role to scientists in relation to foreign affairs (Fähnrich, 2015; Rüffin & Schreiterer, 2017b; Ruffini, 2020a), as well as to distinct governance arrangements or successful multinational endeavours which aim to ease national tensions (such as SESAME). The concept of science diplomacy hence seems to be a moving target with loose boundaries; as illustrated earlier in this chapter, it is increasingly used as a catch-all concept in different fields, (cf. Davis & Patman, 2015; Kaltofen, Acuto, & Blackstock, 2018). Kaltofen and Acuto argue that “*we could speak of science diplomacy as both practice and scholarship that unpacks that practice and where both inextricably intertwine but without agreeing what is and isn’t part of the study*” (2018, p. 9). Furthermore, science diplomacy is framed by a multitude of normative expectations and meanings among different actor groups (Flink & Rüffin, 2019; Flink & Schreiterer, 2010, p. 669; Ruffini, 2020b), even within the same country (Flink, 2020b), which makes it a moving target. While the concept is used by scientists, policy-makers and

27 Drawing on Sending et al. (2011, p. 530), diplomacy has traditionally been “*more the province of practitioners than academics*” and has been defined by its purpose or the skills that diplomats require, such as the art of negotiating.

non-governmental actors alike, it is understood in different ways, and there seem to be limited points of reference. This raises concerns about the generalisability and transferability of empirical findings.

A third weakness regarding the discourse on science diplomacy derives directly from the weaknesses discussed above: the notion of science diplomacy has turned into a value-loaded and self-explanatory concept which assumes a mutually beneficial relationship between science and diplomacy, as illustrated previously. This cognitive effect is strongly linked to the distinct, seemingly inherent characteristics of science: the universal language of science draws on established and accepted methods and common objects of investigation that are increasingly of a global nature. This line of argument serves as the dominant explanatory pattern for the use of science diplomacy and seems to be its driving force. To sum up, from an analytical point of view, these shortcomings are severe. The mainstream discourse of science diplomacy promotes a normatively coloured understanding that shows signs of a conceptual overstretch and risks becoming a hollow concept and an empty signifier (Laclau & Mouffe, 2014). This is reinforced by the largely normative debate on science diplomacy and its lacking theoretical embeddedness. Accordingly, there is a need for a meaningful conceptual and empirical entry point to the study of science diplomacy with the aim of overcoming the boundary issues described earlier.

2.7. *Conclusion*

This chapter served a dual goal: firstly, it aimed to shed light on the prevailing understanding of science diplomacy and secondly, it outlined the body of knowledge, in particular pointing to gaps in scholarly literature. The literature review ascertained the lack of empirical insights in relation to the study of science diplomacy; furthermore, in terms of a conceptual point of view, it identified insufficient definitions and unclear demarcations as problematic. In addition, there is a need for more solid criteria to help establish why certain activities should be identified as distinct science diplomacy activities. While science diplomacy has great potential as a vehicle for facilitating and improving international relations (although expectations may be somewhat over-optimistic), this chapter considered a number of aspects which have held back this concept. The contemporary debate on science diplomacy remains largely hypothetical, and the concept is used in an ambiguous way, mostly inspired by normative considerations rather

than elements of predictability. While this applies to general discourse on the subject, it also relates to more specific issues, such as the governance of science diplomacy. Despite the astronomical rise of science diplomacy, the body of literature and knowledge in this field is still in its infancy and there is still a lack of solid insights into aspects such as actors, stakeholders and underlying rationales. Furthermore, the conceptualisation of instruments is not yet sufficient. Accordingly, it can be concluded that scholarship has yet to establish robust insights into the governance of science diplomacy.

This study takes account of these shortcomings and is positioned in such a way that it follows a distinct analytical and empirical path in order to overcome these issues. Rather than approaching the notion of science diplomacy in general terms, it adopts an instrument-centred perspective to address this fluid discourse. To this end, this thesis focuses on Science and Innovation Centres (SICs) as a distinct and underexplored institutional response in the governmental toolbox (a detailed introduction to SICs can be found in the next chapter). Adopting this (somewhat inverted) perspective allows us to identify key actors and, in addition, in line with the theoretical approach, consider their rationales behind engaging with this instrument. The following aspects are analysed in detail: the development of a science diplomacy instrument, the institutionalisation of science diplomacy and the identification of key actors, and actors' rationales for engaging with the instrument. In combination, this facilitates analysing an instance of science diplomacy in depth while also being able to generalise findings in relation to a wider discourse (i.e., the governance of science diplomacy). In response to the literature reviewed in this chapter, for the purpose of this study, science diplomacy is understood as common intentional action between foreign affairs and science for a common goal.

3. Science and Innovation Centres: Definitions and Concepts

This chapter introduces Science and Innovation Centres (SICs), the instruments that are central to this study. SICs are a distinct and novel policy instrument and are among the few institutional responses in the science diplomacy toolbox. Whilst these institutions are notable and unique, they largely constitute a black box in academic scholarship. It also introduces and characterises SICs as a novel instrument and provides an insight into these institutions and their significance to this study. First the phenomenon of SICs is explained in the wider context of the institutional responses that have been developed at the interface between foreign affairs and science, such as science attachés (section 3.1). This is followed by a solid definition of SICs that is underpinned by a systematic comparison (section 3.2). These findings are derived from an inductive and exploratory research exercise, which was undertaken to demonstrate the uniqueness of the research object and the insufficient scholarly attention to it. The comparative section of this chapter is therefore seen as a response to the absence of literature on this topic and aims to identify the key characteristics of SICs, as well as to compare institutions and evaluate their similarities and differences (section 3.3). Finally, there is an attempt to structure the empirical data observed by proposing a SIC typology. This chapter classifies three (ideal-typical) SIC models which facilitate the analysis and study of this novel institutional development (section 3.4). In the course of this study, two of these models will be analysed in depth to provide a scholarly assessment of this novel instrument. Furthermore, an empirical account of the study of science diplomacy is provided, which once again reveals a gap in scholarly literature.

3.1. A New Instrument—Challenges in Researching SICs

Following the rise of science diplomacy discourse in recent years, it has become evident that the majority of diplomatic missions increasingly also address science and technology matters (Berg, 2010; Fleury & Zala, 2012). This is due to the huge impact of science and technological developments on a country's prosperity and progress, particularly in light of contempo-

rary challenges (Carlsson, 2006; Hesse, 2010). The significance of science and technology is reflected in the thematic portfolio of diplomatic missions; furthermore, there has also been an increase in institutional responses. A prominent example of this is the creation of science attachés, dedicated positions responsible for science and technology matters. Although the introduction of science attachés dates back to the 1950s, this concept has become increasingly institutionalised in recent years. The USA and Switzerland were among the first countries to appoint science attachés. In the early 1950s, the USA appointed its first science attaché to its embassy in Stockholm (Loftness, 1955), while Switzerland appointed an attaché for science at its embassy in Washington in 1958 (Fleury & Zala, 2012). Their tasks were to connect and distribute scientific information, as well as to advise and represent the government in matters of scientific relevance (Jost, 2012; Loftness, 1955). Loftness (1955) clarifies that science attachés served both the government and scientists (see similarly Forbes, 1957).

Science attachés have become an integral and consolidated element of diplomatic representation around the world, while their portfolio increasingly also covers innovation. Despite this, the profile of science attachés is considered to be changing in the sense that countries increasingly draw on (seconded) experts rather than diplomats to serve as science attachés (cf. Berg, 2010, p. 72). Similarly, another example mirroring the significance of science and technology to diplomacy is the creation of *distinct units* abroad. These units operate as a point of contact and concentrate activities, resources and personnel. As Leijten explains: “*Many, if not all, developed nations have special offices in their foreign services, which are responsible for science diplomacy actions. In organisational terms, it can be anything from a dedicated attaché in embassies to rather independent offices*” (2017, p. 19). This study focuses in particular on these independent offices and organisational units²⁸, which are known as Science and Innovation Centres (SICs). Drawing on scholarly literature, it becomes apparent that there has so far been limited academic interest in examining and analysing these SICs, despite their innovative and unique character, and their implementation by

28 Please note that SICs are organisational units or organisational instruments. The question of the organisational nature of SICs is not answered in this study and requires a distinct organisational analysis. This links, for instance, to aspects such as actorhood, which are elaborated in the works of Krücken and Meier (2006) or Whitley (2008).

several pioneering countries²⁹. There are a handful of single case studies which explore one specific SIC, namely Switzerland's Swissnex (Fetscherin & Marmier, 2010; Marmier & Fetscherin, 2010; Schlegel et al., 2011).

While these scholarly contributions are insightful, they do not cover contemporary developments in the field and are not set up in a longitudinal and nuanced way, such as this study. Aside from the works of Epping (2018, 2020) and Ruffin (2018), there appears to be no other scholarly literature on this topic, despite ongoing and revived discourse on science diplomacy (Flink, 2020a; Ruffini, 2020b). Furthermore, there are few (recent) comparative studies and none which are systematic; Berg (2010) briefly describes these units (though for the first time) and Ruffin (2018) provides a three-country comparison of Denmark, Germany and the United Kingdom. Ruffin describes the basic characteristics of SICs, while also suggesting a framework to classify their work (this will be discussed in more detail later). Other sources (i.e., Flink & Schreiterer, 2010; Witjes & Sigl, 2015) refer to these units but do not analyse them in detail. Accordingly, current research on SICs is still in its infancy. There are no systematic overviews of countries that operate SICs as part of their national strategies and there are no comprehensive studies of the exact structure, composition, mission, institutionalisation or set-up of such institutions. Moreover, there are limited explanations available of how SICs operate at the interface of science (policy) and foreign affairs, the dynamics they create or their (potential) impacts³⁰. Therefore, SICs present an open avenue for research since, to a large degree, they constitute a black box in academic literature. This is noteworthy, given that these hybrid units systematically bring together actors from science, diplomacy and business.

29 It is, however, acknowledged that particularly in “*knowledge-intensive contexts*” novel forms of collaboration become visible and, in fact, new organisational forms arise (cf. W. W. Powell and Soppa (2015, p. 1295)).

30 Evaluative data is publicly available for some SICs, such as the ICDK and Swissnex. However, other evaluations have not been published (as in the case of Germany) or are not yet available (Nordic Innovation Houses). For the purpose of this study, such data serves as background information since it is primarily addressed to governments rather than academic scholarship.

3.2. Defining SICs

The first attempt to define these institutions was probably made by Berg (2010), who refers to science and technology networks or science diplomacy networks. He defines them as “those types of dedicated S&T staff who work abroad with a national mandate and usually in association with the respective ministry for foreign affairs” (2010, p. 70). Berg observes that countries extend their network by “establishing additional hubs abroad which operate independently to the diplomatic missions” (2010, p. 73). He considers these to be innovative business models that are opened in key-tech hotspots rather than in capitals. As such, they are a “powerful instrument to achieve individual policy goals and to support overall science policy agenda” (Berg, 2010, p. 74). Switzerland, Denmark and Finland were among the first countries to put such structures in place; Berg refers to this as the first wave. Germany and Ireland introduced such institutions in the second wave³¹. Berg affirms that this type of centre has the potential to become a “professional player in the host country’s innovation market” (Berg, 2010, p. 73) in a way that is different to embassies. Berg explains that this is due to geographic location, the diversity of their staff members and finally to their set-up; embassies, on the other hand, fulfil a role as door-openers and should not be underestimated (cf. Schlegel et al., 2011).

Flink & Schreiterer (2010) consider the distinct functions that these institutions fulfil; their main purpose is to promote science and technology. They connect stakeholders in higher education and research and open doors for the business sector. Ultimately, they contribute to the promotion and branding of a country with respect to its systems of higher education, research and science. Hence, SICs are understood as a politically anticipated branding tool, as “an early attempt at capitalizing on a niche in nation branding by fostering S&T, higher education and innovation abroad” (Schlegel et al., 2011, p. 297 and also Fetscherin & Marmier, 2010). Ruffin (2018) also attempts to characterise SICs in his comparative analysis of Swissnex, the Innovation Centre Denmark and the Science and Innovation Network (UK). He suggests referring to these units as science and innovation diplomacy agencies; furthermore, he considers them to be a distinct element of a country’s science diplomacy strategy. They are considered

31 The Irish Innovation Centre has since been closed. Desk research has revealed that the workings and set-up of this centre were poorly documented and therefore little information is available for this study.

to be “*qualitatively different from older approaches*” (Rüffin, 2018, p. 5), such as attachés. Despite this comparative effort, Rüffin fails to provide a comprehensive definition of these institutions. He analyses these units in relation to possible tensions due to their set-up and their isomorphic tendencies, as well as their approach to science and innovation diplomacy.

The findings show that SICs reflect differences in terms of their exact orientation and their set-up (cf. Epping, 2020). However, they are also considered to be isomorphic, for instance, in terms of their locations, mix of employees and governmental management³² (cf. Epping, 2018). As an attempt to describe and define these institutions, the literature discussed above is considered too narrow and, to some extent, even misleading. Consequently, a definition should be chosen that both allows for stronger content-driven labelling and also frees the instrument from immediate notions of direct (science) diplomacy. At the same time, however, these ties should not be ignored; it is evident that, while science diplomacy notions may be linked to this instrument, they reflect a particular political *zeitgeist* (Epping, 2020). Furthermore, this definition should also provide a description that is closer to the original names used by different countries (which do not evoke immediate notions of science diplomacy). In response to these shortcomings, this study proposes referring to these institutions as *Science and Innovation Centres (SICs)*. To specify, a Science and Innovation Centre is defined here as:

a distinct unit or satellite institute which has been established in another country by a government and which operates at the nexus of higher education, research, innovation and diplomacy. Thus, SICs typically operate within a network structure (cf. Epping, 2018, 2020).

This definition of SICs derives from the author’s extensive explorative work on the subject and responds to the subject’s largely absent and incomplete conceptualisation in scholarly literature. It will be used throughout this study to characterise these units. Due to the lack of a comparative overview of SICs, the following sections provide insights with the aim of consolidating and enriching this definition. Thus, they contribute to a coherent and comparative understanding of this new development.

32 According to Witjes and Sigl (2015), this duality of governmental responsibility reflects the creation of a new policy field which bridges science, technology and innovation, and international relations.

3.3. Conceptualising and Comparing SICs

3.3.1. Operating Countries (Sending Countries)

Berg (2010) refers to Denmark³³, Finland³⁴ and Switzerland as examples of countries that run or have run SICs; these countries constituted the first wave of SICs and are hence forerunners in this field (the Finnish FinNode joined the Nordic Innovation House a couple of years ago). As these countries are known to be highly innovative, this is not surprising. Given that those three are known to be highly innovative countries this is also evident from their rankings in the Global Innovation Index, which identifies highly innovative countries³⁵ (WIPO, 2021). Similarly, the UK³⁶ network started operating in 2000 (see Table 1). Berg, however, does not refer to the UK in the list of first wave countries possibly since there may not have been a separate unit but instead a distinct subunit within the embassy. The second wave of countries referred to by Berg (2010) is comprised of Germany and Ireland³⁷. The Nordic Countries, the Netherlands³⁸ and more recently the Flemish representation³⁹ can be added to this list of countries (see Table 1).

One background interview conducted as part of my research revealed that the concept of SICs had also been discussed as a potential instrument in the French context. Even more importantly, the French ministry was advised to create an institutional unit inspired by the German and Swiss models. Ultimately, however, this decision was not pursued⁴⁰. The fact

33 For more information on the development of the DIC, see Oxford Research A/S (2015).

34 For more information, see Embassy of Finland (2016).

35 A country's capacity for innovation is measured by the Global Innovation Index (WIPO (2021)). According to the most recent rankings (2021): Switzerland ranks first, the UK fourth, the Netherlands sixth, Denmark ninth, Germany 10th and France 11th. Other Nordic countries are in the top 15: Sweden scores second place and Finland seventh place.

36 For more information, see Morgan (2010).

37 The Irish Innovation Centre has since been closed for reasons unknown.

38 It was not possible to collect additional information on the Dutch Innovation Network, apart from a desk research exercise, since inquiries remained unanswered.

39 For more information, see <https://www.flandersinvestmentandtrade.com/en/strategy/tech-makes-flanders-tick> (accessed 18.02.2022); see also Vlaamse Regering (2020). Due to the novelty, there is little information available, yet.

40 It is unknown what ultimately impacted the decision not to implement such an instrument. On a contextual note, there are already institutional structures operating

that all these countries established SICs reflects an isomorphic tendency concerning instrument selection. This points, on the one hand, to the originality of this idea, and on the other hand to a certain (perceived) impact of these instrument, which presumably differs from what can be achieved with other (existing) instruments in the science diplomacy governmental toolbox⁴¹.

Table 1 Overview: Science and Innovation Centres (SICs)

Country	Name of SIC	Launch
Denmark	Innovation Centre Denmark (ICDK)	2006
Finland	Initially opened as FinNode; later became part of Team Finland. Since 2016, it has been part of the joint Nordic Innovation House.	2007
Flanders	Science & Technology Offices	2021
Germany	German Centre for Research and Innovation (DWIH)	2009
Ireland	Irish Innovation Centre	No data
Nordic Countries	Nordic Innovation House	2016
Switzerland	Swissnex	2000
The Netherlands	Holland Innovation Network	No data
The United Kingdom	Science and Innovation Network	2000

Source: created by the author.

abroad, such as the offices of the prestigious National Centre for Scientific Research (CNRS).

- 41 An immediate question which arises is whether a policy transfer took place between these countries (this is subject to additional research). Key hotspots such as Silicon Valley reveal a high institutional density and presence of different countries. Often, just like in embassy districts, these institutions reside next door to each other, allowing for fast knowledge exchange (interview SNX1). In addition, people working at these institutions form a distinct expat community, with their own channels of communication, since people know each other (interview DIS1). In turn, this creates a distinct environment and allows for ideas and news to travel quickly.

3.3.2. Target Countries (Receiving Countries)

Besides identifying the countries that run SICs (home/sending countries), in order to fully understand these instruments, it seems equally relevant to identify the target countries (host/receiving countries) where SICs are based. A comparative overview (see Table 2) reveals a general coherence in terms of the target countries of SICs (this is also confirmed by Ruffin, 2018). These countries can be categorised as a) the BRICS⁴² countries, also referred to as emerging economies, b) centres of excellence, such as the Boston area, where the Ivy League universities are located and c) locations in the vicinity of key technology hubs, such as Silicon Valley. While these three categories apply to most SICs, there are some variations between countries. Brazil and the USA seem to be attractive locations for all countries, while European locations are less relevant, except for the Danish and Dutch SICs, which have offices in Germany (Munich). They are also represented in Israel. Germany and the Netherlands, on the other hand, have offices in Russia. The specific geographical coverage which different countries have opted for is also seemingly linked to their historical ties and existing institutional infrastructures abroad, not to mention political and scientific/innovation relevance, as the research data reveals (interviews DIS1, SIS2). The combination of these factors seems to explain why certain locations/regions are selected in favour of others.

A closer look at the target countries reveals another distinct characteristic of the structure of SICs; they operate as international networks. Comparing the size of the networks, with the exceptions of the Dutch and the UK networks (this will be elaborated on later), they tend to be of a similar size. The Danish network, which has eight offices, is the largest, while Germany, the Nordic countries and Switzerland currently each have five main locations in their networks. However, the present network sizes only provide a snapshot as they have been subject to change in the past and have at times taken an incremental approach. Most SICs have gradually increased the number of their offices over time; however, in the cases of Germany and Switzerland, one office was also closed down⁴³. Both networks, however, also recently expanded their network: in early 2020, the German network

42 The abbreviation BRICS refers commonly to the following five countries: Brazil, Russia, India, China and South Africa.

43 In addition, Switzerland has drawn on the concept of outposts, which are smaller, more fluid and flexible units in larger countries; they are topical and responsive to changing needs and conditions. In the past, outposts were created in China, New

opened a site in San Francisco, USA (additional locations are also under discussion). Switzerland will open another Swissnex in Osaka, Japan in 2022 (Swissnex, 2021d). To some degree, this signals a change to the findings of Rüffin (2018, p. 4), who predicted that there would not be many new offices established in the future, and that the BRICS countries would create their own agencies (the latter prediction, in particular, is still open).

Table 2 Target Countries SICs

Country	Denmark	Germany	Flanders	Nordic Countries	Switzerland	The Netherlands	The UK
Geographical Spread	Brazil (São Paulo) China (Shanghai) Germany (Munich) India (New Delhi) Israel (Tel Aviv) South Korea (Seoul) USA (Boston, Silicon Valley)	Brazil (São Paulo) India (New Delhi) Japan (Tokyo) Russia (Moscow) USA (New York) 2021/2022: USA (San Francisco)	China (Guangzhou) Denmark (Copenhagen) France (Paris) Germany (Munich) India (Mumbai) Japan (Tokyo) Singapore, UK (London) USA (New York, Palo Alto)	Hong Kong Japan (Tokyo) Singapore USA (New York, Silicon Valley)	Brazil (Rio de Janeiro)* India (Bangalore) China (Shanghai) USA (Boston, New York, San Francisco) 2022: Japan (Osaka)	17 countries**: Brazil Canada China (3)*** France Germany (2) India (3) Israel Japan Russia Singapore South Korea Sweden Switzerland Taiwan Turkey UK USA (3)	100 SIN officers in ca. 40 countries & territories Key regions: 1) Europe 2)Asia Pacific 3)India, Middle East & Africa 4)Americas
Institutional set-up	Located in embassy/ consulate	Mainly own offices	No data	Mainly own offices	Own offices / located in consulate****	Located in embassy/ consulate	Located in embassy/ consulate

* The exact network composition changed in the past, since Switzerland had so-called outposts, being smaller and more fluid representations in certain large countries, such as for instance the outpost in São Paulo.

The concept of outposts seemed to have disappeared over time and in the case of Brazil, there is now one Swissnex with the team being split between Rio de Janeiro and São Paulo (cf. <https://swissnex.org/brazil/about-us/our-team/>, accessed 13.01.2022).

** For more information, visit <https://english.rvo.nl/partners-network/international-economic-network/netherlands-innovation-network/contact> (accessed 12.08.2021)

*** The bracketed number refers to the number of offices in the country.

**** For an overview, see Eidgenössische Finanzkontrolle (2016, p. 15)

Source: created by the author.

If we focus on the geographical spread of SICs, two countries have a larger number of locations: the UK (Science and Innovation Network) and the Netherlands (Holland Innovation Network). These two cases differ from the other SICs since they are distinct units operating within embassies. Both units are officially tied to their countries' diplomatic representation abroad and operate under their umbrella (however, it should be mentioned that the latter is overseen by the Ministry of Economic Affairs). These close ties explain the SICs' comparatively wide geographical coverage. In contrast, the other countries operate their SICs as satellite institutions (with their own premises) which operate alongside national diplomatic representation bodies. These SICs have their own structures in place and

York and São Paulo. The outpost in New York, for instance, was gradually officially integrated into Swissnex Boston; the São Paulo outpost was later closed but Swissnex Brazil remained. Over time, the concept of outposts disappeared.

can hence be considered to operate outside the umbrella of diplomacy, in contrast to those units based within embassies. Admittedly, it became evident that there is nevertheless regular and intense exchange between SIC satellite institutes and their corresponding embassies. Finally, reference is made to *mainly own offices* (see Table 2), which signals that a unit is not located within the diplomatic premises or does not constitute a subunit of an embassy. Instead, SICs might either have their own facilities or share a workspace or premises with partner institutions that already have international offices.

3.3.3. Links to Diplomacy

The previous sections have already touched upon a key characteristic shared by all SICs: they are tied to the diplomacy umbrella of their home country to varying degrees (cf. Berg, 2010 Ruffin, 2018). The most obvious connection relates to financial and administrative responsibility. SICs are under the auspices of ministries of foreign affairs, albeit conjointly with sectoral ministries for education and research. In some SICs, other ministries are also involved, such as the Dutch Ministry of Economic Affairs and the German Ministry of Economic Affairs and Energy (although their role is more peripheral than the two leading ministries)⁴⁴. Furthermore, Swissnex, for instance, is administratively part of Switzerland's external diplomatic representation, reflecting the decisive role of SICs in foreign policy. Similarly, the Innovation Centres Denmark (ICDK) are officially the responsibility of the Danish embassies/consulates, but in practice they operate largely autonomously (Oxford Research A/S, 2015). Moreover, some SICs' CEOs have diplomatic status, as in the cases of Denmark and Switzerland, while for Germany, this is not the general construct (however, the DWIH Moscow is an exception to this, and its director is part of Germany's official diplomatic representation there⁴⁵). As described in the previous section, SICs may also be physically linked to diplomacy since they are distinct subunits or are located in consulates or embassies, which underlines their

44 In the case of Denmark, the Trade Council is part of the Ministry of Foreign Affairs and is in charge of the ICDK, see Gottlieb (2019b, 2019a).

45 This is explained by administrative and legal aspects in the host country. Since the framework conditions vary strongly between the host countries, different set-ups are in place to create these official representations abroad (confirmed in a background talk (12.05.2022)).

close links. This applies, for instance, to the SIN (UK) and the ICDK (Denmark), which are located in their countries' embassies.

This embeddedness reflects a dual connotation: being a door-opener for SICs in some on the one hand, since “*a certain diplomatic leverage effect occurs behind the networks (stronger political status through the ‘embassy label’)*” (Schlegel et al., 2011, p. 297). On the other hand, the closed nature of embassies may hamper the open and connecting character that SICs wish to convey. Embassies, for instance, typically have strict access procedures in place. Simply walking in is not possible since access must be granted. Thematically, this organisational set-up is noteworthy as internationalisation activities in higher education and science have traditionally been the responsibility of the respective sectoral ministry. While the core task of ministries of foreign affairs is the external representation of national interests, the explicit promotion of higher education and research carried out by SICs is a newer development⁴⁶ and it ultimately feeds the science diplomacy paradigm: science is used as a vehicle in foreign affairs. An exception to the previous example is the Holland Innovation Network, which is physically located within the diplomatic representation body. However, it is the Ministry of Economic Affairs that oversees the network (which is possibly explained by the strong focus on innovation). This shared ministerial responsibility is not uncontested and could conceivably lead to tensions which might hamper the SIC's activities (Rüffin, 2018). Findings for the German DWIH reveal severe inter-ministerial struggles, which have ultimately impacted the design and mission of those units (Epping, 2020). The close links between SICs and foreign affairs are also reflected in official strategies: foreign affairs ministries stress the political dimension and the potential impact of these instruments on wider (political) science diplomacy goals. This has been analysed in detail for Germany and Switzerland (cf. Epping, 2020).

3.3.4. Core Activities and Key Stakeholders

A comparison of SIC names reflects a certain convergence in the labelling of these units and points to their core missions. Almost all SICs have

46 This development must also be understood in light of the changing roles of foreign ministries in recent years: scholarly literature highlights a loss of their core activities to other (state) actors (cf. Moses and Knutsen (2001); Lequesne (2020)).

the word ‘innovation’ in their name (see Table 4) with the exception of Swissnex⁴⁷. Following re-branding in 2007/2008, the name Swissnex was established as a joint brand that evokes immediate notions of innovation. Innovation is currently considered a core element of Swissnex activities. The German and UK SICs also refer to research and science in their names, as well as innovation; this suggests that these elements are both core elements in their work; however, further research would be required to establish whether science and research indeed play stronger roles in their activities than in the other networks. The names of the German and the UK SICs certainly constitute a deliberate branding exercise for the two countries⁴⁸: both countries wish to promote and be internationally recognised for excellence in research/science and innovation.

Taking a closer look at the descriptions of SICs’ core missions reveals that, in most cases, research and science also play a significant role—and it would be surprising if this was not the case⁴⁹. The Danish unit, for instance, aims to help Danish research institutions gain access to international opportunities and to enable them to operate abroad. Likewise, Switzerland explicitly aims to connect with global partners in the field of education and research. The Nordic Innovation House, however, mainly focuses on innovation activities and business support (Nordic Innovation House, 2021), and stakeholders from science and research are referred to only to a minor degree⁵⁰. The Dutch network also has a more dominant focus on accelerating innovation, and technological themes are central to the Flemish SICs. Finally, the names of SICs also differ in terms of their own characterisation as houses, centres, offices or networks. Units that refer to themselves as networks (SIN (UK) and the Holland Innovation Network) are located

47 This is also referred to as the “*integrative narrative of innovation*” by Rüffin (2018, p. 4).

48 The interview data for Germany indicates that the idea was initially to create units that focus mainly on research/science, while innovation was, nevertheless, added as a key topic. However, this proved to be an ongoing point of discussion between the actors involved, particularly the traditional research-oriented actors.

49 While a distinction is made between innovation and research/science, the importance of and connection between education, research and innovation is not explored here. Instead, the intention is to gain a sense of the predominant thematic focus, which in turn may point to the key actors involved. Accordingly, this distinction is slightly artificial but serves as a focus.

50 This study firmly acknowledges that education and research are core elements of a successful innovation policy (cf. Edler and Fagerberg (2017)).

within embassies, while the units referred to as houses or centres have their own premises⁵¹.

A closer look at SICs' core missions points to the variety of actor groups that operate within SICs (partially with a governing function (cf. Epping, 2020)) or are SIC clients. These range from research institutions to universities, to entrepreneurs and companies, to name a few (see Table 3). Typically, research and science organisations and business entities do not operate under a shared roof. This diversity of stakeholders therefore leads to a broad coverage of themes, which SICs unite under one roof. Accordingly, given this diversity in actors and themes, SICs can be considered "hybrid" units (cf. Schlegel et al., 2011, p. 292). In addition, SICs promote national higher education, research and innovation systems in a holistic way (cf. Fetscherin & Marmier, 2010; UK Science & Innovation Network, 2015). Due to their international locations and core goals, SICs function as a one-stop solution agency representing streamlined coverage of their national ecosystem. This is a unique development, considering that in most countries, there is a scattered international presence of national actors and that this is limited to a few (prestigious) higher education institutions, research institutes or intermediary and research organisations, not to mention corporate offices.

The creation of institutional structures abroad is costly and at times administratively burdensome; thus, the creation of SICs marks a turning point. Due to their integrated approach, SICs bring added value to the visibility of the combined national higher education, research and innovation systems, while also enabling individual actors and institutions to benefit from this new visibility. SICs specific tasks include providing expertise to higher education and research institutions, finding partners abroad or setting up cooperation programmes. Another core area of their work relates to networking (cf. Berg, 2010): SICs aim to connect scientific communities in the host and home countries by, for example, providing lecture series on current topics or hosting academic and informative events. This networking character is deeply interwoven in the DNA of SICs since they also operate in a network structure (see section 3.3.2). At the other end of the spectrum, SICs support businesses that are striving to enter certain markets.

SICs typically have access to or maintain a certain infrastructure abroad, such as having their own offices and contact databases, and ideally also

51 The research data for Germany reveals that there has been an ongoing discussion as to whether the German SICs should be referred to as houses or centres.

Table 3 Dimensions for Comparison I: Tasks and Thematic Focus

Dimensions for Comparison	
Names of SICs	<ul style="list-style-type: none"> * Innovation * Innovation & research/science
Core Activities	<ul style="list-style-type: none"> * Promoting higher education, research and innovation * Horizon scanning * Business entry * Reporting to governments
Key Stakeholders and Clients	<ul style="list-style-type: none"> * Individual researchers * Research institutions * Universities * Entrepreneurs * Companies

Source: created by the author.

developing a reputation and an established local network of researchers, policy-makers and expats. These resources can easily be accessed by pertinent national actors in the ecosystem of education, science and innovation in relation to their own activities abroad, while, at the same time, responding to ongoing calls for internationalisation (cf. Altbach, Reisberg, & Rumbley, 2009; Carlsson, 2006; de Wit et al., 2015; Edler & Fagerberg, 2017). Accordingly, SICs function as a low-threshold platform for those actors wishing to launch internationalisation activities. Furthermore, SICs may also function as a horizon scanner for national actors in science, research and innovation, and for policy-makers. Depending on the political ties of each SIC, the latter aspect may be more strongly woven into the DNA of certain SICs, while for others, this may be more of a sideline. To give an example, one of SIN's core tasks is to generate policy insights in order to improve overall UK policy in the fields of science and innovation (cf. UK Science & Innovation Network, 2015, p. 3). In addition, Swissnex is, to some extent, considered to function as a horizon and trend scanner.

Table 4 SICs' Core Missions⁵²

Country	Name	Core Mission
Denmark	Innovation Centre Denmark (ICDK)	"Denmark has Innovation Centres in Shanghai, Silicon Valley, Boston, Munich, São Paulo, New Delhi, Seoul, and Tel Aviv. Their purpose is to help Danish research institutions and companies with access to foreign knowledge, networks, technology, capital and market opportunities".
Germany	German Center for Research and Innovation (DWIH)	"The German Centres for Research and Innovation (DWIH) are a network of German research organisations, universities and research-based companies. In five cities around the world, the DWIH provide a joint platform for German innovation leaders, showcase the capabilities of German research and connect German researchers with local cooperation partners".
Flanders	Science & Technology Offices	"Together with our Science & Technology Coordinator, our Science & Technology Counselors play a crucial role in FIT's tech mission. Abroad, they build an extensive network of tech companies, venture capitalists, knowledge and research centers, clusters, incubators, accelerators and so on, while creating connections to Flanders' ecosystem".
Nordic Countries	Nordic Innovation House	"Nordic Innovation House is a unique collaboration with the Nordic countries. We are a bridge connecting the cold corners of the globe with the main hotspots around the world. With backing from Nordic Innovation, we bring Nordic entrepreneurship, values, and our way of doing business to the global innovation ecosystem. We bring together the most innovative entrepreneurs, all working to connect the dots – and getting connected".
Switzerland	Swissnex	"Swissnex is the Swiss global network connecting Switzerland and the world in education, research and innovation. Our mission is to support our partner's outreach and active engagement in the international exchange of knowledge, ideas and talent. The five main Swissnex locations are established in the world's most innovation regions. Together with around 20 Science Offices and Counselors based in Swiss embassies, they contribute to strengthen Switzerland's profile as a world-leading hotspot of innovation".
The Netherlands	Holland Innovation Network	"Holland Innovation Network ("Innovatie Attaché Network" in Dutch) is part of the Dutch Ministry of Economic Affairs that operates in multiple countries with a strong innovation capacity and/or potential. This network aims to improve the innovation capabilities of the Netherlands by linking global and Dutch innovation networks. Focal areas for the organization are science, research, technology and innovation".
United Kingdom	Science and Innovation Network	"The Science and Innovation Network (SIN) has approximately 100 officers in over 40 countries and territories around the world building partnerships and collaborations on science and innovation. SIN officers work with the local science and innovation community in support of UK policy overseas, leading to mutual benefits to the UK and the host country".

Source: created by the author.

The exact portfolio of tasks, however, varies between SICs (cf. Rüffin, 2018), and this is also linked to the way that these institutions are governed and funded (this will be explored further in section 3.3.5). SICs manoeuvre between the logic of international cooperation and that of competition (J. J. W. Powell, 2018, 2020) and seem to provide new distribution channels and ways to make an impact. Thus, in response to the wider discourses on SICs, they can be viewed in many ways: as manifestations of the knowledge society, an instrument that reinforces a country's position as a global key player, a response to a run for excellence and the need to attract talent, and a way to enter new (emerging) markets and tackle global challenges (Epping, 2020). Accordingly, the fact that SICs unite and respond to these global (political) themes while, at the same time, accounting for individual actor interests is another example of why SICs should be considered hybrid units.

3.3.5. Governance Arrangements

3.3.5.1. Organisational Set-Up

In terms of organisational set-up and governance, ministerial authority is generally shared between foreign affairs ministries and sectoral ministries (see section 3.3.3). This set-up may offer several advantages, particularly in relation to the management and employment of staff members abroad. However, it may also constitute a (potential) source of conflict in terms of direction setting⁵³. A comparison of different SICs reveals that, in ad-

52 Core missions are taken from the respective websites:

Denmark: <https://ufm.dk/en/research-and-innovation/international-cooperation/global-cooperation/innovation-centres-and-attaches> (accessed 06.08.2021)

Germany: <https://www.dwih-netzwerk.de/en/who-we-are/> (accessed 06.08.2021)

Flanders: <https://www.flandersinvestmentandtrade.com/en/strategy/tech-makes-flanders-tick> (accessed 18.02.2022)

Nordic countries: <https://www.nordicinnovationhouse.com/#about-nih> (accessed 06.08.2021)

Swissnex: <https://swissnex.org/about-us/mission> (accessed 06.08.2021)

The Netherlands: <https://netherlandsinnovation.nl/> (accessed 06.08.2021)

The UK: <https://www.gov.uk/world/organisations/uk-science-and-innovation-network> (accessed 10.08.2021)

53 In scholarly literature, this conflict is referred to as jurisdictional egoism between different ministries (see Mai (2016)).

dition to ministries, other key stakeholders may also be involved in the governance of SICs. In the case of the German DWIH, a strong stakeholder-led governance structure can be observed⁵⁴, with a key role assigned to intermediary organisations. This actor-led structure seems to be a distinct characteristic of the DWIH and could not be identified in relation to Swissnex (cf. Epping, 2020) or SIN (UK).

Furthermore, other forms of key actor involvement were also identified, such as advisory boards, for example in the cases of Denmark (Ministry of Foreign Affairs Denmark, 2021), Germany (DWIH-Netzwerk, 2021) and Switzerland (Swissnex, 2021b). These advisory boards provide advice either at a network-wide level or on-site at particular SICs. On-site governance arrangements differ between SICs, although they usually have a head of unit, who coordinates a team. Teams vary in size and are often composed of a mixture of national and local employees. Berg (2010, pp. 69–70) mentions that the type of staff working at SICs ranges from diplomats and people on secondments to locally recruited employees; again this varies between SICs. Moreover, not all SICs operate as teams; there are also solutions that focus on individuals, such as the Flemish science and technology counsellors (Switzerland also uses a similar system with representatives who are part of the embassy's staff).

3.3.5.2. Funding

Funding arrangements are a central element to understanding and comparing how SICs function (see Table 5). Among the countries included in this study, there are several different funding models. On the one hand, some SICs are fully government funded, such as the DWIH (Germany) and SIN (UK). The DWIH are institutionally funded by the Federal Foreign Office through the intermediary organisation, the German Academic Exchange Service (DAAD). Similarly, SIN is funded by the Foreign and Commonwealth Office and the Department for Business, Energy and Industrial Strategy (SIN, 2018). Some SICs, on the other hand, have mixed funding sources. Swissnex, for instance, runs on a public-private partnership model, where one third of the costs are covered by public sources, while the remaining two thirds need to be earned. In addition, each location has certain individually agreed upon (political) targets or key performance indicators which determine their success. In a similar vein, the Danish model

54 Bach and Jann (2010) consider this to be a reflection of the German system.

is partially publicly funded, while additional income is earned through consultancy services. This is also reflected in the ICDK's portfolio: the Danish SICs offer services free of charge (for instance to university clients), whereas they provide commercial services to Danish enterprises.

Table 5 Dimensions for Comparison II: Organisational Set-Up and Funding

Dimensions for Comparison	
Advisory Boards	* In place / not in place
Staff Categories & Size	* Diplomatic / seconded / recruited staff members * Team vs. individual
Funding Model	* Fully governmentally funded * Public-private partnerships

Source: created by the author.

3.3.6. Demarcations to Similar Institutions

The rise of SICs has similarities to several other publicly funded institutions that also operate internationally, for instance cultural sector institutions; these often fulfil similar roles (although in a different context) and are frequently associated with notions of public diplomacy (Ostrowski, 2010; Srugies, 2016). Such institutions seem to play an equally strong representative and bridge-building role, drawing on culture as a vehicle. The German Goethe Institute is a well-known and comparable example and, like the DWIH, it is funded by the Federal Foreign Office; its aim is to promote cultural exchange and dialogue (Mosch, 2009; G. Schneider, Schiller, & Goethe, 2000). Similarly, the concept of Amerika Haus in Berlin and Munich is relevant here; these institutions were financed by the USA and aimed at offering German citizens an opportunity to learn about America⁵⁵. In a similar vein, the Swiss Pro Helvetia institutes⁵⁶ should be mentioned here (cf. Eggenberger, 1986; Kowner, 1993). These institutes are located in selected countries, which in some cases correspond with Swissnex locations. For instance, *Pro Helvetia* has centres in India (New Delhi, a different

55 For more information see https://culturaldiplomacy.org/amerikahausberlin/index.php?en_about (accessed 11.08.2021).

56 For more information, see <https://prohelvetia.ch/de/>.

city from its Swissnex office), China (Shanghai) and the USA (New York). Its core task is to promote Swiss culture and facilitate bridge-building activities between Switzerland and its host countries. However, despite the similar aims of these cultural institutions, such as the key objective of building bridges between countries and connecting communities, SICs are nonetheless distinct in their set-up due to their hybrid nature and holistic approach to operating as a national nucleus for the research, science and innovation sectors.

3.4. Typologising SICs

Bringing together insights from the previous sections, it is evident that in light of common (global) challenges, highly innovative countries have adopted similar responses over time and thus created SICs. While there are some differences in the national character of these SICs, a certain isomorphic tendency can be observed⁵⁷. The comparative overview of the previous sections highlighted similarities and differences, as well as key characteristics of SICs' different national characters. The relevant aspects for comparison include core missions, geographical spread, governance and funding, and proximity to politics and diplomacy, to name a few. With these in mind, a typology is proposed that provides a structure for the empirical data gathered (see Table 6). Typology building is considered a useful strategy for generalisation and structuring purposes (cf. Kuckartz, 2006)⁵⁸ (see also section 5.2.1 for more detail).

To this end, three models are identified that differentiate between SICs based on the key principles of organisational set-up and method of operation (as such, they are more specific and encompassing than already

57 The issue of policy transfer or policy learning, as addressed in Dolowitz and Marsh (2000), is a relevant concept here, although this requires further research, given the existence of common pressures or the wider culture that results from these isomorphic responses (cf. Meyer, Boli, Thomas, and Ramirez (1997)). Does the emergence of SICs as a response to joint challenges suggest a case of policy learning among highly innovative countries, which have adopted a common response applicable to their respective contexts?

58 If we draw on Kuckartz (2006, p. 4050 ff.), creating typologies is a useful strategy to navigate between singularity and generalisation. Methodological implications and steps for doing so will be explained in the methods chapter (see section 5.2.1).

3. Science and Innovation Centres: Definitions and Concepts

existing typologies (cf. Rüffin, 2018⁵⁹); further criteria, such as funding and proximity are accordingly aligned with these principles. While it should be noted that the boundaries between the models are not 100% watertight, they are considered ideal-typical. Based on the criteria allocated, i.e., primarily their organisational set-up and method of operation, the three models are as follows⁶⁰:

- (1) *Service-oriented SICs*: operate according to market dynamics
- (2) *Representational SICs*: operate mainly according to stakeholder preferences
- (3) *Policy-led SICs*: operate in line with policy demands

Table 6 Typology of Science and Innovation Centres

	Service-oriented model	Representational model	Policy-led model
Pattern of activity	Client & market driven	Stakeholder driven	Policy-led
Funding	Public-private partnership	Fully funded	Fully funded
Proximity to politics	Detached (with limits)	Detached (with limits)	Close
SIC Cases	Swissnex, ICDK, Nordic Innovation House	DWIH	SIN (+ Dutch and Flemish Network)

Source: created by the author.

These three models range on a continuum as far as the questions of steering and the actors in charge are concerned. On the one hand, service-oriented SICs reflect a (comparatively) low degree of steering both politically and

59 Rüffin (2018, p. 13) similarly aims to establish a typology of SICs alongside the dimensions of science vs. diplomacy-steered, applied vs. basic research-focused and the way that SICs are steered (top down vs. bottom up). To that end, he compares Denmark, the UK and Switzerland. This attempt at typology building is less encompassing in terms of the countries it is informed by, while the criteria are also not specific and refined enough to shed light on the governance of science diplomacy. In this study, insights into the governance of science diplomacy are most relevant and, hence, organisational set-up and method of operation are considered in a more detailed way.

60 Neither the Holland Innovation Network nor the Flemish network are included in this typology since, based on desk research, too little information was available to enable a solid classification. Requests for additional information and for an interview remained unanswered. However, these SICs seem to correspond most closely to the policy-led model since they are tied to diplomatic representation bodies and, similarly, seem to respond to policy priorities.

steering according to client and market demands. Policy-led SICs are found at the other end of the continuum; in terms of organisation, they are part of the diplomatic apparatus and respond mainly to political demands. The representational model can be placed in the middle since it is strongly driven by key stakeholders (from the science and innovation sector) who project their interests in and through the instrument and hence shape the SICs' main patterns of activity.

3.4.1. Service-Oriented SICs

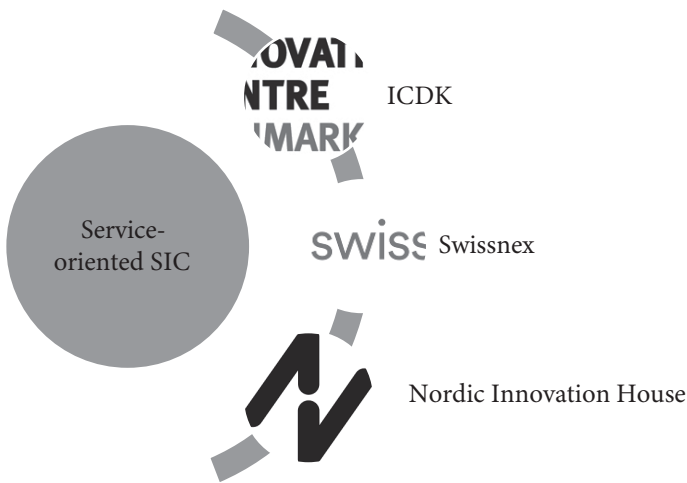
The *service-oriented model* will be discussed first (see Figure 1); this model can be described as operating according to market dynamics. SICs are equipped with a strong degree of *autonomy*, which is also reflected in their *governance set-up*. They function as relatively independent actors⁶¹ since they fulfil a service function for the national system, yet they also convey international visibility. This model seems to operate above national structures (with certain limitations). Service-oriented models are only partially funded by public means and operate on a public-private *funding basis*. Accordingly, they must secure their continuing existence through contracts. In line with the need to generate their own income, they can be considered volatile due to changing market developments and client needs. A core business element for service-oriented SICs is to closely monitor and listen and respond to the needs of their key stakeholders, as well as pay close attention to the markets in which these stakeholders operate. In addition, they seem to have sufficient autonomy to develop innovative formats and ideas for their clients, and they position themselves accordingly. Hence, the way that service-oriented SICs operate is strongly influenced by market logic and their clients' needs due to a certain dependence on these factors.

This set-up similarly provides a basis for legitimacy. An ongoing demand for a SIC's services constitutes an indicator (to all stakeholders) of their added value. Hence, aside from their inherent symbolic function, these SICs are directly subject to stakeholder needs. In line with their funding composition, service-oriented SICs seem to have greater *detachment from political goals*. They have weaker links to (daily) politics in comparison to other models, despite a certain level of supervision and steering through

61 For an overview of literature on (strategic) actorhood and organisations, see Brunsson and Sahlin-Andersson (2000); Krücken and Meier (2006).

performance agreements by ministerial actors. Finally, SICs in this category tend to have a stronger focus on *innovation* activities, and this is reflected in their names. Innovation Centre Denmark, Swissnex and the Nordic Innovation House are all categorised as service-oriented SICs. Accordingly, SICs that fall into this category can be characterised by the need to secure their own existence by delivering specific services. This design principle and the need to generate their own income, in line with market demands, structures the work and set-up of these SICs.

Figure 1 Service-Oriented SIC



Source: illustration author's own account; the logos are taken from the official website.

3.4.2. Representational SICs

The second model identified is the *representational model*, inspired by the German DWIH⁶² (see Figure 2). The representational model can be described as operating according to stakeholder preferences, which is also evident from the *governance set-up* and the level of *autonomy* of this organisation. The SICs' scope of action is determined by key stakeholders

62 The definition of the representational model draws on one case only. Accordingly, its characterisation is subject to refinement and additional research to validate or dismiss this model. This is not yet possible due to the absence of comparable cases. This characterisation would certainly benefit from additional research in the future.

and subject to their approval. Therefore, representational models have less autonomy to act and to develop as independent actors since they are constrained by the corset of their stakeholders' preferences. To elaborate further, stakeholder's needs and wishes are not always in accordance with each other; this model is hence driven by the principle of the lowest common denominator. This potentially limits collective action and collective representation. In addition, there is a further constraining factor regarding the autonomy of the representational model; a representational SIC is led by one representative (DAAD) of the many key stakeholders rather than by an organisationally independent CEO. As a result, representational SICs may be more passive and potentially less dynamic and responsive to developments in comparison to their service-oriented counterparts. This is due to (conflicting) organisational interests projected on to this instrument.

In a similar vein, the portfolio of the DWIH's activities (at least in broad terms, but also more specifically) is subject to the approval of key stakeholders. Therefore, the exact tasks presumably remain at a level that is generally undisputed, and there may be a greater focus on presenting and providing information about the German system. In other words, rather than fulfilling a service function, this representational SIC seems to be concerned with the collective branding and showcasing of Germany. This underlines the SIC's holistic representational function and its replication of the national system in an international context. In terms of *funding* and *proximity to politics*, it can be confirmed that the DWIH are fully funded from public sources and that they do not need to generate additional income. The DWIH are, in fact, not even permitted to generate income⁶³. Secured funding creates a different starting position, for instance in terms of identifying the added value of an instrument. Whilst for service-oriented SICs, this can be directly inferred from the existing demand, it might be more difficult to identify the added value for representational SICs.

In addition, there may be a limited added value for the individual actor since these SICs seem to operate based on the lowest common denominator. The composition of fully governmental funding underlines the political importance that is tied to these SICs, while there are generally loose links to ministerial actors. In line with the strong autonomy of the German science sector, it is anticipated that SICs will continue to maintain weak links to

63 For contextualisation purposes, the DWIH first received institutional funding in 2017. Previously, a mixture of public/private funding sources was in place (inspired by the service-oriented model); however, this proved to be a misleading design principle.

3. Science and Innovation Centres: Definitions and Concepts

ministerial actors/diplomacy. This is further reflected in the ongoing tensions that are characteristic of the representational model, i.e., the question of who is in the driver's seat: ministerial actors/diplomacy or science. In a nutshell, the *representational model* operates within strict framework conditions that are determined by and subject to the approval of key stakeholders. This model is characterised as representational for two reasons: firstly, because its set-up replicates and represents the characteristics of the national system, both in terms of actors and possibly also distribution of power, and secondly, because its autonomy is limited due to that complexity of actors and the fact that its activities focus on non-critical cases, such as representation and one-stop-shop functions. The representational SIC appears to be an instrument that organisations use to project their own interests.

Figure 2 Representational SIC



Source: illustration author's own account; the logo is taken from the official website.

3.4.3. Policy-Led SICs

The third type that can be identified is the *policy-led SIC*; this type is inspired by SIN, the UK's science and innovation network (see Figure 3). Policy-led SICs are characterised by their *proximity to politics*, and they thereby differ significantly from the two previous models. This is manifested firstly in their organisational set-up and secondly in the tasks they carry out. Organisationally, policy-led SICs, such as SIN, operate as distinct units under the diplomatic umbrella. They are an integral part of the UK's diplomatic representation body; within embassies, they constitute a subunit which deals with science and innovation matters. As such, in terms of size, they differ from individual science and technology counsellors (or attachés) since they are typically comprised of a larger team. They have a wide geographic spread due to their ties with and incorporation into embassies; they do not require their own premises and hence have a low

administrative burden. Thematically, SIN explicitly conveys and supports the UK's science and innovation priorities by ensuring exchange between the UK and its local partners. SIN's tasks and priorities derive immediately from national considerations and agendas since it is set up in such a way that it contributes to and supports the UK's strategic and political objectives abroad. Accordingly, the topics that are dealt with are clearly driven by the UK's (changing) strategic priorities, such as ensuring prosperity, security, influence and development (SIN, 2018); those topics are also country-specific and targeted by action plans. Despite fulfilling similar tasks to the previous models, such as being a one-stop shop or approaching new partnerships, policy-led models are responsive to changing political demands. They deliver insights for politics and are seen as a vehicle used to inform policy-making; they thus differ from the two other models. Since they are part of the diplomatic representation body, they are also *fully funded*.

Figure 3 Policy-Led SIC⁶⁴



Source: illustration author's own account; the logo is taken from the official website.

3.4.4. Synthesis of the Typology

The previous sections attempted to analyse the variety of SIC structures. The threefold typology which was identified marks an entry point into this novel field as it aims to portray the empirical diversity. SICs differ mainly in terms of how their thematic scope is determined. Thereby, the continuum

64 The Holland Innovation Network and Flanders Science & Technology Offices reflect similarities with this type; however, there is too little information available to be able to classify them. Nevertheless, section 13.5 proposes avenues for further research and suggests ways to provide an insight into these two cases and be able to categorise them.

stretches from clients and market demands to key national stakeholders, and to political and ministerial actors. The typology is inspired by the comparative overview provided earlier in this chapter; however, it is subject to empirical validation (and possibly modification). Despite observing key differences in terms of set-up, this chapter could not provide explanations as to why countries opt for certain models. Nevertheless, in some cases, the type of SIC appeared to be linked to distinct characteristics of a country's national science and innovation system. For example, the exact model of SIC might replicate how the national system is organised (i.e., bottom-up style, autonomy of the science sector, coordinated activities, etc.). Furthermore, the existence of similar (institutional) structures abroad may explain why some countries find it necessary to establish SICs while others do not. Drawing on Meyer & Rowan (1977, p. 341), we can ascertain that it is often the case that the “*formal structures of many organizations in postindustrial society (Bell 1973) dramatically reflect the myths of their institutional environments instead of the demands of their work activities*”. In a similar vein, it is argued that “[a]ll new organizational forms, no matter how radically new, are combinations and permutations of what was there before” (Padgett & Powell, 2012, p. 2). This underlines the assumption that SICs may be the product of their institutional environment, despite the fact that this may also limit the scope of their work.

This study sheds light on the question of how SICs can be understood and how their set-up can be explained. With regard to the research question, two of the previously identified SIC models have been selected for in-depth analysis. This will facilitate our understanding of how SICs function and fill some of the gaps in the existing literature relating to this novel instrument. In line with the inductive and exploratory logic that guides my research, the two models that will be explored empirically and analytically in this thesis are the *service-oriented model* and the *representational model*. In combination, the analysis facilitates a scholarly understanding of the institutionalisation and instrumentation of these SIC types in a national setting, while also offering insights into science diplomacy. In line with the exploratory nature of this study, the cases for closer study were selected based on the interest they evoke and the insights they provide; furthermore, they also enable a degree of comparability. The specific criteria and the two countries that will be investigated are Switzerland, which provides a prototype of the service-oriented model, and Germany, which exemplifies the representational model (see chapter 5).

3.5. Conclusion

This chapter constitutes a key component of this study since it serves three key purposes. Firstly, it introduced SICs, the instrument that is the subject of this investigation. Academic scholarship has not systematically addressed the topic of SICs; therefore, a definition, which will be used throughout this study, was provided (section 3.2). SICs were identified as hybrid units which respond to a variety of actors and issues. Despite a certain isomorphism, SICs were found to differ between countries in terms of their exact composition and expression. Secondly, an exploratory comparative exercise of SICs was undertaken to shed light on the richness and diversity of existing SICs. Key characteristics were revealed, while differences and isomorphic patterns became visible. The third and final aim of this chapter was to provide a structuring perspective on the variety of SICs and to propose a typology. Thus, three prototypical SIC types were identified from the range of SICs that were studied: *the service-oriented model, the representational model and the policy-led model* (section 3.4).

In combination, these three sections provided insights that facilitate a (scholarly) understanding of SICs, while also positioning them as a unique and distinct instrument in the science diplomacy toolbox. The core goal of this study is to explain how and why SICs developed by examining their emergence and institutionalisation as instruments of science diplomacy. To this end, two SIC models have been selected for closer analysis: service-oriented SICs and representational SICs (this selection will be further justified in section 5.2.4; also, ways of analysing policy-led SICs will be suggested in section 13.5). This will facilitate a) an understanding of how SICs are situated in their respective national contexts and b) an explanation of their institutionalisation and current set-up. In light of the increasing size of SIC networks and the fact that more countries are establishing SICs, this study will contribute to a greater understanding of this wider trend, while also providing an empirical account and contributing to research on science diplomacy. The subsequent chapter addresses the conceptual tools and theoretical assumptions that will facilitate the comparison of the two SICs.

4. Towards a Conceptual Framework

This chapter puts forward the conceptual framework which guides this instrument-centred analysis and positions it in relation to scholarly literature. In line with the objective of explaining and analysing the development and institutionalisation of two SICs, three conceptual components drive this study. Firstly, scholarly literature is reviewed to provide an overview of how policy instruments are analytically framed and understood as distinct governmental tools (section 4.1). This facilitates an understanding of SICs as policy instruments. Policy instruments are commonly conceptualised as goal-oriented, neutral and technical devices, which are distinctly connected to policy design considerations and policy objectives. As such, they may take different shapes and rely on diverse mechanisms to create an impact. To understand how instruments operate and their potential impacts, scholarly literature draws on key taxonomies for analysis. These taxonomies will be introduced in the first section of this chapter (Capano & Howlett, 2020; Howlett, 1991).

Secondly, this study adopts a complementary definition of policy instruments and conceptualises them as institutions in the sociological sense (Lascoumes & Le Galès, 2004, 2007) (section 4.2). This understanding constitutes a conceptual shift from the previously mentioned interpretation of instruments as technical and neutral devices; it therefore requires a distinct pathway of analysis. More specifically, instruments are characterised as being carriers of rules, norms and values, which can structure interactions. They are seen to have a transformative effect and their development may differ from what governments have anticipated. What is more, once in place, these instruments create new perspectives on their use and are subject to interpretation by key actors (Le Galès, 2011, pp. 151–152). This instrumentation (i.e., use) may create distinct effects which might reinforce institutionalisation dynamics (of SICs). These considerations translate into a distinct heuristic framework, which is used for the analysis (see section 4.2.3). This framework, furthermore, enables us to grasp the essence of SICs and develops a distinctly actor-centred perspective. At the same time, it makes it possible to contrast actor-specific rationales with the prevailing normative assumptions about science diplomacy.

Thirdly, to develop this distinctly actor-centred perspective on SICs, a framework is needed which conceptualises organisational behaviour and facilitates understanding of how SICs developed. More specifically, the rationales for actors to participate in SICs and, more generally, in collective action need to be addressed (section 4.3). To that end, the theoretical considerations of meta-organisation theory are mobilised (Ahrne & Brunsson, 2005, 2008). However, this study does not imply that SICs are defined as meta-organisations; rather, they are defined as organisational instruments. The considerations of meta-organisation theory are selectively deployed to the extent that they probe why actors participate in SICs and unpack their differing rationales in order to understand SICs' instrumentation (and hence institutionalisation). In combination, these three components provide a conceptual architecture, which is informed by institutional theory and facilitates the analysis of how SICs developed and institutionalised.

4.1. Policy Instruments: A Functional Understanding

4.1.1. Definition

Policy instruments are traditionally defined as tools which “encompass the myriad techniques at the disposal of governments to implement their public policy objectives” (Howlett, 1991, p. 2; see also A. Schneider & Ingram, 1990). Scholarly literature refers to the notions of both policy tools (Hood, 1983) and policy instruments (Howlett, 1991; Howlett & Ramesh, 1993), and the terms are often used interchangeably. In addition, policy instruments are commonly viewed as being the “building blocks of public policy” (Linder & Peters, 1989, p. 43) and the direct results of policy-making processes (Capano & Lippi, 2017). As such, they are typically adopted to solve public problems (Rist, 1998; Salamon, 2000, pp. 1641–1642) or to instigate social change (Bemelmans-Videc, Rist, & Vedung, 1998, p. 3). This is reflective of a functional and goal-oriented understanding of policy instruments. In addition, policy instruments may have a symbolic function and latent dimensions which are assigned to them (Elken, 2015 and cf. Adler-Nissen, 2014 on symbolic diplomacy). Instruments may take different shapes and forms, and may vary, for instance in their degree of bindingness (cf. Peters & van Nispen, 1998). Analysis of policy instruments has gained renewed attention in recent years as these instruments are considered to be the sub-

stance of governance arrangements that provide “*an empirical window on the policy process [...] and therefore give us insights into how a given policy is implemented and with what effects*” (Hellström & Jacob, 2017, p. 605).

In terms of implementation, scholarly literature assumes that policy instruments are often coupled and thus policy instrument mixes are adopted (cf. Borrás & Edquist, 2013 on policy mixes in innovation policy). Policy mixes are implemented to create synergy effects and to facilitate mutual reinforcement of the instruments (Capano, Pritoni, & Vicentini, 2019). Adopting instrument mixes is a strategic decision, which is explained by the aim of compensating for the weaknesses of certain instruments or tackling uncertainties regarding an instrument’s effectiveness⁶⁵ (Hassel, 2015, p. 10; Howlett, Mukherjee, & Woo, 2015)⁶⁶. In other words, instruments are assumed to “*work in concert to give affect [sic] to different aspects of a policy goal*” (Bali, Capano, & Ramesh, 2019, p. 3). The use of instrument mixes has also been observed in the field of science diplomacy; countries draw on a combination of instruments to address science diplomacy (cf. Epping, 2020; Flink & Schreiterer, 2010).

4.1.2. Taxonomies

To enrich the prevailing definitions of policy instruments, scholarly literature identifies various instrument taxonomies⁶⁷ that serve as analytical

65 Measuring the effectiveness of policy instruments has been discussed intensively by academic scholarship, most often in terms of goal attainment (cf. Howlett (2018); Bemelmans-Videc (1998); Peters et al. (2018)). Other contributions argue for moving beyond pure goal attainment and focus likewise on decision-making processes and the implementation phase as distinct aspects to take into account: “*the evaluation of policy effectiveness depends on a prior problem definition, the output of the political decision-making process, and the implementation of a policy measure*” (Héritier (2012, p. 676)). In addition, even other contributions argue in favour of also looking at issues of capacity, i.e. the ability and technical feasibility to reach effective solutions (cf. I. Mukherjee and Bali (2019)). Measuring the effectiveness of SICs is also an analytically and politically relevant aspect. However, whilst this study does not address questions of effectiveness, it proposes meaningful ways of measuring the effectiveness of SICs which go beyond goal attainment (section 13.5).

66 Analysing policy mixes/instrument combinations constitutes a distinct stream in scholarly literature (cf. Howlett (2004)).

67 These taxonomies are not uncontested since they are considered to omit decisive elements that allow for theory building (cf. Bressers and O’Toole (1998, p. 217)). Hence, they have a structuring and analytical purpose rather than explanatory power.

frameworks for their study. These classifications make it possible to understand how instruments embody political objectives while being reflective of their distinct characteristics and the ways they are designed to generate impact. A selection of taxonomies is reviewed to provide an understanding of the analytical categories. The NATO scheme, which was developed by Hood (1983), is a seminal contribution to classification literature on policy instruments. Hood identifies a “*tool kit*” (Hood & Margetts, 2007) that governments can draw on, mainly based on the resources which are deployed in a particular context. More specifically, these resources are categorised alongside four relevant dimensions of classifying policy tools: nodality (the provision of information), authority (instruments that command and forbid), treasure/finance (instruments drawing on financial incentives, for example loans or grants), and organisation (governmental activity that aims to directly influence citizens). The value of the NATO scheme was reconfirmed by Hood (2007) and is also reflected in its frequent application in scholarly literature (cf. Hassel, 2015, p. 8; Howlett & Ramesh, 2003; van Vught & de Boer, 2015). Other scholars, in contrast, distinguish between policy instruments according to the level of state intervention. Howlett and Ramesh, for instance, identify three types of policy instruments: voluntary, compulsory and mixed instruments (2003)⁶⁸. The degree of state intervention, thereby, ranges from high (compulsory) to low (voluntary) (Howlett, 2005; Howlett & Ramesh, 2003). Furthermore, Howlett points to two types of policy instruments: substantial and procedural (Howlett, 2000). Substantial policy instruments aim to “*directly affect the nature, types, quantities and distribution of the goods and services provided in society*” (2000, p. 415), whereas procedural tools “*are intended to manage state-societal interactions in order to assure general support for government aims and initiatives*” (Howlett, 2000, p. 412).

An equally widespread and accepted classification of policy instruments can be found in the work of Bemelmans-Videc, Rist and Vedung (1998). The authors provide a parsimonious distinction that is oriented towards the means used to achieve compliance and trigger social change: sticks, carrots and sermons. When there is a problem to be solved, instruments can a) take the form of sticks, meaning they are regulative, b) draw on economic means (either giving or taking), which corresponds to the carrot, or c) employ information, which is equivalent to a sermon. Besides this distinction, the

68 This work was first published in 1995 and, over time, has been slightly modified by the authors.

authors argue that instruments need to be examined in their respective contexts as they are assumed to be reflective of a certain *zeitgeist*. Bemelmans-Vidéc argues that policy instruments “*are often indicative of either a certain period in the political and administrative history of states or of a dominant political and administrative culture*” (1998, p. 4). This assumption is noteworthy and relevant to keep in mind for the subsequent analysis of the two SICs (see chapters 7 and 10). Schneider and Ingram (1990) on the other hand take a different angle on the analysis of policy instruments; they highlight the behavioural assumptions of policy tools and reassert that instruments are in fact a political phenomenon. They distinguish between five types of instruments to demonstrate how relevant, politically anticipated behaviour can be cultivated: “*public policy almost always attempts to get people to do things that they might not otherwise do; or it enables people to do things that they might not have done otherwise*” (A. Schneider & Ingram, 1990, p. 513). In this vein, Schneider and Ingram identify the following five tools: authority, incentive, capacity, symbolic/hortatory and learning tools. Authority tools are conventional governmental tools that authorise, prohibit or call for action; incentive tools, in contrast, “*induce compliance or encourage utilization*” (A. Schneider & Ingram, 1990, p. 515). Capacity tools are those that provide resources to reduce barriers, such as a lack of information or skills, thus providing information, education or other resources to resolve such issues. Symbolic and hortatory tools assume that individuals hold intrinsic beliefs, which may affect how and whether they perform certain policy-related actions; thus, symbolic and hortatory tools aim to address and impact these beliefs. Finally, learning tools are applied in cases when it is unclear how the target population can best be reached.

This selective overview reflects the diversity of shapes and characteristics of policy instruments designed to transmit and to respond to wider governmental objectives (for a recent inventory, see Capano & Howlett, 2020). The central categories that can be deployed for analytical purposes include the level of governmental steering or the resources that are utilised. These taxonomies distinguish between and structure the diversity of policy instruments in an analytical way. Furthermore, they shed light on the diversity of choices and reflect the spectrum of considerations which policy-makers encounter when designing new instruments. So far, science diplomacy literature has not systematically classified science diplomacy instruments in relation to these taxonomies. However, the contribution by Leese (2018) can be evaluated as a step in that direction. Scholarly literature has otherwise

only selectively analysed policy instruments (cf. Epping, 2020; Sabzalieva et al., 2021).

4.1.3. Instruments and Policy Design

To expand on the previous sections, policy instruments are traditionally understood as being the results of policy design⁶⁹ considerations (Capano & Lippi, 2017). Policy design is defined as a “*purposive attempt by governments to link policy instruments or tools to the goals they would like to realize*” (Howlett & Mukherjee, 2017, p. 140). Furthermore, policy design is viewed as a “*deliberate endeavor to link policy tools or instruments with clearly articulated policy goals or a policy problem*” (Bali et al., 2019, p. 3). These two definitions underline the functional perceptions of policy instruments in the sense that they are goal-oriented devices which are designed to tackle policy problems (cf. Hoornbeek & Peters, 2017; Peters, 2005). A central role in policy design is assigned to policy-makers: instruments that are designed in a top-down fashion should be sensitive to “*anticipatory design*” in terms of arranging and organising policies in the most suitable ways, in line with set goals (Bali et al., 2019, p. 5). Although policy design is strongly linked to purposive governmental action, scholarly literature attributes a central role to other (non-state) actors in the process (cf. Howlett, 2014a). Recent studies highlight, for instance, the crucial role of networks (Zito, 2018) and actors in the policy design process: “*policy design may not solely be introduced by a set of rational policy designers but rather through interaction between various actors who move in the confinement of the present institutions and on the basis of different interests and resources*” (Haelg, Sewerin, & Schmidt, 2020, p. 314).

What is more, scholarly literature argues that design choices and the design process itself are not linear but may be constrained by several aspects. For example, the capacities of optimal design might be limited by bargaining exercises (Howlett, 2014a, p. 188) or conflicting demands (Capano & Lippi, 2017) between actors which need to be reconciled. In addition, the “*multi-level, nested, nature of policy tool choices*” (Howlett, 2014b, p. 282) must be kept in mind. Accordingly, the options available are

69 The literature on policy design has encountered renewed interest in recent years. However, it also seems to be characterised by questions of demarcation and boundaries (cf. Howlett (2014a); Howlett and Mukherjee (2014)).

often limited and restricted, for instance by programme-level objectives or by the policy-making process environment, in terms of actors, institutions and practices (cf. Howlett, 2009)⁷⁰. Capano follows this line of argument and adds that “*policy design spaces*” might be constrained by legacies of the past, such as existing instruments (Capano, 2018, p. 676). In addition, contingency has been singled out as an element which may impact the policy design process. In a similar vein, “*situational logics*” have been identified as shaping the design process rather than careful assessments (Howlett, 2014a, p. 188 and. cf. Howlett, 2014b). This understanding constitutes a shift away from the ideal-typical understanding of how policies are designed. More specifically, situational forms of logic also refer to notions of contingency or contingent events, which are conceptually rooted in literature on path-dependency⁷¹ (cf. Pierson, 2000). Pierson defines contingency as follows “[r]elatively small events, if they occur at the right moment, can have large and enduring consequences” (2000, p. 263). In other words, the temporal ordering of events can sometimes play a decisive role for certain things to occur and to unfold impact (Pierson, 2004). It can be argued that an event might potentially have a large impact and major consequences if the timing is right. Furthermore, Pierson (2000) argues that if an event occurs too late, the effect might get lost and this would presumably produce a different outcome. Therefore, timing is seen as a crucial element in the design process. In combination, the aspects described above have a constraining effect on the ideal-typical design process. In essence, decisions might be constrained or driven by situational logic rather than being subject to intensive deliberations. This is seen as explaining why certain instrument choices are made and how particular shapes emerge.

In summary, the previous sections have outlined the “*generic*” (Hood, 2007) understanding of policy instruments in scholarly literature; policy instruments are designed to respond to wider governmental goals or selected problems. As such, they are seen as functional tools that are the result of deliberate design processes. These processes might, however, be subject to constraints, such as distinct actor configurations and interplay, as well as arrangements that have evolved institutionally in the past. This might take the

70 Other research streams focus on aspects of instrument choice/design and aim to unravel why certain policy instruments have been utilised by policy-makers instead of others; see Capano and Lippi (2017).

71 The concept of path-dependency is understood as decisions or events which are “*shaped and limited by constraints imposed by past policy*”; see Harmsen and Tupper (2017, p. 351).

form of instrument legacies or actor constellations (i.e., the role of certain key stakeholders, such as intermediary organisations). These premises are subject to reflection in light of changing (new) governance arrangements and actor constellations (as will be discussed in the next section).

4.2. A Renewed Focus on Policy Instruments

A complementary (non-rivalrous) approach to the previously described functional understanding of policy instruments are “*institutions-as-tools*” approaches (Hood, 2007, pp. 134–135). Instruments are defined as institutions in the sociological sense and thus challenge key assumptions of generic policy instrument approaches⁷². In addition, this posits a distinct framework for analysis. Institution-based approaches are inspired by the rise of a new governance paradigm (Salamon, 2000, p. 1613). Salamon observes a shift away from hierarchical governance structures to network governance structures. This implies that governments increasingly draw on other (non-state) actors when solving public problems. The inclusion of non-state actors in addressing public problems has also been pointed to in the comparative overview of SICs (chapter 3). A proliferation of policy instruments is seen to be reflective of these changing arrangements, and Salamon argues that each of these instruments possesses its own characteristics and logics, in essence their “*political economy*” (2000, p. 1613). What is more, Salamon suggests that policy instruments are “*profoundly political: they give some actors, and therefore some perspectives, an advantage in determining how policies will be carried out*” (2000, p. 1627). To pursue this further, Salamon argues that choosing an instrument is already a “*political battle*” (2000, p. 1627). These considerations reflect a different understanding of policy instruments than the one presented in the previous sections⁷³ (see section 4.1.1): “*a tool, or instrument, of public action can be defined as an identifiable*

72 Scholarly literature often distinguishes between organisations and institutions (cf. W. R. Scott (2008)) and sees them as competing approaches. This study is aware of the theoretical implications which each perspective brings. In this study, SICs are conceptualised as organisational policy instruments, which are analysed from an institutional perspective.

73 In line with that understanding, Salamon proposes a four-fold typology of policy tools to visualise the complexity of instrument choice (2000, pp. 1650–1669): 1) degree of coerciveness, being the restriction or en-/discouragement of certain behaviour; 2) degree of directness, referring to the involvement of governments, measured as low/medium/high; 3) automaticity, addressing whether a tool establishes

method through which collective action is structured to address a public problem” (Salamon, 2000, pp. 1641–1642). Salamon’s definition emphasises the *structuring* role of instruments (as opposed to the technical, functional understanding). The work of Salamon marks the dawn of a new pathway for studying policy instruments and has laid the foundations for Lascoumes and Le Galès’ (2007) intellectual approach, which will be discussed in the next section.

4.2.1. Instruments as Institutions

This changing understanding of policy instruments has been consolidated in the work of Lascoumes and Le Galès (2004, 2007) and will also be adopted as the main understanding in this study. The authors follow Salamon (2000) in terms of conceptualising policy instruments as institutions in a sociological sense, although they refer to instruments rather than tools⁷⁴. They draw on Powell and DiMaggio (1991) to define an institution as: “*a more or less coordinated set of rules and procedures that governs the interactions and behaviors of actors and organizations*” (Lascoumes & Le Galès, 2007, p. 8). The view of policy instruments as institutions that shape and govern interactions constitutes a distinct difference to the traditional understanding of them, which regards policy instruments as being the functional outcomes of policy design processes (cf. Howlett, 1991, 2000). This conceptual shift inverts the prevailing conceptualisation of policy instruments (see section 4.1), albeit in a complementary way (cf. Hood, 2007). To explicate, instruments are assumed to be carriers of meanings and norms that structure interactions. Accordingly, they play a central role when attempting to understand (changing) governance and public policy arrangements. A public policy instrument⁷⁵ is defined as:

new structures or uses the existing administrative apparatus; and 4) visibility, as being indicative of how visible the tool is, particularly concerning budget issues.

74 The authors propose differentiating between instruments, being a social institution, techniques (a device to measure the instrument) and tools, being a “*micro device*” within the technique (Lascoumes and Le Galès (2007, p. 4)).

75 In line with their understanding of policy instruments, the authors distinguish between five types of instruments (Lascoumes and Le Galès (2007, p. 12)): legislative and regulatory, economic and fiscal, agreement- and incentive-based, information- and communication-based, and de facto and de jure standards/best practices. The first two models are viewed as being classical governmental instruments; the last three types are understood as a reflection of a new types of policy instruments enact-

4. Towards a Conceptual Framework

“a device that is both technical and social, that organizes specific social relations between the state and those it is addressed to, according to the representations and meanings it carries. It is a particular type of institution, a technical device with the generic purpose of carrying a concrete concept of the politics/society relationship and sustained by a concept of regulation” (Lascoumes & Le Galès, 2007, p. 4).

The aspect of governance arrangements is noteworthy and should be discussed in more detail; scholarship assumes that instruments illuminate governance arrangements (Le Galès, 2011) since they generate insights into the relationship between those who are governed and those governing. In other words, *“every instrument constitutes a condensed form of knowledge about social control and ways of exercising it”* (Lascoumes & Le Galès, 2007, p. 3)⁷⁶. In a similar vein, it has been argued that instruments determine certain conditions; for example, they *“confront actors with structures of opportunity, influencing how they behave and privileging certain actors and interests over others”* (Kassim & Le Galès, 2010, p. 4). This underlines the structuring and organising function that instruments have. Therefore, it is assumed that instruments reflect and reveal distributions of power between actors. Moreover, they determine which resources can be *“used and by whom”* (Le Galès, 2011, p. 11). In combination conceptualising instruments as institutions entails a distinct set of assumptions and provides a lens for understanding governance arrangements because they are seen as having a transformative and shaping role for their environment (Lascoumes & Le Galès, 2007, p. 8 and cf. Saurugger, 2014) rather than being neutral devices.

Thus, the analysis of policy instruments therefore needs to account for this understanding. Moreover, the use of an instrument, i.e., its instrumentation, presents a distinct avenue for reflection. The central thesis of Lascoumes and Le Galès is that policy instrumentation

“means the set of problems posed by the choice and use of instruments (techniques, methods of operation, devices) that allow government policy to be made material and operational. Another way of formulating the issue is to say that it involves not only understanding the reasons that drive

ed by governments, while a trend is visible towards the adaptation of incentive-based instruments.

76 This is shared by D. Braun and Capano (2010), who argue that instruments are a form of social representation and reflect certain societal beliefs.

towards retaining one instrument rather than another, but also envisaging the effects produced by these choices" (Lascoumes & Le Galès, 2007, p. 4).

In addition, instrumentation is viewed as being profoundly political: choosing a certain instrument *"may form the object of political conflicts"* (Le Galès, 2011, p. 11) and structure the process and its potential outcomes. To pursue this even further, apart from the choices for particular instruments, it is equally essential to understand their development and *"identify their uses"* (Le Galès, 2016, p. 518). Focusing on the use of the instruments, once they are in place, constitutes a relevant avenue for research because of the structuring character that is assigned to them. Le Galès explains that *"once in place, these instruments open new perspectives for use or interpretation by political entrepreneurs, which have not been provided for and are difficult to control, thus fuelling a dynamic of institutionalization"* (2011, pp. 151–152). While scholarly literature has analysed the choices of instruments and the distinct instrumentation effects this might create (Marques, 2018; Reale & Seeber, 2011), an analysis of instrument use is seen as an equally relevant avenue (cf. Ravinet, 2011). In other words, analysing the use of the instrument and its interpretation by key actors addresses relevant considerations that: *"illustrate the scope of the register of potential instrument appropriation and [...] underline the transformative effects that different uses may bring"* (Lascoumes & Simard, 2011, p. 15).

Rather than being vectors that embody stable notions and meanings (Lascoumes & Simard, 2011), once in place, instruments might develop a life of their own that differs from what policy-makers had initially anticipated (Kassim & Le Galès, 2010). Accordingly, the use (instrumentation) and interpretation of a policy instrument might again fuel institutionalisation dynamics. Furthermore, scholarship argues that the instrumentation might also be subject to change over time and in different contexts (Jenson & Nagels, 2018). To sum up, conceptualising instruments as institutions constitutes a core assumption of this study. This understanding challenges some of the previously mentioned assumptions that instruments are neutral devices that primarily respond to politically anticipated goals (see section 4.1). In the following section, the notion of instrumentation is introduced in more specific terms and linked to how it may fuel institutionalisation dynamics.

4.2.2. Instrumentation and Institutionalisation

The previous section referred to the notion of instrumentation as a central element in the analysis of policy instruments, which are conceptualised in a sociological sense. This is because the instrumentation of policy instruments might create distinct effects and foster institutionalisation dynamics (Lascoumes & Le Galès, 2007). Institutionalisation is thereby understood as the “*stabilisation of public policy instruments*” (Newman, 2009). More specifically, institutionalisation is also defined as *a process by which individuals create a common definition of a social reality* (Mayntz & Scharpf, 1995)⁷⁷. Le Galès (2011) explains that instrumentation should be studied by first connecting the development and choice of an instrument with its implementation and then looking at how the instrument is used (these two steps inform the heuristic framework that will be used for the analysis of SICs, see section 4.2.3). The use of an instrument is seen to create an instrumentation output, which encompasses the procedural dimension in terms of “*instruments, budgets, rules, norms and standards*” (Le Galès, 2016, p. 518). Yet, output can also be “*medium and long-term in terms of (in) ability of policies to organize a policy field and influence social behaviour through conflict resolution, the allocation of resources and the imposition of sanctions*” (ibid.). In other words, analysing the instrumentation, i.e., the use of instruments, is essential since this may create distinct effects which promote institutionalisation dynamics. Lascoumes and Simard identify three instrumentation effects (2011, pp. 15–16):

- 1) Aggregation effect: the instrument brings together heterogeneous actors who work on a certain topic; this ultimately leads to a modification of their initial positions (understood by the authors in an actor network sense). In addition, this might create inertia effects, which, to some degree, explain an instrument’s resistance to change (a definition of inertia will be provided further below).
- 2) Representation and problematisation effect: the instrument leads to a framing of the issue in the sense that it creates a direct cognitive effect and proposes an explanatory system
- 3) Instruments are not isolated devices but are embedded in their context and there may be distinct modes of appropriation (by key actors):

77 Original quote by Mayntz and Scharpf (1995, p. 42), drawing on Berger and Luckmann (1997): “*Institutionalisierung der Prozeß, durch den Individuen eine gemeinsame Definition der sozialen Wirklichkeit aufbauen*”.

professional mobilisation (i.e. “*affirmation of new competencies*”), reformulations (i.e. “*servicing particular interests and power relations between the actors*”) or resistance (i.e. “*to reduce the impact of the instrument*”) (Lascoumes & Simard, 2011, p. 15).

Lascoumes and Le Galès (2007) argue that these instrumentation effects might consolidate each other and reinforce a (gradual) process of institutionalisation. Ravinet (2011) also stresses the aspect of appropriation and describes the role of actors in this process: “*in some cases, an instrument can be put in place even when the actors have not really settled on how it should be used. They may discover the functions they attribute to it during the course of its development*” (Ravinet, 2011, p. 38). What is more, scholarly literature⁷⁸ reaffirms that instruments are bearers of changing ideas and that their functions may also change (Ravinet, 2011). In other words, they are subject to instrumentation by key actors (D. Braun & Capano, 2010, p. 13). Before we proceed to the next section, it is relevant to discuss the notion of inertia as a distinct instrumentation effect. Lascoumes and Le Galès (2007) do not define inertia in their writing (cf. also Lascoumes & Simard, 2011 do not specify this). However, the way that the notion is used seems to reflect an understanding of continuity and resistance over time, particularly in light of external events, such as governmental changes. This understanding differs from how inertia is defined by path-dependency scholars, such as Pierson (2000). Furthermore, assumptions such as equilibrium situations are not key to the work of Lascoumes & Le Galès (2007). Nevertheless, it is essential to understand the concept of inertia; for the purposes of this study, inertia is regarded as patterns of continuity and a certain resistance to change over time (excluding considerations of equilibrium).

To sum up, it is assumed that the study of policy instruments and the study of instrumentation effects go hand in hand as the latter are seen to reinforce the (gradual) institutionalisation of instruments (this will be defined in more detail in section 4.2.3). Furthermore, shifting the analytical focus to instrumentation provides a new and refined perspective on how instruments might change and impact existing (governance) arrangements.

78 The work of Lascoumes and Le Galès has been increasingly applied in scholarship: (Menon and Sedelmeier (2010); Kassim and Le Galès (2010)). Contributions range from environmental studies (Halpern (2010, 2008)) to studies of higher education (Ravinet (2011); Reale and Seeber (2011); Marques (2018)), the European Union (Bache (2010); Saurugger (2014)), and the study of science diplomacy (Epping, 2020).

4. Towards a Conceptual Framework

Moreover, instruments may unravel competition between those actors who steer and drive public policy (Badout, 2011). Therefore, adopting this perspective reveals the “invisible—hence depoliticized—dimensions of public policies” (Lascoumes & Le Galès, 2007, p. 7) and shows “what is at stake politically in a particular policy field” (Bache, 2010, p. 59). In the following section, these conceptual considerations will be translated into a two-step heuristic framework that provides the basis for the subsequent analysis of the two SICs.

4.2.3. A Heuristic Framework

Based on the conceptual considerations (Lascoumes & Le Galès, 2007; Le Galès, 2011), a two-step heuristic framework has been extracted and deployed in order to analyse the development and institutionalisation of SICs. These two steps are: 1) analysing the development of SICs and 2) analysing the use of SICs by key actors. These steps will be introduced and conceptualised in detail in the next section.

4.2.3.1. Step 1: Analysing the Careers of SICs

The first step involves historically reconstructing the long-term development (career) of the SICs, while at the same time disconnecting it from its goals (Halpern, Jacquot, & Le Galès, 2008, p. 2). This long-term perspective will be applied because instruments often reflect longevity, even in the light of governmental changes (the conceptual considerations of policy design inform this analysis, see section 4.1.3). Accordingly, this study focuses on the “long-term political careers of policy instruments, to analyse the debates surrounding their creation and introduction, the ways they were modified, the controversies” (Lascoumes & Le Galès, 2007, p. 17). Furthermore, scholarly literature argues that the effects of certain “decisions are likely to be enduring” (Kassim & Le Galès, 2010, p. 6). The genesis and establishment of SICs deserves particular attention since this phase is seen to reflect the *zeitgeist* at that time (cf. Bemelmans-Vidéc, 1998, p. 4) (see section 4.1.2). More specifically, the following relevant aspects should be considered: arenas of interaction, the key actors involved as well as the discussions that ultimately impacted and shaped SICs’ development. Focusing on these aspects also facilitates identifying arrangements that have evolved institutionally and instrumentation effects linked to the choice of the instrument (see

section 4.1.3). Linder and Peters also argued for this approach much earlier (1989, p. 39): “*an important component of understanding the instruments of government will be understanding where the tools come from (conceptually and practically) and the decisions processes involved in selection*”.

What is more, by reconstructing the development of SICs from a long-term perspective, the concept of critical junctures is employed. The notion of critical junctures is not used by Lascoumes and Le Galès (2007), who, in fact, largely refrain from conceptualising turning points in an instrument’s development. Critical junctures are understood as decisive moments or turning points which change and impact the previous workings of instruments (Hall & Taylor, 1996; Pierson, 2000)⁷⁹: “*Junctures are ‘critical’ because they place institutional arrangements on paths or trajectories, which are then very difficult to alter*” (Pierson, 2004, p. 135). Scholarly literature assumes that critical junctures are often linked to exogenous shocks, which are seen to be the source of change: “*long periods of institutional stasis periodically interrupted by some sort of exogenous shock that opens things up, allowing for more or less radical reorganization*” (Streeck & Thelen, 2005, p. 3) as opposed to incremental change (Caporaso, 2007; Mahoney & Thelen, 2009). According to Harmsen and Tupper, “*the existence of such critical junctures [is] undoubtedly [...] easier to assert than to define precisely*” (2017, p. 351). The concept of critical junctures proves to be a useful lens for analysing the development of SICs. It enriches the heuristic framework in such a way that it enables critical moments in the evolution of SICs to be identified and described; at the same time, it also points to changes in the instruments’ ways of operating. These critical moments may, for instance, refer to changes in SICs’ structures (such as the enlargement or reduction of a network and the potential implications of this), as well as to governance arrangements which introduce new steering or financing structures.

4.2.3.2. Step 2: Use of SICs by Actors

In the second step, the concept of instrumentation is analytically deployed and its potential effects are explored, which may reinforce the (gradual) institutionalisation of SICs. In addition to analysing the choice of a particular

79 The concept of critical junctures is deeply rooted in historical institutionalism (cf. Pierson (2004); Capoccia and Keleman (2007)).

policy instrument, we need to examine instrumentation as it is also inextricably connected to the use of the SICs by key actors (Lascoumes & Simard, 2011; Le Galès, 2011). Analysing the way actors use SICs facilitates an understanding of institutionalisation processes: the “*institutional context, the narratives through which instruments are interpreted and responded to, and changing perspectives as actors adjust to new instrumentation and to each others [sic] responses over time*” (Newman, 2009, p. 4). In line with Newman, this study’s analytical focus will be on the interpretation and the use of SICs by their key stakeholders. This reveals the distinct instrumentation of SICs and may thus reinforce and explain their (gradual) institutionalisation. Lascoumes and Simard argue that such approaches: “*illustrate the scope of the register of potential instrument appropriation and [...] underline the transformative effects that different uses may bring*”. (2011, p. 15). This study hence develops a distinctively actor-centred perspective on SICs (and thus on science diplomacy) and reveals actors’ differing rationales. The next section will conceptualise the use of the instruments by its actors in more detail to enrich this heuristic framework⁸⁰.

4.3. Conceptualising Actor Rationales

In order to develop an actor-centred perspective on SICs, a framework is needed, which conceptualises organisational behaviour and provides an insight into why actors join SICs. This study thus mobilises meta-organisations theory⁸¹ in a selective way (Ahrne & Brunsson, 2005, 2008). This approach provides an orientation on how and why actors might use SICs; however, it is relevant to note that this study does not aim to conceptualise SICs as meta-organisations. On the contrary, this thesis conceptualises SICs as organisational instruments in the sense of them being institutions. Nevertheless, meta-organisation theory has a distinct explanatory value because of its organisational and actor-centred perspective. In essence, meta-organisation theory aims to explain why organisations participate in or create

80 Please note, in this study the focus is not on individual actors but on organisations which participate in SICs (see also section 3.3.4).

81 Meta organisations are defined as organisations that have other organisations as members and “*have assumed the form of associations*” (Ahrne and Brunsson (2005, p. 431)). Meta-organisations possess a set of “*endemic characteristics*” (Ahrne and Brunsson (2005, p. 431)) which scrutinise widespread assumptions in the literature on organisations (cf. Ahrne, Brunsson, and Seidl (2016, pp. 4–5)). This mainly relates to two concepts: environment and membership.

other (new) organisations, in other words, why organisations participate in collective action. Collective action is also a key element in relation to SICs. What is more, the key stakeholders that are analysed in this study are organisations (see chapter 3). Hence, this framework seems applicable for conceptualising their interpretation and their use of SICs. Furthermore, meta-organisation theory considerations are used selectively to the extent that they: a) explain the collective behaviour of organisations and b) reveal an insight into actors' sense-making by drawing on a distinct set of specific rationales. Accordingly, this study deploys certain meta-organisation theory assumptions which shed light on organisational behaviour. Moreover, it develops a distinctively actor-centred perspective, without claiming that SICs are meta-organisations (it also refrains from using key meta-organisation terminology and adopts more general notions, such as collective action and stakeholders, where possible).

4.3.1. Creating and Sustaining SICs

Understanding why key stakeholders (i.e., organisations) create and participate in collective action is central to this study. This is best understood by taking a step back and discussing why collective action was initially considered. According to scholarly literature, meta-organisations (and thus collective action) can either result from a demand of its prospective members⁸² or external actors (Ahrne & Brunsson, 2008, pp. 66–77). In other words, the desire to organise collective action might develop either due to perceived urgency among certain organisations or due to an external demand, such as a political initiative to consolidate collective action (the latter aspect aligns with policy instrument design considerations as discussed earlier in section 4.1.3). Different starting positions and sense-making are assumed depending on this initial decision: these may either lead to immediate support because there is a perceived added value in this collective action (Lubell, 2003), in contrast to added value that first needs to be created. Scholarly literature identifies four overlapping purposes which explain the creation of meta-organisations (Ahrne & Brunsson, 2008, pp. 66–77). Rather than drawing on meta-organisations terminology, these four purposes are described more generally as promoting collective action and

82 In meta-organisation theory, the concept of membership/members is central. In the context of SICs, stakeholders are referred to.

explaining why stakeholders choose to engage in this. Firstly, attempts are made to change patterns of interaction. More specifically, this links to the provision of information and increases the (common) knowledge base, while also facilitating exchange and support for individual stakeholders' operations. Ahrne and Brunsson argue that these considerations are particularly relevant to meta-organisations in science and research (2008, p. 66) and thus presumably also to instruments such as SICs, which also operate in this domain. In addition, a key purpose might be to strengthen collaboration (between members) in order to tackle competition.

Secondly, key stakeholders may take a deliberate decision to promote and engage in collective action to influence the environment by providing more and better resources (as well as influence). Thirdly, collective action may tackle questions regarding identity and status: the creation of a meta-organisation may aim to “*create, reinforce, or at least confirm a certain identity*” because membership is linked to aspects of similarity (Ahrne & Brunsson, 2008, p. 72). In other words, stakeholders that are similar or operate in a similar realm might join forces to gain more influence and be recognised for this. Finally, the creation of a meta-organisation might respond to an external demand (i.e., not from prospective members/stakeholders) with the aim of changing the environment. To put this differently, an external push (i.e., governmental) might bring about collective action. The authors argue that the initiation of collective action can in fact be a response to a mix of purposes, which either derive from stakeholders themselves or from external actors. These purposes can be seen as providing general justifications of why collective action is primarily considered to be useful. The next section will focus on the sense-making of individual organisations and will identify more specific rationales.

4.3.2. Rationales for Joining SICs

If the focus is shifted to the specific rationales, a refined set of considerations can be extracted from meta-organisation theory (Ahrne & Brunsson, 2005); these considerations are applicable to this research context (see section 4.2.3) because they facilitate explanations of why individual organisations choose to participate in collective action (see Table 7). These general meta-organisation theory assumptions are translated into specific rationales for joining SICs in the remainder of this section. Stakeholder rationales for joining SICs primarily relate to general support for a SIC's mission and

activities. More specific inducements include facilitating cooperation with other SIC stakeholders and a desire to change interactions with other stakeholders. Opportunities for collaboration must be understood as aiming to create an impact and “*to achieve external influence*” (Ahrne & Brunsson, 2005, p. 434). This is because meta-organisations (in this study, SICs) can organise collective action and are able to represent and lobby for their members’ interests, while also protecting them. This consideration is subject to further analysis because there are presumably differences in the degree of collective action that can be organised through a SIC in comparison to a formalised organisation.

Table 7 Rationales for Joining Meta-Organisations

Rationales for Joining Meta-Organisations
Inducements
(1) Support for the organisation’s purpose
(2) Cooperation opportunities between members
(3) Change interactions
(4) Exert external influence (through collective action)
(5) Protect own interests
(6) Benefit from social status and prestige
Expected contribution
(1) Cost-opportunity balance
Precautionary reasons
(1) Participate to not be left out
(2) Prevent undesired developments
Identity
(1) Logic of appropriateness
(2) Expectation to participate from environment
(3) Participation equals an entry criterion
Availability of alternatives

Source: created by the author based on the work Ahrne & Brunsson (2005, 2008).

Moreover, participating in SICs can be linked to stakeholders' desires to acquire social status and prestige. Other factors which influence decisions to participate in SICs relate to expected contributions for participation; these might be of a material nature, such as fees that must be paid; however, this also includes opportunities and specific channels of influence. Ahrne and Brunsson refer to "*low costs and good opportunities for exerting influence*" (2005, p. 434) as attractive conditions for participation⁸³.

In addition, stakeholders (members) may decide to join a SIC for strategic or precautionary reasons. More specifically, stakeholders participate in SICs to avoid being left out and not being able to influence what happens at a later stage. What is more, scholarly literature assumes that stakeholders might join a SIC although they do not support its overall idea; however, they participate to ensure they are in a position that allows them to potentially prevent undesired activities or developments (Ahrne & Brunsson, 2005, pp. 434–435). Another set of considerations which explain participation are associated with identity, such as "*logic of appropriateness*" (Ahrne & Brunsson, 2005, p. 435). When organisations wish to join a meta-organisation, they consider the differences and similarities to other members and are likely to join a meta-organisation that operates in a similar domain. In other words, stakeholders consider participating in SICs if there is a sufficient level of similarity to other stakeholders.

Moreover, scholarly literature assumes that participation is often expected by the environment and that non-membership/non-participation would raise questions, or even suspicions. Accordingly, scholarly literature argues that participation in SICs is viewed as facilitating and reinforcing the processes of stakeholders' identity construction. Moreover, it might be indispensable for an organisation to participate in collective action since this creates a source of credibility and non-members are looked at with suspicion. This aspect raises considerations of legitimacy: participation might serve as an entrance ticket or a door-opener in certain settings. This aspect would presumably depend on a SIC's degree of institutionalisation

83 The aspect of expected contributions is also highlighted elsewhere in scholarly literature. A model that also hinges on explaining actor rationales is the work by Coleman (2010), who introduces the resource pooling model. Coleman, in contrast to meta-organisation theory, formulates his assumptions based on individuals as members (rather than organisations). While assuming rationality among individuals, he claims that the most dominant explanation of why actors decide to bundle their activities and resources links to cost-benefit considerations. In other words, the expected outcome for participation must be higher than non-participation.

in terms of reputation building, for instance (as opposed to the theoretical assumptions that membership of a meta-organisation might suffice).

Lastly, the decision about whether to join a meta-organisation might also be linked to the alternatives that are available. In other words, a stakeholder's decision on whether to participate in a SIC might be explained by other opportunities which would enable them to achieve a similar goal⁸⁴. Moreover, Ahrne and Brunsson describe the tendency of meta-organisations to "*become organizations for the weak rather than the strong*" (2005, p. 435), which presumably holds true for SICs too. Following the authors' premise that meta-organisations and their members are rather similar by definition and that they might even face a certain level of competition, they claim that strong organisations are less dependent on meta-organisations than weaker members. This is because organisations that do well on their own, might be less incentivised to join a meta-organisation. In addition, scholarly literature argues more generally that some organisations are more likely to join SICs if other specific organisations are already on board and participating. In other words, the participation of some organisations might act as a pull-factor for others due to their reputation or the potential for cooperation. To sum up, this section conceptualised stakeholders' potential use of SICs. It revealed specific factors and considerations, i.e., the sense-making in relation to creating and joining SICs (inspired by meta-organisation theory). This section thus enriches the conceptual framework by providing explanations as to why actors participate in SICs and highlighting the expected (and nuanced) use of SICs; hence, it sheds light on the operationalisation of instrumentation⁸⁵.

84 Scholarly literature furthermore refers to organisations which deliberately avoid becoming members and keep operating alone (Ahrne and Brunsson (2005, 2008)). It might be more attractive for members not to join a meta-organisation because this may also generate a positive identity which facilitates its interactions with third actors (cf. Ahrne and Brunsson (2008, p. 84)). This aspect is to a lesser degree relevant for this study because the actors which are sampled participate in SICs.

85 The results of the analysis will be presented in an aggregated form. Accordingly, there is little added value to formulating specific assumptions. These would be more relevant if actors were singled out in the analysis, that is, actors who assign a greater value to the SICs might be more likely to use and promote them; actors who participate because of expectations might be less inclined to use SICs for strategic purposes and keep their involvement to a minimum.

4.4. *Conclusion and Discussion*

This chapter provided the conceptual framework for this study and positioned its approach in relation to relevant scholarly literature. Furthermore, key components were defined and a heuristic framework was extracted for analysis. This framework can be applied to explore the development and institutionalisation of SICs. Therefore, concrete research steps have been outlined which provide an analytical lens that guides the study's data analysis and presentation. To reiterate, policy instruments have been conceptualised in two ways: a) technical and static understanding, where policy instruments are seen as the distinct result of a policy design process and b) in terms of a political sociology framework. The latter approach has been adopted in this study. Following the main argument that instruments are institutions in the sociological sense, instruments were ascribed a transformative and shaping role in their environments. Moreover, despite initial goals, they have the potential to create their own effects, which may differ from those which were politically formulated. In this vein, it is argued that, in addition to analysing an instrument's constituencies, it is also relevant to analyse its instrumentation, i.e., the use of the instrument by actors.

To that end, a heuristic framework has been extracted that serves as the basis for the subsequent analysis of the development of the two SICs examined in this study. Two main components have emerged: firstly, a historical deconstruction exercise of the instrument (disconnected from political goals) and secondly, an analysis of the instrumentation and the potential effects that might be created. These effects are viewed as reinforcing a (gradual) institutionalisation process. SICs are governmentally initiated instruments that aim to promote collective action and strongly rely on their use by actors to avoid being an empty shell. To illuminate the instrumentation by key actors, the considerations of meta-organisation theory form a significant building block which helps to outline organisational interests. In other words, the theoretical premise facilitates an understanding of why organisations create and participate in collective action; furthermore, it conceptualises participation in SICs (and hence also science diplomacy) from an actor-centred perspective.

The framework has a significant value with regard to answering the main research question; however, it also has limitations, such as the assumption of a tabula rasa situation in relation to the design processes of instruments. Lascoumes and Le Galès (2007) fail to acknowledge and conceptualise that room for manoeuvring might be constrained by various external factors.

To give an example, policy-makers do not have an unlimited range of options to draw on due to various limitations, as explained earlier (see section 4.1.3). In addition, path-dependency effects might be at stake, and this could affect and limit future design choices. In addition, the concept of turning points in the instrument's trajectory is not conceptually developed in the initial work by Lascoumes and Le Galès (2007). To overcome this, the notion of critical junctures has been mobilised as an analytical concept which sheds light on turning points and key events in the development of the two SICs (see section 4.2.3.1). To conclude, it should not be assumed that instruments develop in a vacuum situation, as Ravinet (2011, p. 16) also pointed out; instead it is vital to consider contextual elements which derive from the aspects mentioned above. The next chapter will outline the methodological choices which guide this study.

5. Methodology

This chapter outlines and justifies the methodological choices which guide this study. In addition to the importance of adhering to scientific principles, transparency is vital in relation to the empirical path which guides this project because *science diplomacy* is a new research field which is limited by the lack of available empirical evidence (section 2.6); furthermore, SICs have largely been neglected by academic scholarship. This study follows an inductive and exploratory form of logic, which is manifested in a qualitative and interpretive research design to address the novelty of SICs as instruments (section 5.2). It is designed in a comparative way and analyses two significant SICs in depth (a *service-oriented SIC* and a *representational SIC*). This thesis uses new and first-hand empirical data in the form of interviews and documents. In combination, these two sources generate rich insights into the emergence and development of SICs and allow for triangulation. Moreover, these two types of sources can also compensate for each other's limitations, such as a lack of availability and access to data (section 5.3). This chapter also outlines the data processing and methods of analysis used (section 5.4). It concludes with a reflection on the methodological considerations and the limitations related to the choices that were made (section 5.5).

5.1. Research Questions

This thesis addresses the following key research question:

How can the development and institutionalisation of SICs as distinct policy instruments of science diplomacy be explained?

This question can be divided into four sub-questions which help to answer the main question. These four sub-questions draw on different data sources:

- (1) What are SICs and how can they be characterised?
- (2) Why did SICs emerge and how have they developed since their genesis? How can the current model be explained?

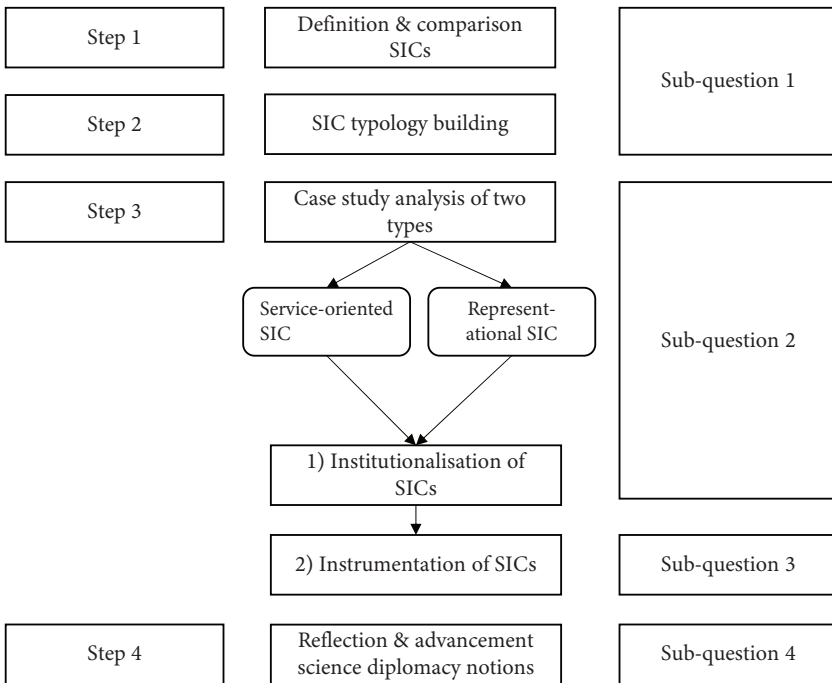
5. Methodology

- (3) Which actor groups are involved in SICs and what explains their participation?
- (4) How can the study of SICs be used to further understand and advance the concept of science diplomacy?

5.2. Research Design

This study is inductive and applies four steps in order to investigate the overall research question (see Figure 4). In step one, a working definition of SICs is embedded into a comparative overview of SICs. This comparison paves the way for a SIC typology-building exercise, which constitutes step two (cf. Kuckartz, 2006). In step three, two of the SIC ideal types which were identified in the previous step are subject to closer empirical investigation. A heuristic framework has been designed (see chapter 4) in order to examine the (gradual and historical) institutionalisation of the instruments, as well as their instrumentation by key actors. These insights inform step four of this study: reflection on the scholarship of science diplomacy, which is in its infancy and is largely based on normative prospects. The following section outlines the underlying methodological assumptions.

Figure 4 Research Steps



Source: created by the author.

5.2.1. Typology Building

In a first step, this study maps out the spread of SICs as a growing phenomenon. This instrument has to a large degree been neglected by academic scholarship and this comprehensive mapping exercise constitutes a logical first step to approaching the subject inductively. Furthermore, the mapping exercise serves as a basis from which to propose a solid definition of SICs, which then informs a typology building exercise. This typology building exercise is more encompassing than the one offered by Rüffin (2018) since it is informed by more countries and sheds light, in a more

refined way, on the governance of science diplomacy⁸⁶. Three different types of SICs are identified: service-oriented, representational and policy-led SICs. These instrument types form the structure of the SIC landscape. Typology building is considered to be a useful strategy for generalisation and structuring purposes in qualitative research; this is particularly relevant for novel phenomena (cf. Kuckartz, 2006). According to scholarly literature, there are four consecutive steps that lead to the creation of types: 1) identifying relative dimensions for comparison (in this case, governance set-up, funding mechanisms and core tasks, to name a few), 2) aligning the empirical cases accordingly, 3) analysing the context to ensure internal validity, and 4) characterising and defining these types (Kluge, 2000).

Internal homogeneity and external heterogeneity are key principles in typology building. Distinct types should be created that reflect high internal homogeneity, while also indicating a high degree of heterogeneity towards the other types identified (Kluge, 2000). These steps have been accounted for to ensure a rigorous approach towards the development of a typology (see section 3.4). In line with this research approach, “*natural types*” (Kuckartz, 2006, p. 4052) were identified, which are empirically inspired and derive from an inductive research exercise (as opposed to being theory-led). The typology-building exercise described above is the starting point for this study and underlines its exploratory approach. Moreover, this paves the way for the subsequent analysis since the aim is not only to describe SICs but also to understand and explain them (this will be explored in depth in the analytical chapters).

5.2.2. Comparative Research

This study is firmly situated in comparative design logic. This path enables a better understanding of SICs than would be possible if a single case study alone was used; a comparison allows the researcher to gain a deeper understanding of the phenomenon at hand (Heidenheimer, Hecló, & Teich Adams, 2005). Drawing on scholarly literature, comparative research “*collects data and/or carries out observations across national, geographical, and cultural boundaries in at least two of such entities, and systematically*

86 The attempt at typology building by Ruffin (2018) is less encompassing in terms of the countries it is informed by, while the criteria are also not specific and refined enough to shed light on the governance of science diplomacy (see footnote 59).

relates those entities in a comparative analysis” (Kosmützky, 2019, p. 1). Such literature assigns tremendous benefits and challenges to comparative research designs. For example, comparative research is complex since an awareness of different contexts is necessary. In the case of this study, an understanding of both the German and Swiss contexts is essential in order to position and understand the respective SICs. For instance, in relation to the level of stakeholder engagement in the German and Swiss SICs: would one really assume a similar degree of involvement to be at stake in both cases? Or might this be a false assumption based on insufficient contextualisation?

While language barriers were not encountered in these two cases, key challenges in comparative research relate to “*analytical logic*” and “*intellectual observation*” (Kosmützky, 2016). To expand on this, a continuous sense-making exercise needs to take place which navigates between uncovering similarities and differences and verifying them. While this constitutes a key challenge, such translation exercises also provide the greatest benefit (Gupta, 2012; Kosmützky, 2016; Smelser, 2003). The ongoing dialectic of similarity and dissimilarity enables unique elements to be identified. These considerations provide a key justification for the selection of two SICs for closer analysis in an attempt to expand the understanding of this novel instrument. In other words, this makes it possible to elucidate the “*features of a larger class of similar phenomena*” (Gerring, 2004, p. 341). Following the typology creation which structured the SICs landscape, two of the three models were selected for comparative analysis, as will be justified below (section 5.2.4): the service-oriented model (Switzerland) and the representational model (Germany).

5.2.3. Case Study Research

The qualitative comparative design here is further enriched by considerations of case study research. Gerring defines a case study as “*an intensive study of a single unit with an aim to generalize across a larger set of units*” (2004, p. 341). Case study research proves to be a promising strategy when considering

“a contemporary phenomenon within its real-life context, especially when [...] the boundaries between phenomenon and context are not clearly evident. In other words, you would use the case study method because you

deliberately wanted to cover contextual conditions—believing that they might be highly pertinent to your phenomenon of study” (Yin, 2003).

Case study research, however, does not suggest the use of a specific method. Instead, it recommends drawing on multiple methods to generate evidence such as interviews, surveys, observations or content analysis (Borchardt & Göthlich, 2009, p. 37; Yin, 2003). This further involves collecting various primary and secondary documentary sources such as protocols, (annual) reports, website information, speeches or newspaper articles (Borchardt & Göthlich, 2009). This combination of data sources allows for triangulation of the data (Flick, 2011), which is defined as combining various perspectives, or methods in relation to the research object. Flick argues that doing so allows researchers to generate new findings (Flick, 2011). The previous sections highlighted the benefits of comparative case study research while suggesting data sources to be sampled. The next section specifies the selection criteria.

5.2.4. Selection Criteria

The case study selection follows a purposive sampling strategy. This means that interesting and distinct cases are sampled according to the researcher’s judgement (Babbie, 2004, p. 183). Purposive sampling is justified in those situations where the number of cases to draw from is small (cf. Seawright & Gerring, 2008), as in the case of the present research context. This strategy hence motivates the exploratory and inductive character of this study. In this study, a *service-oriented SIC* (Swissnex) and a *representational SIC* (DWIH) have been selected for in-depth analysis. These cases were chosen because they are considered leading examples and forerunners of SICs, and the expected findings seem to be more distinct and innovative if these two models are chosen. Both SICs have been in place for (a very) long time. Swissnex could be described as the mother of all other SICs since it was created more than 20 years ago. Germany’s SICs were set up 10–12 years ago, while Swissnex served as an example of a policy learning exercise for Germany (Epping, 2020). There is also an element of natural selection due to the small number of cases to draw on (for instance, only one example of a representational SIC could be identified).

Apart from these considerations, analysing a service-oriented SIC and a representational SIC is seen to provide more innovative insights into the

institutional governance of science diplomacy. Both cases have established distinct organisational units, which largely operate outside the diplomatic umbrella and are hybrid concepts in terms of their actors, themes and set-up. As such, these two models differ from the third model which was identified: the policy-led model (for an overview of all three SICs types, see Table 6, p.49). Policy-led models are an integral part of a country's diplomatic representation body which presumably operate largely within this (bureaucratic) framework⁸⁷. In contrast to this, the other two SICs create a distinctly new setting which might redefine ways of working because of their network character as well as the different actor groups they bring together. Accordingly, they seem to operate in a less hierarchical way. What is more, an actor-specific perspective could be gained by studying these two models, which would presumably not be gained to a similar degree if a policy-led model was selected. This is because of the differing set-up of policy-led models (see section 3.4.3). Therefore, the level of institutional innovation that can presumably be revealed for the understanding of SICs is considered to be higher if a representational model and a service-oriented model are selected for in-depth analysis. This ultimately generates novel insights into the governance of science diplomacy and enables unique patterns of interactions to be identified. Policy-led models are nonetheless interesting cases for analysis, and distinct avenues for further research will be presented in the final chapter of this study (see section 13.5). The remainder of this section discusses obvious similarities and differences between the two cases in terms of their national contexts.

5.2.4.1. Similarities Between Germany and Switzerland

Germany and Switzerland are comparable based on some criteria; however, there are also notable differences. In scholarly literature, it is not uncommon to find comparisons of these two countries, for instance in relation to their (higher) education systems and policies (cf. Graf, 2013; Heidenheimer, 1997). To start with, both countries are federally structured and operate in a rather decentralised way (Griessen & Braun, 2008). This is illustrated

87 The policy-led model constitutes a distinct case to understand the interconnectedness of a SIC to political goals and how it responds to them. Moreover, studying policy-led models could be useful in analysing their functions and contrasting them with other divisions in embassies which have a similar purpose. Specific avenues for further research are discussed in section 13.5.

by looking at the relevant field of (higher) education and science policy: in Germany (higher) education and science policy is at the competence level of the Länder (BMBF, 2018), while in Switzerland, the Cantons are responsible for it (Pasternack, Maue, Hechler, Kolasinski, & Schulze, 2016, p. 164) with the exception of the two Federal Institutes of Technology⁸⁸. Furthermore, both countries have a strong and renowned higher education and science system in place. In the case of Switzerland, this is remarkable considering its “*small scale*” (Fumasoli & Lepori, 2011, p. 164). Switzerland’s research output is above average and this can be explained by factors such as the “*high endowment of financial resources and personnel*” (Fumasoli & Lepori, 2011, p. 164; Lepori & Fumasoli, 2010). Moreover, Switzerland is viewed as highly innovative (Hotz-Hart, 2012) and has produced a high number of Nobel prize winners. Germany also has a strong reputation regarding higher education, research and innovation. It is characterised by a fragmented and differentiated system (Edler, Kuhlmann, & Stegmaier, 2010) and strong academic self-governance (Simon & Knie, 2010). Both countries seem to perform well in terms of innovation. This is, for instance, reflected in their strong positions in international rankings, such as the Global Innovation Index (WIPO, 2021)⁸⁹. These aspects underline the similarities between the two countries, while there are also differences which will be discussed in the next section.

5.2.4.2. Differences Between Germany and Switzerland

There are a number of differences in terms of their structural characteristics such as country size (Chong, 2007). Switzerland is significantly smaller in terms of its territorial size, its population size, and the capacity and set-up of its administration, to name a few aspects⁹⁰. What is more, the diplomatic capacities of smaller states are also limited in terms of resources (Thorhallsson & Bailes, 2016). Accordingly, a different starting position can

88 The two ETHs (*Eidgenössische Technische Hochschule*, the Federal Institutes of Technology), ETH Zürich and EPFL Lausanne, are under the auspices of the federal government (SERI) (Pasternack et al. (2016); Lepori (2008)). The remaining higher education institutions are in the administrative realm of the Cantons (cf. Lepori (2008); Lepori, Huisman, and Seeber (2014)).

89 According to the most recent ranking, see WIPO (2021), Switzerland ranks top (this has not changed over the past five years) and Germany ranks in 10th place.

90 The number of universities also differs between Germany and Switzerland; however, given Switzerland’s performance, this seems to be a minor aspect.

be assumed for the two case countries. However, according to Long (2017, p. 146), “[w]hat matters is not ‘size,’ however defined, but the relationships between states”. To pursue this further, scholarly literature assumes that small states must develop distinct strategies to secure influence and defend their interests. Soft power (cf. Nye, 1990) is identified as a meaningful strategy to that end. More specifically, soft power strategies are seen as distinct tools with which to compensate for and facilitate “*diplomatic mediation*” (Chong, 2007, p. 1). Small states are assumed to exploit “*special characteristics*” to secure their positions internationally⁹¹ and they apply soft power strategies to achieve this (Constantinou et al., 2016, p. xvi; Thorhallsson & Bailes, 2016). In addition, they seek a specific niche to convey an image (cf. Nye, 2008) and aim for “*enlargement of their presence in the international community*” (Chong, 2007, p. 8). To that end, science and technology are mobilised.

To give an example, in its recent foreign policy strategy, Switzerland refers to the potential of soft power and the need to reinforce its position to participate in geopolitical matters (FDFA, 2019). This strategy assigns a crucial role to the promotion of innovation and technology, which are distinct elements of Switzerland’s foreign policy (ibid.), and which are intended to characterise and reinforce its international position⁹². Accordingly, soft power is viewed as a key ingredient of Switzerland’s foreign policy, as well as a tool with which to enhance its visibility, transmit a certain image and ultimately push Switzerland’s agenda. Since its establishment, Swissnex has been considered in an ideal-typical case through which to portray the image of Switzerland as an innovative, technology-driven country (interviews SIW2, SIS2, SIS7).

Soft power is also a key strategy for Germany, although it is a larger country. The importance of soft power has also been mentioned in relation to geopolitical positioning. Its relevance is evident in the three-pillar struc-

91 To take the example of another small state, Luxembourg can be mentioned. The Luxembourgish higher education system is, for instance, known to be highly international, see Harmsen and Powell (2019).

92 Switzerland is well known for its long-term neutrality in international affairs, particularly throughout wartime (Habicht (1953); Fischer and Möckli (2016); Goetschel, Bernath, and Schwarz (2005)). This principle of neutrality seems to be deeply embedded in Swiss politics, and Switzerland positions itself internationally in this way (cf. FDFA (2019)). According to Gabriel, the Swiss position is characterised by a certain dualism, even asymmetry: Switzerland strives on the one hand to maintain its international political independence, while on the other hand, Switzerland is rather interdependent “*economically, scientifically and culturally*” (2003, p. 1).

ture of Germany's foreign policy. In recent years, focusing on soft power has become increasingly relevant (Maaß, 2013), as expressed by the strong focus on promoting Germany's culture and education. These elements are seen as reinforcing Germany's foreign policy strategy, while also conveying a certain image of the country. Despite their different sizes and foreign policy positions (Switzerland is known for its neutrality, which is not the case for Germany (Harnisch, 2013)), in both cases, soft power is viewed as a tool that contributes to wider political agendas and as a means of consolidating their international positions⁹³. In addition, Switzerland and Germany are both countries with few natural resources, which explains the need to deploy strategies which secure their international positions.

5.3. Data Sources

Qualitative data was collected for this thesis. This is motivated by its aim of understanding “*phenomena, social fields, subjective and collective experiences and the related meaning making processes [...] also applied to discover and describe issues in the field or structures and processes in routines and practices*” (Flick, 2018a, p. 47). More specifically, two main types of data sources were collected: 1) expert interviews, which were enriched by personal communications that provided background information and 2) (primary) documents (see Table 8). For triangulation purposes, internet research was also carried out. What is more, the research also included site visits to two national SICs and attendance at information sessions and SIC events, which also informed this study. Due to this mix of sources, it was possible to triangulate the research data and also to compensate for the limitations of each source type. The data collection process was organised in an iterative and explorative way. This strategy was adopted to accommodate the newness of the field and the object of study. The specific choices for the study's two main data sources (interviews and documents) will be outlined in the next section.

93 In terms of soft power, one would expect that this is even more relevant in Switzerland, in comparison to Germany, given its size. For illustration purposes, reference is made to the Global Soft Power Index (Brand Finance (2020)), which measures soft power among different countries. The report attests that both Germany and Switzerland score high in terms of deploying soft power strategies, while Germany ranks second in the overall ranking and well before Switzerland, which ranks 8th (while it ranks higher on aspects such as *reputation*).

Table 8 Overview: Data Sources

	Data Type	Use in the Analysis
Interviews	40 interviews (<i>July 2017–February 2021</i>) with knowledge carriers in Germany and Switzerland from a) the political level, b) key stakeholders, c) representatives of the various SICs. For more details, see the appendix. In addition, one interview with a Danish SIC took place.	Main source of information which a) make it possible to retrace the historical development of the SICs and b) serves as the basis for the analysis of key stakeholders' rationales .
Personal Communications	Several informal background talks and personal communications (<i>March 2017–May 2022</i>)	Insights serve as background information to the main sources of analysis and help to contextualise and triangulate.
Documents	Policy Documents and briefs from various ministries between 2009–2022; For more details, see the Appendix.	Gain insights into the political dimension and importance of the topic; main sources which inform the analysis of changing political rationales.
	Internal Policy Documents: the DWIH's conceptualisation (March 2008, August 2008)	Reconstruct the development and initial discussions of the DWIH.
	Miscellaneous documents related to the DWIH: management summary of the evaluation (2015), revised DWIH concept (2017), standing orders (2018), minutes of meetings (2019/2020).	Background information and contextualisation for the DWIH's institutionalisation.
	Miscellaneous documents: (political) speeches, press releases, newspaper articles etc. between 2006–2022.	These sources make it possible to contextualise and mirror the prevailing <i>zeitgeist</i> . They also triangulate interview findings.
Internet Research	Websites: websites of key actors and SICs	Facilitate the understanding of the role of key actors and collect relevant information.
Site Visits	Site visit to two SICs (<i>November 2017</i>) Attendance of SICs' information sessions and events: DWIH information session (<i>July 2019</i>), Swissnex Day (<i>December 2019</i>)	Understand how SICs are set up in practice. Familiarise myself with SICs in practice, observe their self-understanding and reception among the wider community.

Source: created by the author.

5.3.1. Interviews and Personal Communications

Interviews and personal communications⁹⁴ serve as the main sources of information for a) tracing the development of SICs and b) identifying the key stakeholders' rationales for participating in them. Interviews were chosen as the data source here since they generate distinct insights, which would otherwise be difficult to acquire. This is due to the limited availability of other sources, such as documents (particularly in the case of Germany). Interviews are most frequently used in qualitative research (Mey & Mruck, 2007). Over time, its methodology has evolved towards different types of interviews, such as expert interviews, narrative interviews, discursive interviews and ethnographic interviews, to name a few. These interview types each have their own limitations and possibilities; furthermore, they differ in terms of how they are set up and their degrees of structuration (cf. Helfferich, 2011; Mey & Mruck, 2007; Roulston & Choi, 2018). This research opted for a combination of interview practices and drew on expert and narrative interviews. This choice can be explained by the dual intention of a) generating in-depth insights into selected aspects of the SICs' development (expert interviews) and b) providing sufficient room for the interviewees to reveal their perception of that process and their sense-making (narrative interviews).

To accommodate this duality in practice, the interviews were set up in a semi-structured way by drawing on a set of fixed questions. This is in line with conventional expert interview methods (Bogner & Menz, 2001; Flick, 2011). In addition, the interviews were conceptualised in such a way that they also allowed for narrative interview elements: respondents were encouraged to share their views and perceptions of aspects that they deemed relevant (Bevir, 2006; Helfferich, 2011). To give an example: questions were formulated in an open way, inviting respondents to share their experiences, whilst not imposing a certain view on them (cf. Soss, 2006; R. S. Weiss, 1994). To facilitate this, interviews followed a conversational style, which aimed to overcome the artificial interview situation. At the same time, this constituted a balancing act between focusing on ordinary language interviewing, which is a relevant aspect of narrative interviews (Schaffer, 2006), and also demonstrating familiarity with the context. The

94 Personal communications include emails and telephone conversations with individuals who are currently or were formerly involved in the respective SIC and inform this study. These sources will only be referred to occasionally.

combination of these two practices was adopted to ensure greater data validity. In the following section, the sampling methods are discussed.

5.3.2. Interview Sampling Method

For this study, knowledge carriers for SICs in their national contexts were relevant interview partners. More specifically, key stakeholders who were either involved in establishing SICs or who are currently involved in their operation were interesting partners as they had the potential to shed light on the development and use of SICs. Four groups of interview partners were identified: a) state officials, b) stakeholders in the German and Swiss science and research ecosystems, c) other actors involved in this field, and d) current and former SIC representatives. In line with the concept of snowballing, professional traits were decisive criteria in the recruitment procedure; these traits will be outlined in the next section (cf. Kristensen & Ravn, 2015). An iterative and inductive path characterises the data collection process; the topic was approached in an open and unprejudiced way, and there was leeway for slight adjustments following the initial results (drawing to some extent on ground theory principles). Accordingly, the interviews can be divided into two phases: the exploratory phase (phase I) and the consolidation phase (phase II).

5.3.2.1. Exploratory Phase (Phase I)

The research began with an *exploratory phase (phase I)* to acquire a better understanding of the instruments at hand and gain access to the field. To start with, an interview matrix was prepared, which identified key knowledge carriers and stakeholders who were involved in the SICs' development. This matrix was created by reviewing publicly available documents, such as (annual) reports, speeches and organigrams. In the case of Germany, creating the matrix proved to be challenging as until 2017, there was limited publicly available documentation regarding the DWIH (this is not surprising in light of its development process). Accordingly, this step was time-consuming, and it was difficult to identify relevant knowledge carriers and stakeholder structures. However, this step was crucial for gaining access to the field and navigate into the SICs' actor landscape (cf. Bogner & Menz, 2001). Based on this matrix, an initial set of nine interviews as well as personal communications were held; in order to gain

5. Methodology

a better understanding of SICs and compensate for the lack of other data sources, such as documents. These interviews served as an entry point and prepared the way for more consolidated data collection. Furthermore, the interviews allowed for the snowballing principle (cf. Goodman, 2011) to occur, since interview partners pointed to distinct developments and the role of key actors. This in turn expanded the matrix of potential interview partners.

5.3.2.2. Consolidation Phase (Phase II)

The bulk of the fieldwork was carried out between January 2018 and February 2021 (*phase II*) (see Table 9)⁹⁵. During this phase, **31 interviews** were conducted with knowledge carriers from the four distinct actor groups which were described earlier. The interviews again enabled refinement of the initial matrix of potential interview partners. The majority of the interviews were held face-to-face, while a few also took place on the phone. More specific information about the interviews, such as the length and date, are listed in the appendix⁹⁶.

95 Please note, a few background talks took place even after February 2021.

96 See Appendix 1 and Appendix 2.

Table 9 Overview: Interview Sample

Country	Number of Interviews				Total
	State officials	Science sector	Other actors	SICs	
Denmark				1	1
<i>Exploratory phase (July 2017–December 2017)</i>					
Germany	2	4			6
Switzerland	2			1	3
<i>Consolidation phase (January 2018–February 2021)</i>					
Germany	4	10	1	4	19
Switzerland	4	5	1	2	12
Total	12	19	2	8	41

Source: created by the author.

For the sake of transparency, it should be mentioned that around 15 interview requests were unanswered or were declined. Potential interview partners were either unavailable timewise, were not willing to participate or simply did not respond. The data collection process was impacted by “gatekeepers” (Wanat, 2008). To give an example, while the matrix made it possible to identify stakeholders, it was sometimes difficult to approach them as, in some cases, no contact details were publicly available. In these situations, third parties were asked for assistance; they either provided contact details or forwarded the interview request to the actors (due to data protection and privacy issues). While these attempts were successful in some cases, in others they led to a dead-end as the potential interview partners did not respond to the enquiries. In addition, for the DWIH, gatekeepers were encountered even in cases where a key actor had already

5. Methodology

agreed to an interview. More specifically, key actors who are involved in the daily management of SICs initially agreed to an interview; however, they later withdrew their offer on the instruction of their superiors. Instead, hierarchically more senior staff members were assigned to participate in the interview. This appeared to be an issue of ensuring that the official viewpoint was communicated (ensuring uniformity) and not leaving things to interpretation (prerogative of interpretation). This gatekeeping certainly shaped the interview composition; however, it is difficult to establish to what extent it impacted the quality of the data (presumably this limited the critical perspectives on the day-to-day management of the SICs).

5.3.3. Interview Processing

All interviews were audio-recorded and transcribed. The transcription followed the “*easy*” transcription guidelines stipulated by Dresing and Pehl (2017, pp. 21–23) to ensure better legibility. A few interview partners wished to receive a copy of the transcription and give their approval. This (largely) proved to be only a formality. In a few cases, the interviews were not audio recorded since the interview partners did not give their consent. Their reasons for doing so align with scholarly findings on opposition to audio recordings, such as discussing sensitive information, inhibitions and fears about saying something that is not in line with official positions (Vogel & Funck, 2018). In the few cases where interviewees did not agree to be audio recorded, notes were taken and transformed into interview protocols and postscripts. Vogel and Funck (2018) argue that drawing on interview protocols does not necessarily constitute limitation of data quality; instead, it might be a conscious and deliberate research strategy of its own. Once the interviews were transcribed, they were processed and analysed using *MAXQDA* software to facilitate efficient data handling.

5.3.4. Documents

Documents were the second main data source in this research: substantive primary and secondary documents were collected to trace the development of SICs over time and to enable triangulation. Documents were used as a distinct data source in order to analyse the political objectives associated

with SICs. More specifically, the following documents were collected (see Table 8): policy documents and briefs from various ministries, internal policy documents and miscellaneous secondary documents relating to the two SICs (such as evaluation reports, procedural rules and minutes of meetings). In addition, (political) speeches, press releases and newspaper articles were sampled. The availability of documents, however, differs between the two cases. The Swiss case reflects good coverage over time. Insightful documents are, for instance, the official *Botschaft*⁹⁷ documents. In comparison, the documentation on the DWIH was scattered and largely incomplete, until 2017. Hence, the constraints that are identified in scholarly literature, such as differing levels of completeness, the availability and quality of the documents as well as differing target audiences, also apply here (Bowen, 2009; Rapley & Rees, 2018)⁹⁸. The methods of data processing and forms of analysis are outlined in the following section.

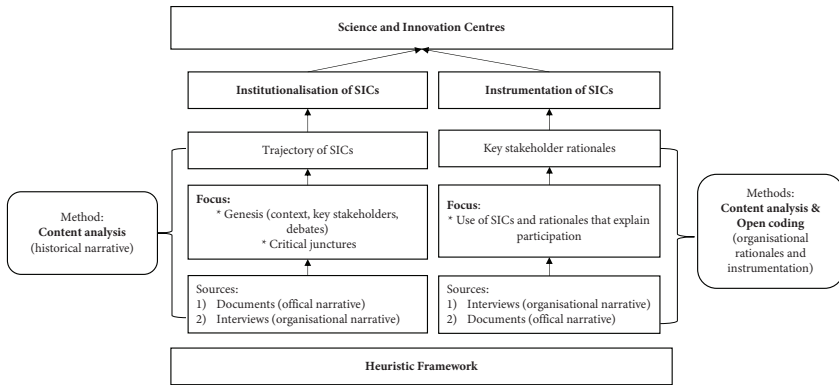
5.4. Data Analysis (Multi-Method)

The data was processed in line with the research design (section 5.2) and the overarching analytical framework. The framework (see Figure 5) organises the different data sources and methods of analysis around the key components of SICs' *institutionalisation* and *instrumentation*. The distinct role of interviews and documents in contributing to an understanding of the development of SICs and their instrumentation was highlighted in the previous sections. A tailor-made data analysis was conducted; this mainly draws on two methods, which are applied for each case study: content analysis and open coding. In other words, each case study follows this distinct logic.

97 *Botschaft* documents are official policy documents which specify the political goals and set the overall strategic direction and vision for the respective legislative periods, while also clarifying matters of funding. The Federal Council (*Bundesrat*), i.e., the highest executive body in the administration, prepares these documents every four years for the parliament. In this context, the *Botschaft* for the promotion of education, science and innovation is most relevant (*Botschaft zur Förderung von Bildung, Forschung und Innovation*, BFI-Botschaft).

98 See the Appendix for an overview of which specific documents were collected and analysed.

Figure 5 Analytical Framework



Source: created by the author.

5.4.1. Content Analysis

Content analysis is used as a strategy to analyse the development of the German and Swiss SICs and present the historical narrative. Content analysis is defined as the “*the process of organising information into categories related to the central questions of the research*” (Bowen, 2009, p. 32). To that end, relevant insights that point to the origins of the development of SICs were extracted in a systematic way across the two main data sources (interviews and documents) (cf. V. Braun & Clarke, 2006). More specifically, key dates and actors were identified, as well as the main points of discussion and contextual factors; this corresponds to the heuristic framework. In a second step, the information was organised and a sense-making activity took place; key events were arranged historically on a timeline (see Figure 6 & Figure 12 for a refined version of these findings). This process created a body of evidence. Furthermore, a continuous sense-making exercise and validation was carried out for the official data sources (documents) and the narratives which were presented in the interviews. Where applicable, ambiguities between the two sources are identified in the data presentation. Furthermore, content analysis has also been used to analyse the political objectives connected to SICs and to identify changing themes (see sections 8.1 & 11.1). Documents were used as the primary source for this analysis.

5.4.2. Open Coding: Gioia Methodology

The instrumentation of SICs was analysed by applying an open coding exercise based on the Gioia methodology. The Gioia method provides an inductive path to data analysis (Gioia, Corley, & Hamilton, 2013) in a more systematic and structuring way than content analysis; this method makes it possible for a researcher to examine the spectrum of rationales that guide actor participation in SICs (rather than discussing this per actor). The analysis followed three steps, which each increase in terms of the level of abstraction and provide a distinct data structure (examples of this can be found in chapter 8).

First, an open coding process was carried out to create first-order concepts (Gioia et al., 2013, pp. 21–22): interview passages that are relevant to the underlying research interest were coded. More specifically, those text passages were coded in which interview partners either gave reasons for their participation in SICs or explained why SICs are useful⁹⁹. In addition, distinct examples of specific use were coded, as were those cases which mentioned limits to participation. The interviews also included an avenue of reflection which addressed the hypothetical situation of closing SICs¹⁰⁰. This made it possible to identify the perceived importance of SICs, while also providing further insights into actors' sense-making. Labels were created for the passages that adhere to the original wording of the interviewees as far as possible. Since this step took place inductively, the coded extractions mushroomed: for example, in the German case study, the first analytical step led to 67 different codes and 450 text passages that were coded across 14 interviews. To reach a more manageable number of codes, the initial coding exercise was shaped by an iterative systemisation process to condense the insights: going back and forth between the interviews and

99 The analysis largely relied on self-reported actor rationales. This might be subject to certain bias, such as the intention to look better, and will be elaborated in the next section. To compensate for this, annual reports from key stakeholders were selectively analysed to reveal actors' participation and work triangulating to the self-reported use.

100 This counterfactual approach is seen to be a useful tool which sheds light on the (perceived) added value of the instruments or its effectiveness. This is elaborated in more detail in section 13.5.

codes took place to a certain extent, which led to the regrouping or merging of codes¹⁰¹.

In a second step, these concepts were considered on a higher and more abstract level, and aggregated second-order themes were formed. Finally, the data was organised into aggregate dimensions, which provided an even higher level of abstraction to the initial categories. These three steps generated a distinct data structure that provided reasons why actors engage with SICs. The analysis is visualised in a data structure (see chapters 8 and 11) which, according to Gioia, is presumably the most “*pivotal step in our entire research approach*” (2013, p. 20) since it transparently shows how the raw data is processed and analysed.

In the German case study, 14 interviews were analysed¹⁰² with 11 different actors (out of a total of 17): 10 key stakeholders and one chair of a local advisory body. In the Swiss case study, five interviews were analysed: three actors that are institutionally involved in the Swissnex Committee and two representatives of higher education institutions¹⁰³ that reflect the client-focus. The number of interviews differ between the two studies; this can be explained by natural conditions that derive from a comparatively smaller system as well as Swissnex’s different set-up and its actor involvement (see section 9.1), as well as non-responses to interview requests. While the German SICs involve multiple actors and stakeholders, the Swiss system is organised differently and is comparatively smaller. This, in turn, also impacts the number of potential interview partners (and stakeholders). These conditions account for the diverging numbers of interviews; however, they do not impact the quality of the data and it is still possible to draw valid conclusions.

101 The literature is indifferent on how strictly a coding structure should be developed to conduct rigorous qualitative research. For instance, Gläser and Laudel (2013) support modifying coding categories throughout the coding process, while other scholars, such as Schreier (2014), propose a sequential approach and argue in favour of sticking to a fixed scheme of categories at a certain point in the analysis.

102 With some key actors, multiple interviews and informal background talks took place. This will, however, not bias the results and is accounted for in the data analysis and the subsequent data presentation.

103 Four additional institutional stakeholders from the Swissnex Committee were approached to participate; however, requests were declined or remained unanswered.

5.5. Conclusion and Reflection

This chapter presented the distinct methodological choices which underpin this research. In terms of transparency, certain choices and set-ups also pose limitations and this requires consideration. In general terms, drawing on interviews and documents as data sources presents certain limitations that also apply here (see for interviews for instance Flick, 2018b; Helfferich, 2011; Kothari, 2004). Among these limitations are, for instance, interviewees' memories. Memories may be selective and skewed, and they may also be limited by stakeholders' attempts to present themselves in a positive light in retrospect. This might also hold true in relation to the self-reported use of SICs. This limitation is acknowledged and can be balanced out by drawing on multiple interviews and consulting the document types which were described earlier to validate these findings. In a similar vein, interviewees were asked to speak on behalf of their organisation. However, it is not possible to check to what extent interviewees consistently adhered to this request. Potentially, individual opinions may have nevertheless found their way into the interviews. These limitations were attempted to be controlled for by stressing that the view of the organisation should be conveyed in the interviews. What is more, additional documents (such as annual reports) were consulted and internet research was conducted to account for these limitations and facilitate triangulation. In addition, the gate-keeping restrictions and the denial of access to certain interview partners (as mentioned in section 5.3.1) should be mentioned as factors that limit, or at least shape, the exact composition of the data.

Finally, the interview process itself might be biased by the interviewer's role, which may impact the quality of the data (see Kothari, 2004, p. 99). For instance, questions might be formulated in a way that pushes the interview in a certain direction or the researcher may become a dominant interviewer (Mey & Mruck, 2007) rather than an active listener. The researcher's awareness of these potential biases is seen as a strategy to minimise the impact of such bias. In addition, the immediate and continuous transcription of the interview material inevitably triggers a process of self-reflection on how the interviews were conducted. To sum up, different strategies were devised to accommodate the limitations that the research design and methods entail. These strategies were thoroughly applied in order to ensure that rigorous qualitative insights can be provided. The next chapter presents the empirical findings, starting with the German case study.

Case Study (I): Representational Model—The DWIH, Germany

This part is dedicated to the case study presentation. In line with the overall aim of investigating and understanding the institutionalisation of SICs as instruments of science diplomacy, this case study is structured in three parts. First, a solid description of the German DWIH network is provided, as a manifestation of the *representational model*. This facilitates scholarly understanding of the instrument and helps interpret the data (chapter 6). This is more systematic than in the initial comparative chapter. The second part of this case study describes the historical development of the representational model (chapter 7). In line with the heuristic framework, attention is paid to the instrument's inception as well as critical junctures (for a definition, see section 4.2.3) throughout its development. This outlines the factors that explain the instrument's current form. The third part (chapter 8) of this case study provides an analysis of rationales that lead actors to participate in the DWIH. In line with the conceptual framework, this adds an additional layer to the institutionalisation of the instrument and describes its instrumentation. Finally, an interim conclusion is drawn, which brings together chapters 6, 7 and 8 and highlights the instrumentation of the instrument (section 8.7.1).

6. Description of the Current DWIH Network

The DWIH network currently comprises six offices in locations around the world. The DWIH operate in Brazil (São Paulo), India (New Delhi), Japan (Tokyo), Russia (Moscow) and the USA (New York) (see also chapter 3). Most recently, an additional office has been opened on the West Coast of the USA in San Francisco (DAAD, 2020). In essence, the core objectives of the DWIH are to “*increase the visibility of German innovation leaders around the world [...] raise awareness of the German science, research and innovation landscape, advise scientists in Germany and the host countries, and connect actors at the local level*” (DWIH-Netzwerk, 2019). This quote highlights two central themes: visibility and cooperation. The network is designed in such a way that it relies on several key actors (see section 6.1) who are involved in its governance to varying degrees (see section 6.2). This reflects the DWIH’s characterisation as a representational SIC. The DWIH largely operate outside the German diplomatic umbrella (see section 3.3.2) and generally have their own premises. The DWIH New York, for instance, is located in the United Nations office alongside other German actors. Similarly, the DWIH Moscow has shared offices. However, not all locations share a common site which gathers all (German) stakeholders under one roof (i.e., DWIH Tokyo). The exact constellations seem to be dependent on the on-site framework conditions, such as the availability of suitable premises (interview DWIH3). Furthermore, financial considerations may also play a part (interview GIW10). On a general note, the DWIH are deeply rooted in their respective contexts abroad. The focal topics also differ slightly at each DWIH and reflect the local context. However, their work is also guided by common annual DWIH themes. Accordingly, the DWIH conduct activities which are relevant to their national and host country environments (interview DWIH1) with the help of their local ecosystem of supporters¹⁰⁴.

104 Recent insights suggest that the total network of supporting actors across all locations comprises 100 different actors, cf. DAAD (2022).

6.1. Principal Actors

The DWIH network brings together three distinct actor groups which are all involved in its main governance structures. The DWIH maintains close ties to key actors from the political sphere, such as ministries, key actors from the research and science landscape, and actors representing the innovation sphere. The actors that represent the research and science landscape play different roles in the ecosystem and they also vary in terms of their characteristics, such as their size, age, budget, centrality to politics and, importantly, regarding their international outreach and institutional presence abroad. Overall, these key actors reflect the diversity of the German research and science landscape. As of today, there are in total 15 principal actors that are central to the DWIH network and have an ongoing governing function. Three ministries are among the key political actors, whereby the DWIH are under the financial and administrative auspices of the *Auswärtiges Amt*:

- *Auswärtiges Amt (AA)*
- *Bundesministerium für Bildung und Forschung (BMBF)*
- *Bundesministerium für Wirtschaft und Energie (BMWi)*.

The research and science landscape is represented by the key stakeholder *Alliance of Science Organisations in Germany*¹⁰⁵ (short: Alliance) with its 10 member organisations. On a contextual note, it should be mentioned that the German research and science ecosystem is characterised by the strong independence of its key organisations (interviews GIW3, GIW13) and by a “*dominance of institutional interests*” (Edler et al., 2010, p. 175, cf. Simon & Knie, 2010). This is reflected in their decision-making autonomy,

105 The *Allianz der Wissenschaftsorganisationen* is the association of the key research organisations in Germany. Its chairmanship rotates annually among its members. On a non-regular basis, the *Allianz* issues common position papers and voices its point of view on pressing issues and developments affecting the research and science sector. See https://www.dfg.de/en/dfg_profile/alliance/index.html (accessed 26.06.2020). By definition, the members of the *Allianz* have different functions and roles in the science and research ecosystem. Hence, they also have different points of departure. In addition, they differ concerning aspects such as closeness/centrality to policy-making, budget, age, etc. This gives them distinct positions within the system. To give examples of their distinct roles, the AvH and the DAAD both act as intermediary organisations to the AA, while the DFG is the research funding organisation; the FhG, HGF, LG and MPG are four non-university research institutions.

independent (political) agendas and the vested interests they bring to the table (Stucke, 2010):

- *Alexander von Humboldt Stiftung* (AvH),
- *Deutscher Akademischer Austauschdienst* (DAAD) — German Academic Exchange Service
- *Deutsche Forschungsgemeinschaft* (DFG) — German Research Foundation
- *Fraunhofer Gesellschaft* (FhG) — Fraunhofer Association
- *Hochschulrektorenkonferenz* (HRK) — German Rectors' Conference
- *Helmholtz-Gemeinschaft* (HGF) — Helmholtz Association of German Research Centres
- *Leibniz Gemeinschaft* (LG) — Leibniz Association
- *Nationale Akademie der Wissenschaften Leopoldina* — German National Academy of Sciences Leopoldina¹⁰⁶,
- *Max-Planck-Gesellschaft* (MPG) — Max Planck Society
- *Wissenschaftsrat* (WR) — German Council of Science and Humanities.

Furthermore, and this accounts for the DWIH's focus on innovation, there are two additional key actors:

- *Bundesverband der deutschen Industrie e.V.* (BDI) — The Federation of German Industries
- *Deutscher Industrie- und Handelskammertag* (DIHK¹⁰⁷) — Association of German Chambers of Industry and Commerce.

Together, these 15 organisations constitute the key actors that are involved in the overall, central governance of the DWIH network (as will be shown in the next chapter). Nevertheless, two actors can be singled out as playing a pivotal role in the spectrum: the AA and the DAAD. The AA is the ministry responsible for the network and it also provides the institutional funding base. Since 2017, the DAAD has been in charge of the daily coordination and management of the network. At the same time, it also provides the institutional and legal infrastructure for the DWIH to operate abroad.

106 On a contextual note, the data suggests that the Leopoldina joined the *Allianz* only at a later stage when it was announced that it would also become a national academy. However, it is unclear when exactly the Leopoldina became a member.

107 For an overview of the development of the AHKs and their embeddedness in overall German foreign policy, see Schultes (2011) and Jäger, Höse, and Oppermann (2011).

Thereby, the DAAD serves as an intermediary organisation to the AA¹⁰⁸ and is at times even considered to be a quasi-policy-maker in its own right (cf. Fromm & Raev, 2018, p. 286). This is due to the fact that it possesses great agenda-setting power as an intermediary organisation and works closely with key ministerial actors. This arrangement is not new per se, since the AA historically relies on intermediary organisations when it comes to the management of its programmes (Harnischfeger, 2007; Maaß, 2015)¹⁰⁹. Although the DAAD is responsible for the network's day-to-day management, the remaining principal actors are equally involved in the governance of the DWIHs, as will be shown below. This governance by multiple actors is deeply rooted in the DNA of the DWIH and constitutes a design principle, as well as a recurrent theme throughout the institutionalisation of the DWIH (Epping, 2020). Accordingly, the DWIH are considered to reflect the representational model.

6.2. Hybrid and Nested Governance Structure

The DWIH network is embedded in a nested governance structure that reflects and accommodates strong actor involvement¹¹⁰. Firstly, there is a central governance structure in Germany (headquarters) that steers and oversees the overall network. Secondly, each location has an additional layer of governance on-site with governing bodies that are composed of actors responsive to the respective context¹¹¹ where the network node is located. Despite these tight governance arrangements, the DWIH are conceived as an instrument that merges individual interests working towards a larger goal while retaining individual visibility (interviews DWIH1, DWIH2). In other words, it is often assumed that the DWIH are greater than the sum of

108 As has been previously mentioned, the Alexander von Humboldt Foundation also acts as an intermediary organisation to the AA.

109 The involvement of agencies and intermediary organisations is reflective of a general development in Germany in recent years. Ministries increasingly rely on agencies to conduct their daily work; Bach and Jann (2010) refer to this as an “*administrative zoo*”.

110 The information that is presented in this section is based on three different sources: a) interview data, b) internet research and c) procedural orders that were made available to the researcher (as amended in 2018).

111 In 2017, a reorganisation took place which created common on-site governance structures. Prior to this, there was a considerable degree of variety regarding these on-site structures, such as advisory boards.

its individual parts due, for instance, to synergy effects that are created in terms of visibility and outreach (interviews DWIH2, GIW8). This suggests an additional value of the DWIH.

6.2.1. Central Governance

The DWIH's central governance is composed of two tiers: a) the high-level board of trustees (*Kuratorium*) and b) the programme committee (see Table 10). The board of trustees is the central governance body and determines the strategic direction of the network. One of the board's core tasks is also making the final decision on the key (annual) theme that is to guide all DWIH activities. The board of trustees involves high-level representation from the 15 principal actors: from the political sphere, the presidents from the Alliance of Science Organisations and actors operating in the innovation realm¹¹². In addition, two seats are reserved for representatives from research companies. The board of trustees is chaired by the AA and co-chaired by the president of the Alliance of Science Organisations (a position which rotates among its members). This set-up has been subject to discussions in the past (see section 7.3.2). The board of trustees is supported by a programme committee that serves as the hands-on link between the strategic board of trustees and the DWIH locations. It is hence in charge of implementing strategic goals and putting them into practice, while also mediating between the two levels. The programme committee is comprised of the working level of all principal actors, in addition to the directors of the local DWIH and the chair of the local advisory body for each DWIH (a position which rotates biannually). The chair of the local advisory body may be a different actor to the ones described above (this is explained below).

112 For more information, see: <https://www.dwih-netzwerk.de/de/ueber-uns/kuratoriumsmitglieder/> (accessed 26.06.2020).

6. Description of the Current DWIH Network

Table 10 Organisational Structure: DWIH Network

	Governance Body	Role	Composition
Central Governance	Board of trustees (Kuratorium)	<ul style="list-style-type: none"> * Central governance body * Sets out strategic direction and controls the network * Agrees for instance on a common annual theme 	<ul style="list-style-type: none"> * AA, sectoral ministries, presidents of the alliance of science organisations, scientists, business representations, representatives from research companies * Chaired by the AA, co-chaired by president of alliance of science organisations
	Programme committee (Programmkomitee)	<ul style="list-style-type: none"> * Working level to board of trustees * Hands-on link between the strategic board of trustees and the DWIH locations 	* Working level representatives of the board of trustees, DWIH directors, chairs of local advisory boards
	Auswärtiges Amt	* Finances and administers DWIH network	* Auswärtiges Amt - Division 604
	DAAD staff section	* Day-to-day management; legal umbrella, responsibility, and coordination	
On-Site Governance	Executive Director, programme manager, local support team	* Daily management of the DWIH on-site	* DAAD branch office holder
	Local Advisory Board	* Advises and consults the work of the DWIH on site	<ul style="list-style-type: none"> * Constituted by actors that have an institutional presence abroad as well (supporters) and those planning to (associated supporters) * Regional German diplomatic representatives * Chaired by a president

Source: created by the author and based on interview data, internet research¹¹³ and procedural rules.

6.2.2. On-Site Governance

At each DWIH location, the network is run by an executive director, who is also in charge of the DAAD branch office. This was established following a major reorganisation in 2017, when the DAAD became more greatly involved in the governance process. Since then, the DAAD has provided the institutional and legal infrastructure for the DWIH and also borne financial

¹¹³ More information is available on the official DWIH's webpage: <https://www.dwih-netzwerk.de/en/who-we-are/organisation/> (accessed 30.07.2021).

responsibility for it (interview DIWH1). Prior to this, the leadership of the DWIH was in the hands of consortia made up of the key stakeholders (see Table 11, p. 123). Given this evolving (and accountable) role, it seemed justified that the DAAD took a more significant role in the management of the network in 2017 (interviews GIW2, GIW8, GIW13). Notably, this has continuously been under discussion throughout the development of the DWIH (interviews GIW5, GIW9, GIW15). Accordingly, a duality in institutional affiliation can be observed since the executive director represents the DAAD and the DWIH. While this may often create a synergy effect, these two institutional roles are also viewed critically by some actors. This is due to the balancing act of institutional interests and a (potential) lack of detachment from the institutional context. At times, this could raise the question of which affiliation takes precedence¹¹⁴. In other words, this duality is viewed critically in cases when the two institutional affiliations are in conflict and if one affiliation is more dominant than the other (interviews GIW8, GIW10). In the interviews, it became clear that visibility is a key aspect: Who is invited to an event? Which affiliation should take precedence—the DAAD or the DWIH? Or even, does the DAAD want to be invited as representing only the DWIH and not the DAAD? The interview data suggests that, ideally, there should be no conflict of interests; however, at the same time the subordination of the DAAD in favour of the DWIH is not anticipated. While these issues now involve the DAAD, they are not linked to the DAAD as such. These types of questions would presumably similarly arise if another institution (from the circle of principal actors) were responsible for the management of the DWIH.

Hence, this points to issues regarding the design principles (and these could possibly be overcome by installing an independent key representative, although this has so far been opposed). The executive director is supported by a programme manager and a local support team, although the team size varies according to the location. In line with the broad thematic scope, activities and events are organised on-site in a relatively independent way (interviews DWIH1). In addition, each location has a formalised advi-

114 The data reflects that there is an awareness of this dual institutional affiliation and a good role understanding of DWIH and DAAD interests. In potentially sensitive situations, it was revealed that the DAAD takes a neutral stance (interview DWIH3), while generally few critical situations have been encountered (interviews DWIH1, DWIH2, DWIH3). Moreover, reference is made to structural checks and balances arrangements, which aim to monitor any perceived imbalances, such as the local advisory boards chaired by a non-DWIH/DAAD representative.

6. Description of the Current DWIH Network

sory body, which oversees and advises on the work carried out by each office. The local advisory body consists of those national actors that have a presence abroad, also known as supporters. In addition, stakeholders who are not represented at that location can become associated supporters and can participate in the advisory body with voting powers. Furthermore, the German diplomatic representation body in the particular region is also involved¹¹⁵. The advisory body is chaired by a president from that group, who operates in close consultation with the DWIH management, sometimes even taking a representative role (interview DWIH1). Furthermore, due to this role, the chair of the advisory body is also formally involved in the central governance bodies (see section 6.2.1). These governance bodies are formalised, both at the central level and at the individual level on-site, with procedural rules specifying the composition, voting modalities and ways of operating (this new centralised structure is, however, contested and has been challenged on the grounds that it adheres to bureaucratic rather than a science-driven logic (interview GIW2)). To sum up, the DWIH are characterised by an actor-centred governance structure that is deeply rooted in their early years and foundational phase (Epping, 2020). The current structure resulted from a) bargaining processes among the stakeholders and b) an external evaluation which reflected on the work of the DWIH. In response to this evaluation, the DWIH's image and governance has become more streamlined, as will be shown later on (see section 7.3.2).

6.3. Funding

Since 2017, the DWIH network has been institutionally financed by the AA. The costs of personnel and certain types of activities are covered by institutional support from the AA, through the DAAD. In 2021, the total financial support provided to the DWIH locations (five, at that time)

115 This could be seen as involvement by the AA; however, the data suggests that on-site, these representatives do not fulfil a controlling and steering function (interviews DWIH1, GIS5). On the contrary, like all other members of the advisory body, they are in a position to make proposals for the work of the DWIH, such as for particular topics or events. This constellation nevertheless reflects the DWIH's nested governance structure.

amounted to approximately 1.5 million euros¹¹⁶ (source: personal communication 21.04.2022). This suggests that funding was reduced since data from earlier years (i.e., 2017) refers to the sum of 2.5 million euros. Prior to 2017, the network was funded on a project-basis, which meant that public money was allocated on an annual basis and the consortia had to apply for funding again each year. What is more, the data suggests that the DWIH can, in practice, provide limited amounts of funding for events which are organised by its supporters on-site. However, the exact amount differs strongly between the locations, and, in fact, it is reported that this financial support is seldom applied for¹¹⁷.

6.4. Political Embeddedness

Politically, the DWIH are situated in a governance architecture involving two main ministries: AA and BMBF. The DWIH are considered to be a hallmark in the AA's science diplomacy strategy, which was newly launched in 2020¹¹⁸ (Auswärtiges Amt, 2020c) and was part of foreign culture and education policy (*Auswärtige Kultur- und Bildungspolitik*, AKBP)¹¹⁹. Germany's AKBP can be classified alongside three main fields: culture and language, education and science/research, and communication and media. These three fields overall aim to create a pre-political room for dialogue and discourse, empower civil society and a free media as well as the creation of trust (cf. Anheier, 2017, p. 4), and facilitate a dialogue on values, i.e.,

116 To position this in terms of the overall public expenditure on research and innovation activities, please see the BMBF (2020b) and more specifically, see Anheier (2017).

117 This was confirmed through personal communication (12.05.2022). What is more, a trend is witnessed for joint events which are designed and conceptualised between supporters and the DWIH.

118 Prior to that, the DWIH were a key element of research and academic relations policy, which is the translation of *Außenwissenschaftspolitik* (AWP). In 2020, these activities were newly integrated into the science diplomacy strategy (cf. Auswärtiges Amt (2020c)). The science diplomacy strategy combines old instruments of the AWP and puts forward new ones (for more information, see section 8.1.4).

119 A budget of 2.1 billion euros was allocated for AKBP by the Federal Ministry of Finances (2020). Although this amount is shared between different ministries, the largest part resides with the AA (Auswärtiges Amt (2021)). The DWIH are not listed as a separate position since they are part of the DAAD's budget. According to Anheier (2017, p. 4), this sum is comparable to the budget of the USA for public diplomacy (see also interview GIS4).

“Wertedialog” (Maaß, 2013, p. 9). Each field draws on distinct instruments to supplement these topics with the help of intermediary organisations that operate on behalf of the government (Maaß, 2015). The DWIH belong to this education and research field. Simultaneously, the DWIH are anchored as an instrument in the internationalisation strategy that is accounted for by the BMBF for the whole government (BMBF, 2017a).

There are several other instruments that operate in the same realm¹²⁰, which include instruments to strengthen international cooperation, as well as instruments that are intended as branding exercises, such as “Germany – Land of ideas” or “GATE-Germany” (BMBF, 2017a, p. 98). In addition, classical programmes and initiatives that fund international (research) cooperation and mobility must be mentioned (cf. BMBF, 2020b). Compared to other instruments that are in the realm of the BMBF (cf. BMBF, 2020b), the DWIH can be singled out due to their long-term funding and institutional arrangements. These exceed other instruments in the toolbox, such as bilateral cooperation or mobility programmes. In this vein, projects for transnational education (*Transnationale Bildung* (TNB) projects) should also be mentioned (Raev, 2020), as well as other science attachés and their networks (Auswärtiges Amt, 2021, p. 88). Moreover, the DWIH should be understood in relation to other institutional presences abroad which are AA funded, while they should also be distinguished from them. These instruments include the DAAD, the Max-Weber Foundation, the Goethe Institutes (G. Schneider et al., 2000), the German Archaeological Institutes and German schools, to mention a few. However, although these instruments largely operate in the same realm and each constitute distinct institutions, unlike the DWIH, they do not have an umbrella function and are not set up in such a holistic way. In addition, the DWIH brings together a larger number and a wider range of actors. Finally, the political objectives attached to the DWIH are also notable and are subjected to a detailed analysis in the following section (section 8.1).

120 Scholarly literature regards this as a new development; it is seen as a move away from the focus on individual tools in favour of implementing tool mixes or toolkits to tackle specific issues (see section 4.1).

7. (Gradual) Institutionalisation of the DWIH

Following the description of the DWIH as an instrument (chapter 6), this chapter turns to an analysis of the *long-term career* of the DWIH. The (gradual) institutionalisation and development of the DWIH are described by paying close attention to their inception phase (section 7.1) since it is assumed that this is where key design principles were laid out. In addition, critical junctures throughout the instrument's career that have led to changes in the instrument's composition are identified (section 7.3). In combination, this historical perspective serves as a lens to explain the current form of the DWIH and to generate insights into the wider rise of SICs, being distinct instruments of science diplomacy adopted by highly innovative countries.

7.1. Genesis of the DWIH

In line with the policy instrumentation approach, in the following section, the main aspects that contextualise and anchor the creation of the DWIH are presented (for an overview of the milestones, see Figure 6 on p. 130). In principle, the DWIH are conceived to be an instrument that would benefit the whole ecosystem, since they intend to showcase and strengthen Germany's position internationally. However, the design and inception phase of the DWIH marked a tug of war at various levels and between the actors involved. Furthermore, the DWIH's creation phase revealed political friction and struggles, as will be shown in the following section.

7.1.1. Launch of the Initiative Außenwissenschaftspolitik

The development of the DWIH as a new and distinct policy instrument in the German context must be understood in light of the subordinate policy *Initiative Außenwissenschaftspolitik* (Auswärtiges Amt, 2009a) and cannot be disentangled from it. In January 2009, the *Initiative Außenwissenschaftspolitik* was publicly launched as a joint initiative of the *Auswärtiges Amt* (AA) and the sectoral ministry (BMBF) and introduced a set of associated

measures (tool mix) (Ammon, P., 2009; Auswärtiges Amt, 2009a; Steinmeier, 2009). The initiative was considered a milestone, setting them on the path of promoting international research and science cooperation towards conveying and reinforcing the realisation of Germany's wider foreign policy goals. Although some instruments that were subsumed under this initiative existed previously, they were subject to a renewed focus of attention and funding (cf. Erler, 2008). This newly devised initiative explicitly intended to draw on higher education and research as distinct, shaping elements of Germany's foreign policy (Auswärtiges Amt, 2009a, 2009b; Erler, 2008; Maaß, 2011, pp. 590–592). The package of policy instruments in the toolbox consisted of a range of instruments, such as scholarship programmes, initiatives to foster German language use (cf. Maaß, 2011) and the creation of a new position (*Außenwissenschaftsbeauftragter* (Götz, 2009)) in the AA that gave the new policy a political face, to name a few. Thus, the DWIH were just one instrument that was designed and launched in the governmental toolbox; however, they were a distinct, new institutional response (Erler, 2008).

7.1.2. Policy Entrepreneurs

The emergence of this initiative in January 2009 was, however, subject to intense debates and discussions among different actors in the (political) environment. The process of launching this new policy and the design of the DWIH started much earlier and seems to be strongly connected to the role and the ideas of individual policy entrepreneurs¹²¹. Back in 2006, Georg Schütte, secretary general of the Alexander von Humboldt Foundation initiated and fed a public discourse on the role of science in/for diplomacy¹²² (he later took the post of BMBF State Secretary). Publishing an article in the established German newspaper *Die Zeit* (Schütte, 2006), he called upon politicians to devise a coherent and systematic foreign science policy¹²³ in order to respond to challenges such as competing international science

121 Scholarly literature defines policy entrepreneurs as those “*who, from outside the formal positions of government, introduce, translate, and help implement new ideas into public practice*” (Roberts and King (1991, p. 147)). For more insights, see Gunn (2017).

122 Interview sources suggest that Georg Schütte got to know and was inspired by the idea of science diplomacy in the USA (interview GIS2).

123 Please note: Georg Schütte refers in his original text to the German term *Außenwissenschaftspolitik*, which translates as foreign science policy (this also reflects the

systems. Considering the fact that Germany is a country which lacks raw materials, he reasserted that Germany needs to stay competitive in times of globalisation and take an active role in shaping science internationally. To that end, a coherent strategy needed to be devised that would address the nexus of research, science and foreign policy more holistically than was the case at that time.

Schütte had found others who shared his views and they advanced the discourse on what became known as science diplomacy, as is evident from the different books he edited (Borgwardt, 2009; Schütte, 2007, 2008, 2009). Schütte's initiative was well received by the foreign minister, at the time, Frank-Walter Steinmeier, a social democrat (Steinmeier, 2008a, 2008b). There seemed to be a certain political momentum surrounding these developments: Steinmeier had just taken office in late 2005 and was generally open to the topic (in comparison to previous ministers in the foreign affairs department (interviews GIS2, GIW5, GIW15)). These developments culminated in the announcement by Steinmeier, early 2008, that the AA, together with the BMBF and in consultation with relevant science stakeholders, would launch a new internationalisation strategy for science and research in 2009, which would be the *Initiative Außenwissenschaftspolitik* (Steinmeier, 2008b). To contextualise this, the BMBF had just published a government-wide internationalisation strategy itself (BMBF, 2008). This political endeavour by the AA was clearly considered a response to increased global competition and was aimed at maintaining and strengthening Germany's reputation internationally, while also building bridges.

Hence, these measures were regarded as future investments (interviews GIS2, GIS4). Steinmeier further elaborated that the *Initiative Außenwissenschaftspolitik* would be firmly anchored in the third strong pillar of Germany's foreign policy (Steinmeier, 2008b): cultural relations and education policy¹²⁴. Approximately, 90 million euros were made available annually for

wording of the foreign ministry). Notably, the BMBF adheres to different wording: *Wissenschaftsaußenpolitik*. This translates as science/scientific foreign policy. The BMBF deliberately places emphasis on science (interviews GIS5, GIS6, GIW5, GIW9). The ongoing use of these two terms reflects the different focuses and understandings that prevail between the two ministries, ultimately culminating in the question: Who has the prerogative of interpretation?

124 Translates as *Auswärtige Kultur- und Bildungspolitik* (AKBP). Germany's AKBP dates back to the early 1950s and 1960s, when the institutional infrastructure was revised and consolidated. In the late 1960s, the role of cultural and education policy was strengthened and became the third pillar of a modern foreign policy (for a

the *Initiative Außenwissenschaftspolitik* (interview GIS2). The data reflects evidence that the political push for this initiative was clearly associated with AA (although in consultation with other actors)¹²⁵. This was not uncontested in the BMBF and proved to be a source of conflict, as will be shown in the following section (interviews GIW5, GIW6, GIW14). The launch of the *Initiative Außenwissenschaftspolitik* came at a late stage of Steinmeier's term and could be considered a last-minute measure. After the 2009 election, the initiative was further pursued by the new minister, Guido Westerwelle, though—word has it—apparently less enthusiastically.

7.1.3. Early Deliberations

Against this background, the idea of creating a novel instrument, such as the DWIH, was born. In 2008, and seemingly for the first time, the concept of the DWIH, as a distinct institutional instrument, was publicly announced by minister Steinmeier (2008b). More specifically, during a meeting of the Committee on Cultural and Media Affairs (*Ausschuss für Kultur und Medien des Deutschen Bundestags*), Steinmeier presented the wish of research and science institutions to have a *one-stop-shop* solution

reconstruction, see Singer (2003)). To this day, the other two pillars of Germany's strategic foreign policy are diplomacy and foreign trade policy (cf. Auswärtiges Amt (2019c)). For an overview of the (historical) development of this policy area, the work of Harnischfeger (2007) and Singer (2003) can be recommended. According to Maaß (2011), ever since then, the AKBP has gained ground and now represents a solid third pillar, if not the fundament, of Germany's foreign policy. Between 1998–2005, however, there were severe budget cuts for activities falling under the AKBP, and also some of the Goethe Institutes were closed (cf. Gauweiler (2018)). Hence, 2005 marked a low point, budget-wise, for the AKBP. Since then, the budget has steadily increased again, and also new structures, such as the DWIH, were established (cf. Deutscher Kulturrat e.V. (2018)). In addition, a paradigmatic shift in German foreign policy can be observed. In line with Steinmeier, the distinction between interior and exterior policy is outdated, as are national and international dichotomies. Instead, these concepts need to be considered together in order to deal with contemporary challenges (cf. Schaper (2016)).

- 125 The literature also argues that the boundaries between a country's internal and external affairs are increasingly permeable and have become blurred (cf. Weigel (2019)): cultural and educational policy is strongly linked to a successful foreign policy. In other words, foreign policy in fact starts from within a country. This is arguably an explanation for why ministries of foreign affairs approach new policy fields and partake in them in different ways than before (while this also provides new opportunities to redefine their work).

abroad, which would provide joint representation and bundle German activities abroad and would hence enable better networking. On a contextual note, apart from the DAAD, few key science actors had an institutional presence abroad at that time. The AvH had their international network of AvH-friends, and the DFG seemed to be in the process of setting up an office. Hence, the international institutional presence of German science actors abroad was scattered. In turn, it was proposed that *Deutsche Wissenschaftszentren* (German Science Centres, an earlier name for the DWIH) should be founded as a response to contemporary challenges and as part of a wider modernisation strategy (Borgwardt, 2009; Steinmeier, 2008b). The DWIH were conceived to serve as landmarks in the German science and innovation landscape. While Steinmeier clearly frames this as a wish from the key science organisations, interview data suggests otherwise and does not fully confirm this. Instead, sources suggest that the idea of creating the DWIHs was clearly politically motivated and initiated, while relevant organisations were consulted in a second step (interviews GIS2, GIW5, GIW6, GIW14):

The initiative was, I have to think a bit since this is long ago, was started by the AA (interview GIW14)¹²⁶.

The data reveals that, behind the scenes, the AA approached key science and research stakeholders and enquired about the idea of developing the DWIH in 2008 (source: AA internal documents). Besides the AA's two intermediary organisations, the AvH and DAAD, high-level key stakeholders in the form of the Alliance of Science Organisations were consulted during the inception process through various formats, such as formal requests or chimney talks, etc. Interviews furthermore reveal that the DFG, a strong stakeholder, was also part of a small working group involved in the more detailed conceptualisation phase of the instrument. Besides the main key stakeholders (mentioned in section 6.1), initially two other stakeholders were consulted in this design process, as documents reveal. The *Stifterverband* and the German Federation of Industrial Research Associations (AiF) were contacted as potential partners in the process (source: AA internal document, 2008a). Both actors were, however, in their entirety never part of the network for reasons unknown (while some of the AiF's members

126 "Also die Initiative ging, ich muss ein bisschen überlegen, die ist lange her, die Initiative ging ja vom Auswärtigen Amt aus" (GIW14_2020-02-04, Pos. 15).

joined)¹²⁷. In addition, a successor to that internal document reveals (AA internal document, 2008b) that other key actors in the German system, such as the *TU9*, *acatech* and *intech.net* were also considered as eligible participants (which would possibly have held a similar position in steering the DWIH)¹²⁸.

In addition, the idea of establishing joint representative bodies of German science and research organisations abroad was similarly intensively discussed among a wider group of experts (Borgwardt, 2009). The interview data suggests that the idea of creating DWIHs did not develop in a vacuum, which provides further evidence of the political push of the instrument. The data points to the AA's deliberate focus on what other countries/competitors were doing. This suggests a case of policy learning/transfer¹²⁹ (cf. Borgwardt, 2009, interview SNX3):

We looked at what other countries are doing, such as Switzerland; they had Swiss Houses and we looked at this; how are the French doing this? We looked at this to get ideas (interview GIS2¹³⁰).

127 The empirical data suggests that key stakeholders such as the *Stifterverband für die deutsche Wissenschaft e.V.* or the *Arbeitsgemeinschaft industrieller Forschungsvereinigungen (AiF)* (translates as German Federation of Industrial Research Associations) were officially consulted during the early stages of the DWIH. However, both organisations did not join and were also not engaged in discussions (while the BDI, the DIHK and the FhG are, in fact, members of the AiF and joined). The involvement of the AiF and *Stifterverband* was raised in the interviews; however, no insights into their (non-) participation could be gained.

128 Again, the condensed empirical material could not reveal insights into this initial idea.

129 In literature, this process is conceptualised as a policy transfer. A policy transfer is most prominently defined by Dolowitz and Marsh as “*the process by which knowledge about policies, administrative arrangements, institutions and ideas in one political system (past or present) is used in the development of policies, administrative arrangements, institutions and ideas in another political system*” (2000, p. 5). A more specific definition which relates to policy instruments sees this as follows: “*a policy transferred from elsewhere can bring with it not only particular policy instruments, but also the idea, sometimes erroneous, that it was successful in the original jurisdiction. Although some political actors may dispute this ‘stamp of approval’, the salient point here is that the policy makers can claim that it was a success elsewhere and will be when transferred*” (Marsh and McConnell (2008, p. 13)).

130 “Wir haben uns angeguckt, was machen denn so Länder wie die Schweiz, die so Swiss Houses hatten, also das haben wir uns angeguckt, wie machen es die Franzosen, da haben wir uns ja Ideen geholt“(GIS2_2018-02-09, Pos. 85).

“I know that Germany would be interested. I had a meeting with the ministry people at that time [...]. They came in [sic] Bern to see what was the model [sic] [referring to the Swissnex model]” (interview SIS4).

The intention was indeed to strengthen Germany’s bundle of existing manifold efforts, of the different research organisations, to bring offices together, and to orientate ourselves towards the Swiss model of Swissnex (interview GIW8)¹³¹.

In this context, it should be mentioned that the data points to a similar approach which was encountered in the early 2000s. At that time, ministerial actors suggested creating a joint representative body of German research and science organisations linked to the diplomatic umbrella. However, this proposal did not resonate in overall approval among the targeted key stakeholders. Stakeholders were concerned about losing their own visibility if they were to be subsumed under the diplomacy umbrella. This idea was also accompanied by tensions between the AA and the BMBF (interviews GIW6, GIW15), which in combination caused the idea to be discarded at the time (although this initial impetus at the time seemed to come from the BMBF, rather than the AA). Apart from this idea, the data suggests that SHARE Boston was closely monitored by relevant key actors from the German science sector (cf. interview GIW15). In addition, the data reflects that members of the German parliament were eager to learn about SHARE Boston and addressed a request to the government to examine whether there is a need to set up a similar type of unit in Germany (von Arb, 2004, p. 2). This need was ultimately declined due to the fact that a) there were already other flanking measures in Germany in that realm and b) a comparable structure such as SHARE Boston was a rather cost-intensive set-up. This development is notable since this initial position seemed to have been modified over time in favour of installing similar units (this can hence be seen as a delayed policy transfer, see section 12.1.1.2).

131 “Es ging tatsächlich darum, dass Deutschland die vielfältigen Anstrengungen, die es schon gab, von Seiten einzelner Forschungsorganisationen, ein bisschen mehr zu bündeln, Auftritte von Büros zusammen zu fassen und sich so ein bisschen an dem Schweizer Model der Swissnex, oder des Swissnex Netzwerks zu orientieren“ (GI-W8_2018-05-04, Pos. 15).

7.2. Struggles Over the Institutional Set-Up

The gradual institutionalisation of the DWIH was also impacted by actors' preferences and was shaped by the strategic interests of the various parties involved. Following this initial top-down push by the AA, the process of institutionalisation has been subject to conflictual interactions and been shaped by struggles occurring at different levels. Struggles became visible a) horizontally at a ministerial level, mainly focused on competence b) vertically between key (individual) stakeholders and the ministerial level and c) horizontally among the key stakeholders themselves. Furthermore, d) the data points to alliances that were forged between some of the key stakeholders against the ministerial level, pointing to a fourth set of conflictual interactions (however, the data also suggests the alliance organisations were supported by the BMBF on some issues). These interactions are expanded on in the following sections and seem to have impacted the form and institutionalisation of the DWIH.

7.2.1. Ministerial Struggles Over Competence and Design

From the very beginning, the DWIH were firmly situated between the two ministries: the AA and the BMBF. The idea of launching this new policy was clearly initiated and pushed by the AA (section 7.1.1). For the AA, at that time, the creation of the DWIH under its auspices seemed most logical, given that the AA traditionally oversees Germany's external representation¹³². On the other hand, as the sectoral ministry for higher education and research, the BMBF is responsible for internationalisation activities and oversees most of the key stakeholders from the science sector. Despite the

132 On a contextualising note, ministries of foreign affairs have a distinct role in governmental bureaucracy: they operate within the country, while also overseeing diplomatic and consular representation abroad. Scholarly literature assumes that, in comparison to other ministries, they have limited financial means (Balzacq, Charillon, and Ramel (2019)) and also diplomatic practices were subject to changing conditions in the past. Traditionally, diplomacy has been characterised by a rigid understanding in terms of actors, tasks and channels of communication, also known as club diplomacy (cf. Constantinou et al. (2016)). The aforementioned literature observes, however, a recent change towards opening up this closed tradition in favour of new forms, modes of interaction and the growing involvement of non-state actors (cf. Cooper et al. (2013, p. 6); Cooper (2013)), which is known as track two diplomacy (cf. P. L. Jones (2015)).

general principle of ministerial autonomy (*Ressortzuständigkeit*), both ministries considered themselves to be responsible for this kind of initiative, resulting in a struggle over competence. This (perceived) dual competence in certain policy fields is not uncommon¹³³ and instead calls for coordination between the departments involved. However, this coordination process proved to be challenging and there was disagreement between the participating ministries (the AA and the BMBF) on several issues, for instance on the general running of the organisation. The BMBF was irritated and upset by the AA's political push to launch the project (interviews GIS2, GIW6), as they sensed a certain rivalry (interview GIW9). This reflects jurisdictional egoism being at stake (Mai, 2016 and footnote 133):

*There were question marks on the part of the BMBF as to why the AA is suddenly strongly engaging in this area*¹³⁴ (interview GIS2).

Although the BMBF officially participated in the early deliberations that were initiated by the AA (Steinmeier, 2008b), the BMBF considered the DWIHs were originally falling into their policy domain, rather than the AA's; the AA, on the other hand, considered the DWIH to be their core business (interview GIS2)¹³⁵. In addition, the BMBF had also prepared an internationalisation strategy for the whole government at around that same

133 The political system in Germany adheres to the principle of ministerial responsibility (*Ressortzuständigkeit*). Each ministry has clear competences, well-defined tasks and is responsible for its line of action. Political reality reflects, however, that often policy issues relate to more than one policy area given their nested character. Accordingly, several ministries need to be involved and coordination is required. This coordination process might, however, be hampered and friction can occur due to competition between ministries (cf. C. M. Jones (2010)). Mai (2016, p. 204) deploys the concept of jurisdictional egoism (*Ressortegoismus*), suggesting that ministries stand in competition with each other. This is even more the case when the government is formed by different parties and party-political profiling takes place. Jurisdictional egoism can take different forms, such as withholding information, refusing to cooperate on common projects or delaying processes, to name a few examples. The vision of a state as a unified actor with a distinct national interest has been discarded (Allison (1968); Bendor and Hammond (1992)).

134 "da gab es schon Fragezeichen von Seiten des BMBF, warum das Auswärtige Amt sich jetzt plötzlich so stark in dem Bereich engagiert" (GIS2_2018-02-09, Pos. 75).

135 Conflicts over competence seem to have shaped the history of the AA. Historical reconstructions by Singer (2003, pp. 9–10) reveal that as early as in the phase of its reconstruction following the second World War, the AA encountered conflicts over competence with the Ministry of the Interior. More specifically, though anticipated by the AA, it was not possible to include all institutions which have a foreign cultural focus in the AA's departmental responsibility.

time—the first of its kind. While the strategy also acknowledged the need for a coordinated presence by the German research and science sector abroad (BMBF, 2008, p. 4), the combined interview data reveals that this did not necessarily mean the DWIH (interview GIS6). The fact that the AA was in the driver's seat was viewed as decisive and impacting on the general direction of the DWIH (interview GIW9).

Similarly, the unit in charge within the AA was also considered to have played a decisive role in shaping the instrument, while discontinuity among those responsible within the AA was also mentioned, as was the fact that the AA does not typically manage projects on such complex topics (interview GIW10). Another element of dispute at the ministerial level links to the financial support for projects like these. Generally, the BMBF is financially better equipped to run these kinds of initiatives, while the AA typically has limited financial means. The question of who should fund the DWIH emerged as another distinct issue throughout the instrument's development (interviews GIW2, GIW15). The data reveals that after the DWIH's inception, the AA enquired about supplementary funding from the BMBF; however, this request was declined due to the limited influence they would have on the DWIH and a different strategic focus on the part of the BMBF (interviews GIW5, GIS5).

This happened in discord between the AA and the BMBF. The BMBF, who would have actually been responsible, was left behind when founding the DWIH. Later on, it was discussed whether it should take over given that it is financially better equipped than the AA. However, the BMBF declined; it was further not interested since it conducts science foreign policy rather than foreign science policy (cf. interview GIW5 and also GIS5, GIS6)

Normally, these things are done together with the respective departments. In this case, there was a very strong initiative from the Auswärtiges Amt, which informed about this, and I think with the opportunity to give money, but without having any influence¹³⁶ (interview GIS5).

Hence, the AA took over the funding of the DWIH network; however, this was organised on an annual project basis. More specifically, this implied

136 "Normalerweise macht man solche Dinge aber dann gemeinsam mit dem jeweiligen Ressort. In dem Fall kam es sehr stark, sozusagen als Initiative des Auswärtigen Amtes, die [...] damals mehr oder weniger mitgeteilt wurde und ich glaube mit der Möglichkeit verbunden war, Geld zu geben, aber auf Einfluss letztlich zu verzichten" (GIS5_2020-01-14, Pos. 7).

submitting an annual renewal request for the project, which involved a significant administrative workload for DWIH locations. This furthermore proved to be a source of uncertainty and a constraint to the longer-term planning of activities on-site (interview GIW2). Inspired by the Swiss role model, which has the industry as paying clients on board, it was anticipated that, over time, the DWIH would also generate its own income and become self-financing. This was considered by the stakeholders to be a design error and a critical issue right from the start (interviews GIW5, GIW6, GIW14, GIW15¹³⁷). This ultimately proved to be one of the main points of criticism in the subsequent audit (see section 7.3.2).

Furthermore, at that time, the AA was run by the Social Democrats (SPD) while the ministry for education and research was in the hands of the Christian Democrats (CDU)¹³⁸, and this may have possibly impacted and reinforced these tensions (interviews GIS2, GIW15). This constellation of political parties was not perceived as advantageous to the development of this common project (interview GIW12). In fact, it proved to be another area of conflict related to party politics and profiling. Some of the DWIH locations had been opened multiple times by the two ministers, again indicating that there was some form of discord and the need to create a political profile (interviews GIS2, GIW5, Westerwelle, 2012a). In addition, the party who headed the AA until then, changed in autumn 2009, shortly following the DWIH's inception in early 2009. The data suggests that the AA's focus shifted towards other topics after then (interviews GIS2, GIS4).

Furthermore, the interviews assume that the design and shape of the DWIH would have presumably differed if the BMBF had been in the driver's seat instead (interviews GIS5, GIS6, GIW13, GIW15). A different approach to action would have prevailed and some of the difficulties and arguments encountered throughout the process would have probably been avoided. Interviewees further assumed that solid funding arrangements would also have been provided from the start. To draw on another example, the two ministries' underlying approaches to designing an instrument

137 More specifically, some actors were reluctant to invest their own financial means since they saw the ministerial actors as being in the driver's seat to secure and provide funding. On the other hand, there were those actors who wanted to use their financial means to participate, whilst this was (politically) permitted (signalling a certain paradoxical situation).

138 Even more so, the Federal Ministry of Finance was also in the hands of the SPD at the time. This was viewed as presenting favourable conditions in which to launch this overall policy initiative (interview GIS2).

differ: while the BMBF would have presumably taken a focus from within the system, i.e., what science and research need, and how this can be reflected in a potential instrument such as the DWIH; the AA, on the other hand, takes an outward approach in terms of marketing: how Germany can represent itself better (interview GIW9).

These two approaches also reflect different forms of logic. Some sources go so far as to assume that the DWIH would have presumably even worked better if the BMBF had been in charge (interviews GIS6, GIW15). Accordingly, the tensions between the AA and the BMBF were viewed as being omnipresent throughout the development of the DWIH; while stakeholders felt as though they were pawns in the ministerial battle (interview GIW6 and cf. Epping, 2020)¹³⁹. What is more, the tensions between the two ministerial actors were viewed as creating unfavourable conditions for the development of the DWIH and as impacting the DWIH's gradual institutionalisation in their early inception phase and beyond.

7.2.2. Agreeing on a Model (Format, Themes and Goals)

Aside from the struggles over competence and direction between ministerial bureaucracy the establishment, and the gradual institutionalisation of the DWIH also led to heated discussions and disagreements between the ministries and the key stakeholders which were involved. To start with, a link to the diplomatic missions was one of the initial ideas concerning the institutional set-up of the DWIH. Discussions focused on whether the DWIH should operate under the diplomatic umbrella. Whilst politically, this was initially considered to be an option, the key science organisations opposed this idea since they did not want to be subsumed under the DWIH label or the diplomatic umbrella. Instead, they wished to maintain their own visibility and autonomy (interviews GIW5, GIW6, GIW8):

*Because we [...] are all interested in being visible on our own and not just as an organisation of the German embassy*¹⁴⁰ (interview GIW6).

139 Raev (2020, p. 317) observes similar patterns of ministerial struggles over competences and resources in the development of the *Transnationale Bildung* initiative, a sister policy instrument in the AA's *Initiative Außenwissenschaft*.

140 "Weil wir allesamt, [...] wohl das Interesse daran haben auch selbst sichtbar zu sein und nicht nur als Organisation der deutschen Botschaft verstanden zu werden" (GIW6-2018-03-27, Pos. 20).

This issue of the DWIH's specific role was closely linked to this and was also the subject of intense debate and heated discussions (the question of governance is explored in depth in section 7.2.4). Initial policy documents suggest that the DWIH had the potential to fulfil a coordinating function for key German actors abroad (presumably inspired by the Swiss case). However, this idea was opposed by some key stakeholders (pointing to the strong autonomy of key stakeholders in the German system):

For us, it was fine to collaborate on certain aspects and coordinate these aspects; however, we did not want to be generally coordinated (in the sense of having overall coordination) (interview GIW5 and cf. GIW10).

These two examples reflect the vertical disagreements between the ministries and stakeholders. The data suggests that, for instance, the alliance organisations regularly addressed issues of relevance in various exchange forums and discussed how to position themselves in relation to the ministries (interview GIW13). Such discussions also dealt with the specific themes, such as the DWIH's thematic coverage. Initially, the focus was purely on centres targeted towards research and science (cf. AA internal documents, Steinmeier, 2008b, 2009). This was also confirmed in Steinmeier's 2009 inauguration speech, while subsequent conference documentation refers to centres of science and innovation already (Auswärtiges Amt, 2009a). Although the DWIH's name includes the word innovation, this proved to be an issue of debate and mirrors another set of (ongoing) tensions. The interviews suggest that key science stakeholders were reticent and unhappy about the inclusion of innovation as a thematic focus (interviews GIW2, GIW7, GIW10, GIW13¹⁴¹), whilst the general connection between science and innovation was not questioned (see also section 8.1).

In a similar vein, the inclusion of business and innovation stakeholders in this project was viewed critically and at times contested and culminated in the question: What are the main objectives of the DWIH? This dissatisfaction is symbolic of another issue that shaped the negotiations: the DWIH's goals and mission and the highly relevant and sensitive issue of who determines such goals and sets the agenda. In other words: Which interests are at stake and which ones are most relevant and take precedence in discussions (and decisions)? To recall, several different stakeholders were involved in the process and their (at times) diverse interests needed to be

141 The interviews further reveal that the relevance of innovation varies strongly across the DWIH's different locations.

reconciled: these diverse interests included the science community, which had diverse interests among themselves (interview GIW6), political/foreign policy objectives, and interests from science and research companies. In addition, these discussions were coupled and shaped by the different starting positions of the actors. The data reveals that some actors prioritised operating in particular locations and tended to act relatively independently, even in the light of this new instrument. This presented challenges in terms of establishing and activating this new instrument (interviews GIW6, GIW9).

7.2.3. The Network

Alongside and closely tied to the discussions on the exact model, deciding on potential locations where the DWIH should operate was a pressing issue. The data reflects that during early deliberations a key aspect for the locations was to rely on already existing structures. In other words, the DWIH should not start operating from scratch but instead should be able to use already existing infrastructures, such as the institutional presence of the DWIH's key actors, or Goethe Institutes or German Archaeological Institutes (interviews GIS2, GIW5). This motivation could be explained by the financial and administrative burden that is linked to creating such structures (interview GIS1). At the same, it was hoped that piggybacking on existing structures would enable the DWIH to benefit from their visibility and access. Accordingly, the following were considered key criteria: a) a certain institutional density should already exist in the target countries, b) the destinations should be attractive to the actors involved (interview GIS4) and c) they should offer potential in terms of emerging markets, talent and technological developments.

The data is unambiguous concerning the decision about the number of centres that should be opened. While initial internal documents mention the intention of setting up three offices in America, Asia and Europe (internal AA document, 2008), other sources refer to four initial locations (notably, New York was not one of them) (interview GIW15, Steinmeier, 2009). Yet other sources mention that five locations were identified at the start—São Paulo, Tokyo, New York¹⁴², Moscow and New Delhi—since they

142 In the past, the New York location was often considered a forerunner to the DWIH brand (cf. Auswärtiges Amt (2014)) and as a sort of best practice case for how the

offered the greatest potential for the key stakeholders, while also reflecting an institutional agglomeration of German actors (interviews GIS2, GIW5). This choice of countries was also conveyed as a sign of the political importance of these countries, particularly when looking to the future (cf. Ammon, P., 2009).

The decision on the exact locations was, however, again influenced by individual actors' preferences. An initial idea was to open a DWIH in China, possibly Beijing. That option was, however, dropped soon given that the DAAD and DFG did not support this idea. In the case of the DFG, the Beijing office constituted a symbolic and special case (Borgwardt, 2009), while the DAAD also wanted to maintain its premises there (interview GIW5). Accordingly, that option was ruled out at that time and the DWIH network started operating in five locations. The discussions on the DWIH's locations also seemed to be a trigger for actors to launch their own initiatives. The data reveals that these general discussions also created momentum among certain actors to reconsider their own international presence. More specifically, in some cases actors also opened offices in these DWIH locations to take advantage of the synergy effects.

7.2.4. Debates on the Governance Structure

Closely tied to the question of the network structure was the question of governance. This turned out to be a delicate issue since different perceptions prevailed (interview GIW6). More specifically, during the early conceptualisations of the DWIH (2008), one of the initial ideas was to involve a private body in the set-up and operation phase. However, key actors opposed the idea of central coordination of the joint instrument as previously discussed (see section 7.2.2). During these early deliberations, similarly, one actor stood out as having a particular interest in running the DWIH: the DAAD. The DWIH were regarded as operating in an area that originally strongly overlapped with the DAAD's self-concept (and were also possibly seen as threatening its position in the system), while the DAAD also had an unprecedented international outreach and network of offices around the world (interviews GIW9, GIW15). Accordingly, and in line with

network ideally creates impact and conducts activities (interviews GIW10, DWIH4). However, this role model was also contested and seen as being a skewed comparison which neglects the distinct limits and opportunities of each location.

the DAAD's own ambitions (interviews GIW5, GIW8, GIW9, GIW15), it was initially proposed that the DAAD should oversee the network.

This was due to its (existing) international presence and its unparalleled know-how on the administrative issues involved in setting up an institutional infrastructure abroad. Furthermore, at the time, the DAAD already operated as an intermediary organisation for the AA. Nevertheless, this proposal was not approved (interviews GIS2, GIW5, GIW8, GIW9). Even stronger was the fact that there was disagreement and a sense of mistrust between some of the organisations (horizontal struggle between key stakeholders). Accordingly, although it seemed an obvious choice, the idea that the DAAD should take on a stronger coordinating role and oversee the network, this was opposed by other stakeholders (interviews GIW5, GIW8) and was explained by (institutional) mistrust. The DAAD itself considered it to be missed chance:

And you can see in these locations, the DAAD was already there [...] the point is that possibly some of the actors did not like it that everything would be in the hands of the DAAD, and they naturally also wanted to participate, Humboldt and in particular the research organisations, yes¹⁴³ (interview GIS2).

This quote points to some actors' deliberate strategic behaviour by opposing the DAAD, which was possibly also linked to protecting their own interests (it would have been perceived by other actors as an increase in power if the DAAD had taken on this role). Other sources point to a chain of unfortunate events that took place at a political level (interviews GIW9, GIW15). The AA's economic division, rather than its cultural division (which was in charge of the DAAD), were responsible for the DWIH. Accordingly, a certain dynamic developed where decisions about how to govern the DWIH locations was (re-)negotiated in a setting which largely excluded the DAAD (even though it was an intermediary organisation for the AA).

143 *“Und man sieht an diesen Stationen auch, eigentlich im Grunde der DAAD war überall da [...] aber der Punkt war, möglicherweise haben einige der Mitspieler es nicht so gerne gesehen, dass das alles beim DAAD läuft und die wollten natürlich auch mitmachen, Humboldt und vor allen Dingen die Forschungsorganisationen ja“ (GIS2_2018-02-09, Pos. 55).*

Table 11 DWIH Network: Initial Composition and Leadership Arrangements (until 2016)¹⁴⁴

Locations	Leadership Consortia (until 2016)
Brazil Sao Paulo (opened 2012)	AHK & DAAD
India New Delhi (opened 2012)	DFG (until 2015) DAAD (from 2016)
Japan Tokyo (opened 2010)	AHK & HRK
Russia Moscow (opened 2011)	DAAD
United States New York (opened 2010)	DAAD & DFG
Egypt Cairo (2012-2016), <i>Deutsches Wissenschaftszentrum</i> (DWZ)	DAAD

Source: created by the author.

The final decision on the leadership for each location was taken during a high-level breakfast with the presidents of the Alliance of Science Organisations (interviews GIW9, GIW10, GIW15). This resulted in the division of governance responsibility for the selected locations between various actors. Accordingly, it was agreed that the leadership of the DWIH locations should be put in the hands of consortia of key stakeholders (see Table 11). The consortia differed at each of the five locations and the main actors involved were the DAAD (in almost all locations), the DFG, the AHK

144 DWIH India: due the vacancies on the DFG side, the DFG and DAAD were both in charge (Deutsches Wissenschafts- und Innovationshaus Moskau (2013, p. 8). DWIH Russia: for more information, see Haber (2012); Auswärtiges Amt (2012). DWIH New York: the office was officially opened by the BMBF. For more information, see Schavan (2010).

7. (Gradual) Institutionalisation of the DWIH

(*Außenhandelskammer*) and the HRK. This process, though seemingly adhering to specific criteria, was viewed critically and the criteria were contested (interviews GIW8, GIW9, GIW10). With the exception of the DWIH India, this governance set-up was in place until a major reorganisation was implemented in 2017. The DWIH India was placed under the DAAD's leadership in early 2016, due to the vacancy of DFG project staff. The DAAD jumped in here, at first temporarily and then permanently (interviews DWIH3, GIW7). The discussion on the governance of the DWIH is symbolic of the horizontal-level struggles that accompanied the DWIH's institutionalisation. These ultimately raised the following questions: Who is in charge? Whose interests are (best) reflected? Which channels of influence are prevalent among actors?

7.3. Critical Junctures in the Instrument's Development

The previous sections reconstructed the set-up phase of the DWIH, its context and main discussions. This phase was characterised by intense and at times controversial discussions, mistrust, tugs of war and strong actor preferences. Following these (often long) negotiations (interview GIW15), all five locations started operating between 2010–2012 (see Table 11), although some data suggests that they developed quite independently and differently from each other (interviews GIW6, DWIH4). Following the inception phase, consolidation took place, where the locations started to operate while being subject to critical junctures (see section 4.2.3 for a definition). The data reveals three of these junctures, in the subsequent development of the instrument, which had a lasting impact and influenced the DWIH's form (as will be explained later in this chapter). Again, these events did not occur without struggles, although the data suggests that the struggles were less fundamental and severe in comparison to those during the inception phase. For instance, the horizontal struggles between key science actors were less pronounced at this stage, and there was a slight shift towards vertical struggles between the ministries and science actors (whereas the latter group became allies against the AA).

7.3.1. Closing the Cairo Office

In 2012, a sixth location was (semi-officially) added to the network (Westwelle, 2012b) (see Table 11). In light of the Arab Spring, the German Science Centre Cairo (Egypt) became part of the DWIH network with the aim of strengthening German–Egyptian dialogue (interviews GIS4, GIW5). However, various sources stress that this marked a solo effort on the parts of the AA and the DAAD. This was not backed up by the support of the other key actors who viewed this location critically and did not share its (scientific) significance (interviews GIW4, GIW5, GIW7, GIW8, GIS3). This accordingly led to disagreement between the AA and some key stakeholders of the Alliance of Science Organisations, who were not happy with this proposal. What is more, they took it very badly since it was not intensively discussed previously with them. In effect, this is why certain key stakeholders eventually did not participate and supported the Cairo office (interview GIW5). In response, Cairo was not officially named as a DWIH but as the German Science Centre Cairo. Nevertheless, it was flagged on the network's official website¹⁴⁵ and mentioned in the same breath as the DWIH locations; thus, the AA effectively considered the centre to be a DWIH (interview GIW8). At the end of 2016, funding for the Cairo office was terminated and it was no longer listed with the DWIH (Auswärtiges Amt, 2017). The data suggests that this was linked to the results of an external evaluation by the federal audit office, which was preceded by severe criticism of the general workings of the DWIH network (Bundesrechnungshof, 2013). The closure of the Cairo office was regarded as sacrificing a pawn (interviews GIW5, GIW7, GIW8, GIS6) and as a demonstrative response to the criticisms raised in the audit report. In addition, since Cairo was not viewed as a DWIH by all stakeholders, there was little resistance to its closure among the key stakeholders (although it was also viewed as a potential (political) loss of face (interviews GIW5, GIW11)). On a political level, however, it was instead explained more diplomatically that the Cairo centre did not meet the relevant criteria for maintaining this structure, such as its significance to science organisations, business representation bodies and politics (interview GIS3).

145 The DWIH's network website was updated at the end of 2017 and earlier versions cannot be accessed anymore.

7.3.2. The DWIH Revisited: Reorganisation in Response to an Audit

In 2014, the DWIH was faced with a major external shock regarding its operations and, accordingly, its institutionalisation. The DWIH were subject to criticism by the federal audit court, which questioned their legitimacy and general existence, mainly because of their failure to finance themselves (cf. Bundesrechnungshof, 2013; correspondence with *Rechnungsprüfungsausschuss* (RPA), 2017). The idea of operating in a self-funded way was initially a design principle (inspired by Swissnex); however, this was contested from the start and was perceived as unrealistic and flawed (interviews GIW5, GIW6, GIW15). This criticism, nevertheless, came as a surprise to some stakeholders since the inspection of the DWIH occurred soon after they had been launched and had begun working in 2012. This (unusually) early investigation by the financial auditors is hence considered to be an expression of the political tensions that surround this instrument (interview GIW15). Despite this, these criticisms were also viewed as a blessing (interview GIW6) since they initiated a process of reflection on the DWIH's varying and diverse structures, and the ongoing disagreements between stakeholders on the key objectives, direction and governance of the DWIH (interview DWIH1).

In the context of the 2014 evaluation, the RPA called on the AA to evaluate the DWIH's goals and their success by authorising an external agency to conduct an evaluation (to be submitted in 2015). While the AA viewed the evaluation report as generally providing positive feedback on the workings of the DWIH, it had to review the network's structure, governance and *modus operandi* to strengthen the network's impact. In this vein, the AA also announced the intended closure of the Cairo office (Auswärtiges Amt, 2017). Furthermore, the AA, in collaboration with the BMBF¹⁴⁶, was called upon to prepare a report on the leverage potential and synergy effects of the DWIH, which was embedded in the larger governmental strategy. As the AA's intermediary organisation and 'think tank', the DAAD was also closely involved in this reorganisation process (interview GIW7). This joint report

146 The data is unclear concerning the role of the BMBF. While the RPA refers to the BMBF's involvement in the formal coordination, other sources point to its supportive role; however, they also signal that the AA was solely responsible for the new set-up and reorganisation (cf. interview GIS3). Even others see the BMBF as having been awakened only after the reorganisation was completed (interview GIW7).

outlined the planned changes, which were ultimately accepted by the RPA, marking an end to that politically troublesome period.

The process underlined the added value of the DWIH for its ecosystem; the discussion on whether the DWIH should be kept in place was thus successfully overcome, also due to the AA's strong stake in the instrument. Following this close supervision, the adaptations related to reorganisation of the DWIH in terms of stronger top-down management with the aim of improving the efficiency of the centres (interview GIS3); furthermore, there were plans to revise the funding arrangements in favour of institutional funding, although this was to be coupled with target agreements (interviews GIW4, GIS3). The overall reorganisation, however, did not relate to the actual tasks of the DWIH; instead, a streamlined image and the coordination of activities was anticipated, which was anchored by a common governance structure. This process of revision struck the hour of the DAAD, again. What had long been anticipated and frequently been attempted by the DAAD became a reality: the responsibility and joint leadership of the DWIH network fell into the hands of the DAAD (cf. DAAD, 2017, 2018), however, this time it was in agreement with and even proposed by other key stakeholders (interviews GIW2, GIW5, GIW7, GIW12).

In close cooperation with the other stakeholders, the consortia–leadership model was replaced in favour of the current model, where the DAAD is officially in charge of the network and the DAAD branch office director in each region is also the DWIH's official director (this element is, however, not uncontested). Another major change for the DWIH was the transition from annual programme funding to institutional funding, through the DAAD. While, in general, the interviewees indicate that the reorganisation was useful in terms of creating a common, stronger character and ultimately also of increasing the impact of the network; on the other hand, the renewed structure is also considered to have a stronger bureaucratic approach and a top-down character (interviews GIW2, GIW6, GIW8, GIW10). This centralisation of the network is viewed critically, particularly with regard to the issue of the harmonisation vs. the individuality of activities for each node, in other words what decisions should be made centrally. The data refers to the example of defining common annual themes for all locations. While this seemed like a good idea to some actors (interview GIW5), it was also perceived as leading to a loss of vitality for individual locations and posing an obstacle in terms of catering to the demands of the hosting country (interviews DIWH4, GIW10). In other words, the limitations that result from a harmonisation of activities in comparison to responding

7. (Gradual) Institutionalisation of the DWIH

to country specific needs is an ongoing source of discussion. Generally, however, the data indicates that previously encountered tensions between key stakeholders were overcome and became less severe and omnipresent in this reorganisation phase. The process of reorganisation was less strongly driven by horizontal struggles between key stakeholders than the DWIH's inception phase.

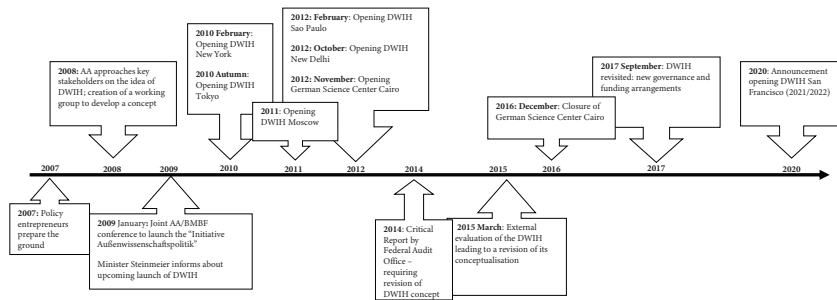
However, vertical disagreements, i.e., between key stakeholders and political bureaucracy continued; these generally focused on the issue of who should oversee the running of the network (ministerial actors vs. science organisations) and how a balanced situation could be achieved. As in the inception phase, key science organisations wished to maintain their independence (interview GIW7) and did not want to operate as intermediaries for the AA's political goals or find themselves in top-down driven situations. Instead, they once again emphasised their autonomy. These discussions found their way into the governance structures and centred on the question of who should chair the central governance bodies. As a result, the board of trustees is co-chaired by the president of the Alliance of Science Organisations, alongside the AA. This dual constellation is assumed to be a response to the tension between actors and is seen as a solution on equal footing that also allows for checks and balances (interview GIW7). The interviewees were uncertain, however, about how a situation would escalate in the case of severe disagreements between the AA and key science organisations.

7.3.3. Expanding the Network

The discussions on the expansion of the network taking place among the key stakeholders in the years 2019 and 2020 seemingly marked an end to the period of consolidation. Two options were discussed: opening a DWIH in China and an additional location in the USA, namely in San Francisco. Although the data reveals that there was initially reluctance to expand to San Francisco among some of the key stakeholders, it was eventually announced that a sixth network location would be opened in San Francisco as of 2021/2022 (DAAD, 2020), which was eventually supported by key stakeholders (DAAD, 2022). Opening a DWIH in China still remains a shared political and stakeholder goal (cf. DAAD, 2022). Doing so was already discussed in the inception phase; however, realistically it has proven

to be a longer-term goal on the agenda (Auswärtiges Amt, 2020c, p. 6)¹⁴⁷. The discussions about the new locations led to a renewed debate about which criteria and indicators should be given priority in the discussions on opening new locations (interviews GIW10, GIS3): key innovation hotspots vs. the presence and density of higher education institutions as well as the goals of science actors vs. political goals. This example seems to sum up the omnipresent conflicts in the gradual institutionalisation of the DWIH, such as: Who is in charge? Who determines the goals, and the direction? And ultimately which interests are given priority—political objectives or scientific and innovation considerations?

Figure 6 Milestones in the Development of the DWIH



Party Constellations During Legislative Periods of the German Parliament			
2005–2009: CDU/SPD Coalition AA: SPD (Steinmeier) BMBF: CDU (Schavan)	2009–2013: CDU/FDP Coalition AA: FDP (Westerwelle) BMBF: CDU (Schavan/Wanka)	2013–2017: CDU/SPD Coalition AA: SPD (Steinmeier) / (Gabriel) BMBF: CDU (Wanka)	2017–2021: CDU/SPD Coalition AA: SPD (Maas) BMBF: CDU (Karlczek)

Source: created by the author.

147 Rather interestingly there is a German–Canadian Centre for Innovation and Research which has similarities to the DWIH and aims to tackle similar goals (see, <https://www.gccir.ca/de/start/> - accessed 30.07.21). To name a few, international exchanges should be promoted, as should a mutual awareness of Canada and Europe as centres of excellence. The Centre receives funding from the Federal Ministry for Economic Affairs and Energy. Despite having a similar mission, it is not part of the DWIH network for reasons unknown. However, the data revealed that it collaborated with the DWIH New York in the past (interview DWIH4). To follow up on this, the issue was raised in an interview with a German state official; however, there was no awareness of such a structure, even though a *DWIH Canada* is listed in the AA's official files, which are, however, not publicly accessible, and thus could not be further analysed (this was identified through personal communication with the AA's archive, 29.03.2018).

7.4. Findings and Discussion

This chapter reconstructed the trajectory of the DWIH, which reflects the representational model, over time. In line with the heuristic framework, the focus was on the DWIH's emergence as well as its subsequent evolution and critical junctures (Lascoumes & Le Galès, 2007). The deconstruction of the instrument revealed the tensions and logic that spurred on and characterised the DWIH's development and explain its current model. The case study findings led to the following key observations, which can be regarded as explanatory for the DWIH's institutionalisation (see Table 12).

Table 12 Key Findings for the DWIH's Institutionalisation

DWIH - Germany	
Genesis	<ul style="list-style-type: none">* Top-down logic driving the establishment (promoted by policy entrepreneurs)* The role of key stakeholders: tug of war and struggles over competence in a nested institutional environment* Strategic actors and organisational positioning
Critical Junctures & Evolution	<ul style="list-style-type: none">* Development according to functional logic and by political will* Critique by auditors leading to major reorganisation (governance and funding)* Shift of competences/power within the actor structures* Closure of Cairo location (politically motivated)* Expansion in 2022
National Characteristics & Contingency	<ul style="list-style-type: none">* The role of actors is reflective of the organisation of the German research and science system (replication)* Contingency: institutional responsibility at AA

Source: created by the author.

Firstly, it became clear that the DWIH were initiated by a top-down policy process that included relevant stakeholders early on. In particular, the role of (key) actors manifested itself as being of utmost importance throughout the institutionalisation of the DWIH due to their strong position in the German science system. The data indicates that, in the early institution-

alisation phase of the DWIH, the various actors involved each brought different (and at times conflicting) interests to the table. Discussions about governance and the exact format and functions of the DWIH were found to go hand in hand with decisions about the DWIH's key destinations. These aspects also proved to be a source of conflict between actors. In essence, points of dissent ultimately focused on the following two issues: Who is in the driver's seat? And how are actor preferences taken into account in the (gradual) institutionalisation process? (the latter issue will be addressed in the next chapter). To give an example, struggles could be observed on various levels: horizontally between the two main ministries, horizontally between key stakeholders in the science sector as well as vertically between key stakeholders in the science sector and the two ministries (science vs. ministerial/political actors). The latter level of dissent particularly led to the formation of alliances: science stakeholders found themselves united against ministerial actors (despite not being a homogenous group) on issues such as the coordination of the DWIH. Hence, the gradual institutionalisation of the DWIH can be described as taking place in a complex and nested institutional structure of actors (*Institutionengeflecht*) with their own preferences and perceptions, which are, to some extent, in competition with each other. However, this is reflective of distinct characteristics in the German system in relation to autonomy, fragmentation and self-control (Edler et al., 2010; Simon & Knie, 2010; Stucke, 2010) and hence not particularly surprising. The institutionalisation process of the DWIH can furthermore be described as a muddling through and tug of war between strategic actors, although these aspects appeared to be more dominant in the instrument's inception phase.

A second observation which accounts for the DWIH's development relates to functional logic. The criticism by the federal court of auditors can be seen as a major external shock regarding the workings of the DWIH and led to changes in governance and funding arrangements, while also placing the DAAD in a stronger position¹⁴⁸. This critical juncture also paved the way for creating a unified structure, which also triggered identity formation processes. At the same time, interview partners revealed that this intervention led to (stronger) bureaucratic management of the DWIHs. Although the auditors' criticism was viewed as being severe, since it questioned the overall operations and legitimacy of the DWIH, the instrument successfully

148 Evaluating the impact of these arrangements on the actual workings of the DWIH is subject to additional in-depth research.

7. (Gradual) Institutionalisation of the DWIH

remained in place (cf. Lascoumes & Simard, 2011 on “*inertia effects*”). Drawing on Powell, “*things that are institutionalized are relatively inert, that is, they resist efforts at change*” (1991, p. 197).

A third observation points to contingency (for a definition, see section 4.1.3) in the development of the DWIH, which also impacted the institutionalisation. This became visible in the case of which ministry was in the driver’s seat. The interview partners speculated that the model would probably have looked different if the BMBF had been in charge from the start, rather than the AA. This was explained by the better financial endowment and the general responsibility for these matters tied to the institutional funding of most partners. To give another example, the data refers to the DWIH’s organisational placement within the AA; its placement in its economic division, rather than its cultural one, was viewed as essential and presumably impacted aspects such as the governance arrangements in a lasting way.

Finally, tracing the gradual institutionalisation of the DWIH reveals that exogenous factors impacted the DWIH’s development, such as clear political will and an audit exercise. However, endogenous facts also impacted the development of the DWIH, such as discussions and tensions between the key stakeholders, which led the DWIH in particular directions (such as the governance of the locations in the early phases). Given that actors have played a strong role in the DWIH’s institutionalisation, it is essential to examine actors’ perspectives in more detail. The next chapter will analyse why actors choose to participate in the DWIH by revealing their sense-making and their rationales to use of the instrument. In combination, these two elements allow us to fully grasp and analyse the gradual institutionalisation of the DWIH over time. What is more, the following chapter will explore the political sense-making (i.e., the political objectives) that is associated with the DWIH.

8. Analysis of Actor Rationales for Participation (DWIH)

This chapter complements the reconstruction of the DWIH's development (chapter 7) and examines the instrumentation of the DWIH, i.e., the use of this instrument by key actors. It also generates additional evidence on the (gradual) institutionalisation of the DWIH. The chapter is divided into two main parts; the first part addresses the (political) objectives and goals that the DWIH has responded to over time (section 8.1). The second part presents the rationales of key actors, which can explain their participation in the DWIH and enable a better understanding of how the instrument is used. In combination, these two analytical stages provide an insight into how the DWIH are interpreted and used by key actors, as well as how they are embedded into their context. In other words, this chapter presents evidence regarding the DWIH's instrumentation, which may ultimately push forward institutionalisation dynamics.

8.1. *Political Objectives*

The following section analyses the political objectives that the DWIH should respond to, i.e., their political instrumentation. To evaluate the DWIH's framing by the key ministries¹⁴⁹, an analysis of publicly available political documents was conducted (see Table 13) (see also Appendix 1.2). This analysis adds another layer of insights into the DWIH's (gradual) institutionalisation since it reveals how the instrument is seen by key political actors. The analysis identified three main objectives, which are strongly intertwined thematically. These objectives are linked to a) branding and visibility, b) cooperation and competition and c) economic considerations. The findings reveal that the DWIH's initial objectives, such as to showcase Germany and improve its international position, have remained firmly in place over time, while layering in favour of new objectives was also identified. This will be discussed in the next sections.

149 See footnote 133 on the considerations of inter-ministerial competition (cf. Mai (2016)).

8.1.1. Branding and Visibility

Since its launch in 2009, the DWIH has been viewed as an instrument that helps to promote Germany as a country that excels in science, research and innovation. Its initial core goals were to raise the profile of the German science and innovation ecosystem, and to promote international cooperation and networking activities (see Table 13). The DWIH were further identified as a vehicle that contributes to wider foreign policy goals due to its embeddedness in Germany's overarching science diplomacy strategy. The DWIH are by definition instruments of Germany's foreign policy strategy and hence contribute to these wider objectives, despite the fact that in certain years (2014, 2015, 2020) this is less explicitly mentioned in the policy documents. More specifically, the DWIH are seen as an instrument that can exert influence. Early conceptualisations of the DWIH emphasised its role: despite the fact that the DWIH operate in an international environment, they are primarily intended to cater to German needs (internal document, 2008).

Moreover, it should be prevented that the DWIH are (indirectly) used by host countries as a platform to exert influence¹⁵⁰. Furthermore, the DWIH were seen as a way of opening up new paths for diplomacy by drawing on distinct channels of communication to ultimately increase their potential to exert influence. This is reflective of the science diplomacy discourse (which led to the DWIH's creation). To give an example, establishing a good international reputation for the German science system was considered beneficial for pursuing successful foreign policy and achieving distinct objectives (cf. Ammon, P., 2009). These assumptions reflect the normative prospects linked to the science diplomacy discourse, as has been discussed previously (see chapter 2). The data shows that these key objectives, which respond to branding and visibility, have remained relatively stable and in place over time.

150 This consideration is notable because it points to limits and unintended effects of science diplomacy activities, such as a reversed influence.

Table 13 Main Themes and Objectives Tied to the DWIH

	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020
Branding & Visibility: promote, present, and inform about Germany												
Showcase and strengthen Germany as an innovative country, present know-how (abroad)							**	**	**	**		
Showcase and strengthen Germany's (dynamic) research and science sector				*	*		**	**	**	**		
Promote and strengthen int. cooperation and networking (between German and int. scientists)					*		**	**	**	**		
Service point (for national innovation leaders who operate abroad and int. scientists exploring opportunities to work in Germany)							**	**	**	**		
Improve public perception of German engagement in science												
Facilitate foreign policy goals												
Cooperation & Competition												
Access to talents, resources and new markets						*	*	*				
Participate in the scientific excellence of other states						*						
Reinforce worldwide networking and internationalisation of higher education, science and research										**		
Contribute to being internationally competitive										**		
Economic Considerations												
Tackle skill shortage by securing (highly skilled) workforce						*						
Secure forerunner role (in terms of business & innovation)												
Facilitate knowledge exchange: secure growth and employment												
Strengthen bilateral (science-technological) cooperation							*	*	*	*	*	**
Promote economic and societal innovation							*	*	*	*	*	**
Global Responsibility & International Solidarity												

Legend

Grey cells = topic is mentioned by the AA

Grey cell +* = topic is mentioned by BMBF only

Grey cell +**= topic is mentioned both by AA & BMBF

* Please note, the official 2014 publication by the AA does not refer to the DWIH at all. However, the BMBF document refers to the DWIH.

* Please note for 2014, 2015 and 2020, the DWIH were not seen as contributing to foreign policy goals. However, the DWIH are an instrument of the AKBP and are by definition viewed as contributing to Germany's foreign policy goals.

Source: created by the author.

8.1.2. Cooperation and Competition: Internationalisation

In 2014, the DWIH were subject to a minor change of framing. Germany's internationalisation strategy explicitly situates the DWIH in the larger discourse of cooperation and competition dynamics. Notably, the BMBF issues the internationalisation strategy for the whole government and seems to add another layer¹⁵¹ to the framing of the DWIH (cf. Huisman & van der Wende, 2005; J. J. W. Powell et al., 2017). The BMBF views the DWIH as an instrument that a) responds to key challenges, such as the run for talent, b) grants access to resources and funding opportunities and c) secures Germany's (reputation for) excellence and fosters its participation in other markets and regions of excellence (BMBF, 2014). These objectives underline the earlier assertion that the BMBF looks at the DWIH from a different angle: it takes a perspective from within the system and views the DWIH as vehicles with which to strengthen the German science and research system. More specifically, the DWIH are considered to create new capacities and respond to international dynamics, such as competition and cooperation (Deutscher Bundestag, 2013, p. 2) (see section 7.2.1).

This stands in contrast to the AA's perspective, which typically views the DWIH as an instrument with which to promote Germany's visibility internationally. In other words, while the BMBF takes an internal perspective, the AA adopts an external perspective (these different forms of logic were discussed in section 7.2.1). What is more, from 2018 onwards, the documents point to the DWIH's role in facilitating internationalisation activities and tackling international competitiveness. While this framing had already been adopted by the BMBF prior to that (in reports in 2014 and 2016), the AA has only considered these to be core aspects for the DWIH since 2018. This may be linked to the DWIH's audit exercise, which took place in 2015/2016 and called for stronger cooperation between the two ministries (AA and BMBF) in relation to the DWIH.

8.1.3. Economic Considerations and Innovation

Around 2015, the DWIH experienced another layering in the form of economic considerations linked to the DWIH. The DWIH's role of secur-

151 The concept of layering is often associated with the works of Capano (2019), for instance.

ing Germany's position in the future, given its scarce natural resources, was highlighted when the network was launched. However, this objective was not mentioned prominently again until the AA report in 2015. This change in layering may suggest that economic considerations became a pressing (political) issue around that time¹⁵². More specifically, the AA report assigned a crucial role to scientific findings and ideas as the engine for future developments, which would ultimately contribute to Germany's economic and societal innovation capacity. The DWIH are seen as a strong instrument that reinforces this capacity (cf. Auswärtiges Amt, 2016). The analysis further reveals that, since 2015, *innovation* has increasingly become a key political concern for the DWIH. This mainly relates to reinforcing Germany's international competitiveness. Although the DWIH's name includes the word *innovation*, this focus has been contested throughout their institutionalisation, and the data refers to intense debates about the DWIH's core mission among key science stakeholders (see chapter 7).

8.1.4. Consolidating Science Diplomacy

In 2020, the stable framing of the DWIH changed due to a renewed strategic focus on science diplomacy. The AA resurrected the political relevance of science diplomacy and launched a new strategic framework. This strategy marks a change of framing because new topics were included, and this constituted a (partial) thematic shift compared to the 2009 version. This new strategy developed from intense stakeholder consultation (AG Science Diplomacy, 2019) and seems to be more holistic in concept, while it also encompasses more themes than its predecessor. Four core themes are identified (Auswärtiges Amt, 2020a, 2020c): a) tackling global challenges and finding answers to strategic questions relating to issues such as climate change, public health and digitalisation, b) strengthening academic cooperation and mobility, while also promoting partnership programmes for higher education institutions, c) promoting academic freedom and supporting scholars at risk, themes which emerged from threats of fake news and international developments at the time, and d) promoting and branding Germany as a place of innovation and research. The DWIH serve as a most prominent way to promote Germany internationally.

152 In line with Bemelmans-Videc (1998, p. 4), instruments are viewed as reflecting a certain *zeitgeist* (see section 4.1).

This strategy appears to be strongly in line with Germany's internationalisation strategy (BMBF, 2017a), yet it reflects a change of framing. Its strategic objectives shifted in favour of emphasising global responsibility and underlining international solidarity (for instance, towards scholars at risk), while also focusing on the distinct principles of science, such as academic freedom. This stands in contrast to the previous approach, which primarily focused on national considerations (Epping, 2020; Flink & Schreiterer, 2010).

8.1.5. Discussion

The analysis of the DWIH reveals that key objectives and core goals have remained relatively stable over time¹⁵³: the DWIH are an instrument which aims to promote Germany internationally and reinforce its visibility. However, the comparison of the objectives shows that certain topics become more relevant in some years and disappear again in others. This is particularly evident in relation to cooperation and competition, as well as economic considerations. This suggests that the instrument is used by ministerial actors as a platform to address politically relevant topics¹⁵⁴. In 2020, new political framing of science diplomacy was introduced, which constitutes a move away from primarily national considerations. Furthermore, the analysis further shows that interpretations and objectives associated with the DWIH differ between the two ministerial actors.

The comparison over time shows that the BMBF views the DWIH from an internal perspective (i.e., it considers the DWIH to be a vehicle for national actors to improve Germany's research capacity), while the AA adopts an external perspective which focuses on the branding of Germany. This finding reaffirms the tensions and different logic between the two key ministries (see chapter 7). However, the data also shows that in certain years the two ministries adopted similar framing of the DWIH (2016, 2018). This may suggest that a common understanding of the instrument was beginning to evolve, which reinforced the institutionalisation process of the

153 The analysis furthermore sees increased coverage of the DWIH in official reports (following its reorganisation). This may suggest that the DWIH have been consolidated in such a way that they have become an even more prominent tool which Germany uses to position itself with.

154 To what degree this change in framing may have impacted the actual work and thematic coverage of the DWIH (on-site) is subject to additional research.

DWIH. Evidence is further seen in the jointly launched science diplomacy strategy in 2020.

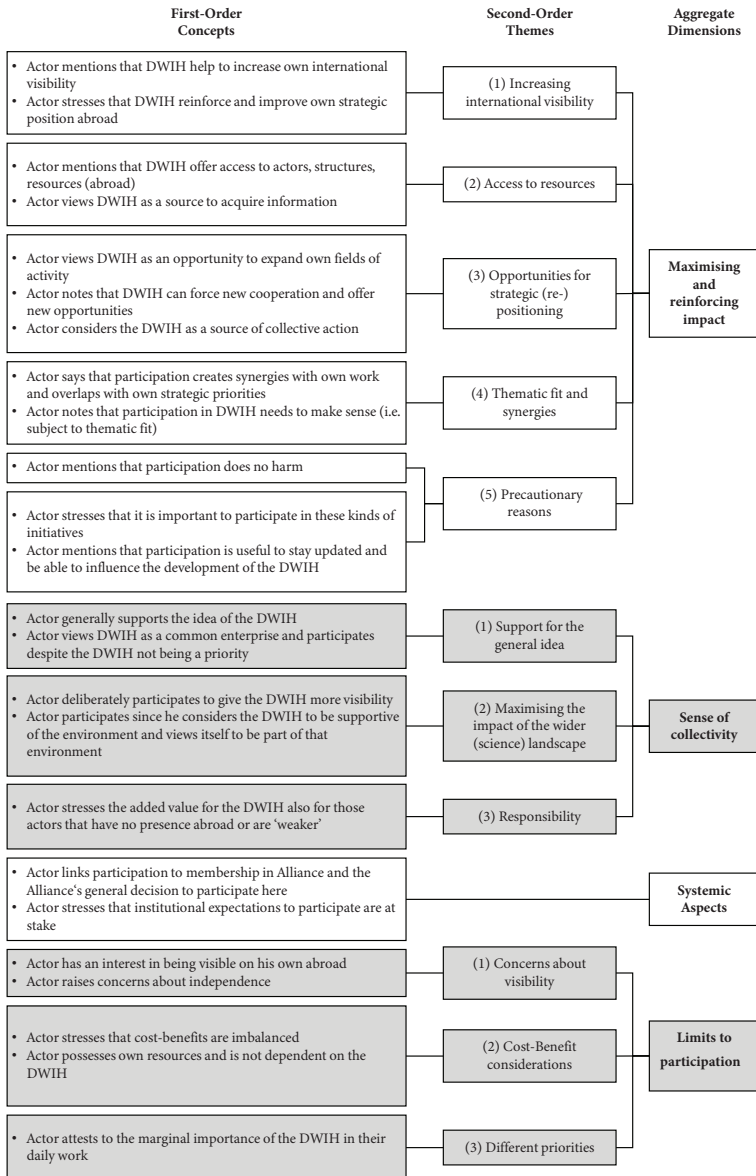
To sum up, the DWIH's core goals have remained stable; however, a certain layering can also be observed. To contextualise this, the analysis reveals themes which are strongly intertwined (it is sometimes difficult to identify demarcations) and are analytical in nature. Nevertheless, thematic shifts should not automatically be interpreted as a sign of diminishing (political) relevance. The next section presents the analysis of the key stakeholders' use of the DWIH.

8.2. Key Stakeholder Rationales

The following section presents an aggregated analysis which explains why actors participate in the DWIH and how they use this instrument (see the data structure in Figure 7). The analysis reveals that the interests of individual organisations are a most relevant factor and seem to be the dominant explanatory element. In addition to these strategic considerations, the data also provides evidence of a collective dimension since the DWIH are viewed as an instrument that benefits the German research and science landscape as a whole. In essence, the analysis identifies three overarching dimensions, which can be viewed as explanations for actor participation: a) actors' strategic interests, b) aspects that link to a sense of collectivity and c) explanations that are of a systemic nature. The three categories reflect a form of dynamic interplay in the interviews as they are typically mentioned in combination. In addition, the interview data points to factors that limit participation in the DWIH. These elements will be discussed in more detail later in this chapter.

8. Analysis of Actor Rationales for Participation (DWIH)

Figure 7 Rationales for Actor Participation (DWIH)

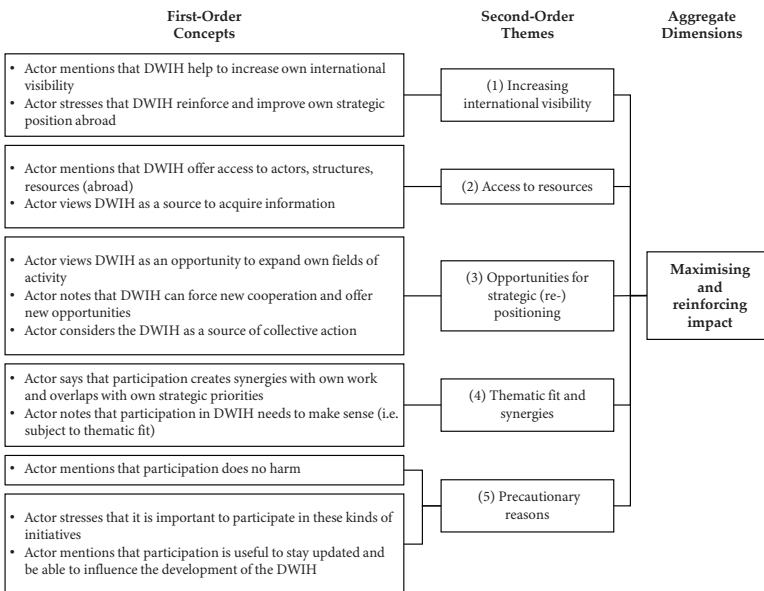


Source: created by the author.

8.3. Strategic Considerations: Maximising Impact

The first set of considerations that explain actor participation are aimed at reinforcing actors' own positions. The analysis reveals five intertwined aspects, which underline that actors' aim to reinforce activities and ultimately maximise their impact (see Figure 8). More specifically, the data shows that actors participate in the DWIH: (1) to increase their own visibility abroad, (2) to gain access to resources, (3) as an opportunity for strategic (re)-positioning, (4) in alignment with their own priorities and topics create synergies, and (5) for precautionary reasons and to gain a strategic position which allows them to influence the DWIH (or prevent certain developments). The next section discusses these aspects in detail: however, there is no suggestion of a hierarchy in terms of importance.

Figure 8 Actor Rationales: Maximising and Reinforcing Impact



Source: created by the author.

8.3.1. Increasing International Visibility

A key consideration that explains actor participation in the DWIH is linked to maximising institutional visibility. The data shows that institutional visibility is a key concern for actors. Being visible and internationally recognised as distinct actors is seen as a motivation to engage with the DWIH. DWIH are viewed as an instrument that can foster this (institutional) visibility abroad (see Table 14). The quotes below demonstrate that actors’ see the DWIH as a useful vehicle to help them strengthen their own international position and can act as a multiplier to their own activities. In other words, the DWIH are used in such a way that they serve as a multiplier for actors’ key missions. Actors’ benefit from the instrument because it may increase the visibility of their organisation internationally, while the DWIH also act as a brand for the wider German landscape (which may lead to collective visibility). The analysis highlights that gaining international visibility is a key consideration that explains participation because actors often strive to operate internationally. In a similar vein, the DWIH are viewed as an instrument that has the potential to advance an actor’s strategic position abroad and reinforces its international activities. Accordingly, the analysis reveals that the DWIH are seen as an opportunity which may promote an actor’s visibility. This multiplier function is particularly relevant in cases where actors have limited or no (institutional) exposure abroad. This relates to those cases where actors do not have their own offices or staff members abroad. It is also relevant to note that actors’ starting positions vary significantly in terms of international outreach.

Table 14 Increasing International Visibility

(1) Increasing International Visibility	
Actor mentions that DWIH help to increase own international visibility	<p>Actor x as such is internationally renowned. That is something that can be expanded and that we want to expand, and an instrument such as the DWIH are very useful in this respect, because they facilitate doing this in a very meaningful way. (GIW2)</p> <p>So, yes, Actor x is always interested in creating an outside impression, and this is why we said we somehow</p>
	<p>“[Actor x] als solche international sehr bekannt sei. Das ist etwas, was man ausbauen kann und was wir auch ausbauen und da ist natürlich ein solches Werkzeug wie die DWIH sehr interessant. Weil sie auch natürlich ermöglichen, dass auf eine sinnvolle Art und Weise zu tun“. (GIW2_2017-07-26: 41 - 41)</p> <p>“Also, jawohl, {actor x} ist immer daran interessiert Außenwirkung zu erzielen, deswegen haben wir auch gesagt bei solchen Ideen</p>

(1) Increasing International Visibility

<p>need to be involved in these kinds of ideas. (GIW6)</p> <p>And for us it is obviously also helpful, if we want to be present in [place x], to do that together with the DWIH. And there were always good subjects to be found where we then hosted a little event, an evening event or something, together with the DWIH. And that works wonderfully. (GIW10)</p>	<p>müssen wir irgendwie dabei sein“. (GIW6-2018-03-27: 34 - 34)</p> <p>“Und für uns ist es natürlich auch hilfreich, wenn wir dann mal in [place] präsent sein wollen, das mit dem DWIH gemeinsam zu machen. Und da haben sich eigentlich auch immer gute Themen finden lassen, wo wir dann eine kleine Veranstaltung, Abendveranstaltungen oder so mit dem DWIH zusammen gemacht. Und das läuft wunderbar“. (GIW10_2020-02-10: 38 - 38)</p>
<p>Actor stresses that DWIH reinforce and improve own strategic position abroad</p> <p>We hope that our own reputation will benefit from this, in the sense that it makes it easier to establish cooperation with international partners. (GIW5)</p> <p>And, of course, occasionally, when we are there, that they support us in organising a nice event or that we, together with them, maximise a joint event/or the effect of our own activities. (GIW4)</p>	<p>“Und natürlich punktuell, wenn wir gerade da sind, dass die uns unterstützen mal eine schöne Veranstaltung zu organisieren, oder das wir mit ihnen gemeinsam eigene Veranstaltungen/also den Effekt eigener Aktivitäten maximieren“. (GIW4_2017-08-10: 51 - 51)</p>

Source: created by the author.

8.3.2. Access to Resources

Closely tied to the previous aspect, the analysis shows that the DWIH are seen as a distinct platform offering access to a range of resources that would not otherwise be accessible to actors (see Table 15). The data provides evidence that actors use the DWIH in cases where it: a) provides access to facilities, b) creates networking opportunities and c) offers a certain infrastructure. Gaining access to these resources is also considered valuable from a cost-benefit perspective. To elaborate, the DWIH are viewed as a valuable, low-threshold opportunity for actors to gain access to these resources. The costs involved in establishing their own institutional presence abroad, which could generate similar opportunities, are considered to be far higher.

What is more, actors view the DWIH as a flexible, low-cost way of achieving their own (international) objectives, particularly if actors' priorities change. In addition, they enable actors to test the waters and find out whether establishing their own premises in the future might be viable option in the long run. In addition, the interview data emphasises that the DWIH are also seen as a valuable source of information. This relates to situations in which actors require specific information about a particular country, the region or a type of infrastructure as well as contact points; this could potentially facilitate actors' own operations. Hence, actors view the DWIH's ability to provide significant information as added value.

Table 15 Access to Resources

(2) Access to Resources	
Actor mentions that DWIH offer access to actors, structures, resources (abroad)	<p>And for that, of course, the DWIH are a good platform which, for one thing, combine local knowledge and which simply achieve a greater impact through this joint presence and activities on-site, and that also makes it easier, of course, for us to be a bit more flexible. [...] So, we, if we considered engaging in a certain country with an own office, this is of course an investment that one has to consider for 15/20 years and that has to pay off, and this can change. So, this is a good reason to participate [in the DWIH]. (GIW2)</p> <p>And therefore, the DWIH opens up ways to approach topics and use networks, to gain contacts that would otherwise remain closed to us. (GIW8)</p>
Actor views DWIH as a source to acquire information	<p>“Und dafür sind die DWIH natürlich eine gute Plattform, die das lokale Wissen zum einen bündeln, die durch diese gemeinsame Präsenz und Aktivität vor Ort einfach auch eine größere Schlagkraft erreichen und die auch natürlich so ein bisschen dazu dienen, um etwas flexibler zu sein. [...] Also wir, wenn man sich jetzt mal überlegen würde, man engagiert sich in einem bestimmten Land mit einem Büro, dann ist das natürlich auch eine Investition, die man irgendwie so über 15/20 Jahre sich irgendwie überlegen muss und die sich dann auch rechnen muss und sowas kann sich ändern. Das ist ein guter Grund sich zu beteiligen [in den DWIH]“. (GIW2_2017-07-26: 41 - 41)</p> <p>“Und deswegen eröffnet das DWIH uns auch Möglichkeiten in Bereichen, in Bereiche vorzustößen und Netzwerke zu nutzen, Kontakte zu gewinnen, die uns sonst verschlossen blieben“. (GIW8_2018-05-04: 23 - 23)</p> <p>“Ein anderer ist sicherlich, das ist aber auch unterschiedlich gelagert bei den Häusern, also man kann natürlich auch Informationen über die Wissenschaftslandschaft vor Ort über die Häuser gewinnen“. (GIW2_2017-07-26: 42 - 42)</p>

(2) Access to Resources

So, for us it is also a source of information, not only a place that we use or a platform that we use to place our own information. (GIW4)	“Also für uns ist es ja auch eine Informationsquelle, nicht nur ein Ort, den wir nutzen oder eine Plattform, die wir nutzen, um unsere eigenen Informationen zu platzieren.“ (GIW4_2017-08-10: 15 - 15)
--	---

Source: created by the author.

8.3.3. Opportunities for Strategic (Re-)Positioning

The analysis identifies a third element which explains participation in the DWIH: opportunities for strategic (re-) positioning (see Table 16). More specifically, the data reveals that some actors view the DWIH as a (strategic) opportunity to expand their portfolio. The DWIH are as a strategic opportunity to access new fields of activity and actors use them for strategic positioning. This finding is notable since it suggests that the instrument may potentially have a lasting impact on individual actors and the way that they operate. In addition, the data shows that the DWIH are seen as an opportunity to enter into new cooperation with other national actors (on-site) under the DWIH umbrella. The data refers to these new forms of cooperation in terms of joint events on-site or the creation of new partnerships with other (national) actors¹⁵⁵. What is more, these types of new cooperation might relate to otherwise atypical things for actors, which gain legitimacy because they are done to support the DWIH (this points to the DWIH as a valuable source of collective action, see next sections). The subsequent quotes illustrate these positive aspirations and the perceived benefits for actors who engage with the DWIH in a good way.

Table 16 Opportunity for Strategic (Re-) Positioning

(3) Opportunity for Strategic (Re-) Positioning

Actor views DWIH as an opportunity to expand own fields of activity	But I think that [for actor x], innovation is a field that we have to tap into. There, [actor x] can of course strongly position itself in a research field and also as an institution. That	“Sondern ich glaube schon, dass [for actor x] [...] Innovation ist ein Feld was wir uns erschließen müssen. Da kann der [actor x] sich natürlich auch positionieren, auf einem Forschungsfeld und auch als
--	--	--

¹⁵⁵ Please note, this slightly overlaps with the aspect *sense of collectivity*.

(3) Opportunity for Strategic (Re-) Positioning

	<p>is why, I think, it is also highly attached to [actor x]. (GIW7)</p>	<p>Institution sich nochmal in einem Feld ganz stark aufstellen. Deswegen ist das glaube ich auch relativ hoch im [actor x] [...] aufgehängt.“ (GIW7_2018-05-03: 225 - 225)</p>
	<p>Like I said, because with the DWIH we access topics that are not our core competence. I already said that this is the innovation topic, so very precisely the intersection between yes, research and industry, and that is at the same time also, at least at many locations, access to pertinent research networks. (GIW8)</p>	<p>“Wie gesagt, weil wir mit den DWIH in Bereiche auch selber vorstoßen, die nicht unsere Kernkompetenzen sind. Ich sagte schon das ist, in die, das ist das Innovationsthema, also ganz konkret die Schnittstelle zwischen ja, Forschung und Wirtschaft und das ist gleichzeitig auch, jedenfalls an vielen Standorten, der Zugang zu den einschlägigen Forschungsnetzwerken“. (GIW8_2018-05-04: 35 - 35)</p>
<p>Actor notes that DWIH can force new cooperation and offer new opportunities</p>	<p>But that also stretches to atypical things for [actor x] like workshops to show [destination x] how [topic x is done]. And then, representatives of [actor x] come and participate in these workshops and teach and lecture there. (GIW14)</p>	<p>“Das geht aber auch hin, bis etwas [actor x] untypische Dinge wie zum Beispiel Workshops zu, die dazu dienen sollen [destination x] die [topic x]. Und dann kommen Vertreter [actor x] nehmen dann an diesen Workshops teil und unterrichten oder lehren quasi“. (GIW14_2020-02-04: 41 - 41)</p>
	<p>In fact, this Monday I will travel to [destination x] [...] we will, among other things, have an event during that time, which we will organise together with [actor y] [...]. Would we have previously jointly designed such an event? Probably not. (GIW8)</p>	<p>“Ich fahre jetzt am Montag tatsächlich nach [destination x]. [...], wir werden unter anderem eine Veranstaltung dann während der Zeit durchführen, die gemeinsam mit [actor y] [...]. Hätten wir vorher solche Veranstaltungen gemeinsam konzipiert? Vermutlich nicht.“ (GIW8_2018-05-04: 25 - 25)</p>
	<p>And then we said, ok let's see how we can use this: maybe we will get closer to [actor x] or maybe launch partnerships that might be beneficial after all. (GIW5)</p>	
<p>Actor considers the DWIH as a source of collective action</p>	<p>So, the division of work and the added value, also belonging to an official German organisation, are indeed immense. (GIW11)</p>	<p>“Also die Arbeitsteilung auch und der Mehrwert, auch einer offiziellen deutschen Organisation anzugehören ist schon immens“. (GIW11_2020-01-10: 12 - 12)</p>
	<p>And then, that is of course very practical, in quotation marks, or it entails synergy, if you have all of</p>	<p>“Und dann, das ist dann natürlich sehr praktisch, in Anführungszeichen oder eben sehr synergiestiftend,</p>

(3) Opportunity for Strategic (Re-) Positioning

these actors on board sitting together at a table and you can discuss how we should, how we want to plan these events. (GIW14)	wenn man alle diese Akteure an Bord hat und gemeinsam an einem Tisch sitzen kann und sich überlegen kann, wie soll, wie wollen wir jetzt diese Veranstaltungen planen.“ (GIW14_2020-02-04: 51 - 51)
--	---

Source: created by the author.

8.3.4. Thematic Fit and Synergies

The analysis of the interview data also reveals thematic fit and the creation of synergies as distinct aspects (see Table 17). The data shows that actors must see a clear added value to their participation in the DWIH, as is illustrated by cost-benefit considerations. This suggests that participation is linked to conventional cost-benefit considerations, which implies that the benefits must be higher than the potential costs. Stakeholders tend to critically examine cooperation opportunities, for example, in relation to thematic fit. In addition, strategic priorities, such as target regions or the nature and set-up of events, emerged as relevant issues. The data furthermore refers to scientific standards or scientific quality considerations, which explain participation in a particular DWIH location. These examples demonstrate that actors' participation is explained by their vested interests and that cooperation is subject to their specific sense-making; ultimately, actors participate because they consider participation to be beneficial to their organisation due to the synergies created (the quotes below illustrate that some actors continue to operate as they would normally and that synergies are thus ensured). These considerations point to the limitations of participation.

Table 17 Thematic Fit and Synergies

(4) Thematic Fit and Synergies

Actor says that participation creates synergies with own work and overlaps with own	We are on board, and we use it [...] but we use it on-site for strategically motivated activities in selected cases. [...] So, when it suits our activities, be it scientific cooperation or even science diplomacy activities, we like to work with the individual centres [...] Let's say it like this, we pre-	“Wir sind dabei und nutzen das, [...] Aber wir nutzen es für strategisch begründete Aktivitäten im Einzelfall vor Ort. [...] Also wenn es in unsere Aktivitäten, sei es jetzt wissenschaftliche Kooperationen oder eben auch Science Diplomacy Aktivitäten passt, arbeiten wir gerne mit einzelnen
--	---	--

(4) Thematic Fit and Synergies

strategic priorities

pare [...] we consider in detail where we strategically want to be active and with whom we are going to do that, where there is enough scientific quality. (GIW3)

Häusern zusammen. [...] sagen wir mal so -wir machen das vorher. Wir überlegen sehr genau wo wir strategisch aktiv werden und mit wem wir das tun, wo ist ausreichende Masse an wissenschaftlicher Qualität gegeben". (GIW3_2017-07-26: 25 - 25)

Well, there are certainly ways for synergies to emerge if we can use mailing lists of the other organisations, invite each other to events, etc. However, we would do many of these things anyhow. (GIW5)

And for us it proved to be a significant advantage to be connected on-site, to appear with other organisations in public. (GIW11)

"Und für uns hat sich das als ein entscheidender Vorteil tatsächlich erwiesen, vor Ort vernetzt zu sein, mit gemeinsamem, eben mit anderen Organisationen auch einen Außenauftritt zu haben". (GIW11_2020-01-10: 12 - 12)

Well, this participation, to varying degrees, has different reasons. One reason is obviously that we [actor x] [...] have given ourselves regional priorities. [...] that means we have given ourselves certain priorities; that is one reason. Another reason, for example, is [country x]. Because [country x] is a firm core area of the joint international work. (GIW2)

"Also diese Beteiligung in unterschiedlichem Grad hat verschiedene Gründe. Also der eine Grund ist natürlich, dass wir [actor x] [...] uns bestimmte regionale Prioritäten gegeben haben. [...] / Das heißt wir haben uns da bestimmte Schwerpunkte gegeben, das ist der eine Grund. Ein anderer Grund ist zum Beispiel [country x]. Also [country x] ist ein dezidiertes Schwerpunkt der gemeinschaftlichen internationalen Arbeit". (GIW2_2017-07-26: 34 - 34)

Actor notes that participation in DWIH needs to make sense (i.e., subject to thematic fit)

So we, so to speak, selectively participate in the DWIH [...] if, in the context of the annual theme or, generally, programme development, we have a look if we have scientists for a specific topic, we can make thematic suggestions that suit us, and then we look if we have scientists for events, that is, if we can suggest them as participants in workshops or events that are held by the DWIH and so on [...] With [city x] I would say the cooperation is resting a bit more at the moment [...] simply because it hasn't occurred, that is simply what our activities, so we have many examples

"Also wir bringen uns sozusagen punktuell in die DWIHs ein [...] wenn wir im Rahmen der Jahresthemen oder überhaupt der Programmentwicklung, schauen wir halt immer ob wir Wissenschaftler haben, die zu einem bestimmten Thema passen, wir können ja auch thematische Vorschläge machen, die zu uns passen, und schauen dann, ob wir Wissenschaftler zu Veranstaltungen, also ob wir die sozusagen benennen als Teilnehmer zu Workshops, Veranstaltungen, die vom DWIH durchgeführt werden und so weiter.[...] Bei [city x] würde ich sagen,

(4) Thematic Fit and Synergies

of cooperation with [country x] and we are also bilaterally engaged. But it simply does not have the momentum in terms of events that create synergy [...] it is simply not that central at this moment. (GIW14)	dass ruht er ein bissl mehr [...] Einfach das hat sich nicht ergeben, das ist einfach was unsere Aktivitäten, also wir haben viele Kooperationen mit [country x] und wir sind da auch bilateral unterwegs. Aber das hat einfach nicht das Momentum im Hinblick auf Synergie-stiftende Veranstaltungen [...] Das ist einfach momentan nicht so zentral“. (GIW14_2020-02-04: 47 – 49)
In each individual case, it is subject-dependent, topic-driven [...] We always think about this from a content perspective [...] and because of that, connecting points arise. (GIW3)	“Im Einzelfall ist es fachbedingt, Topic-bedingt auch jeweils gegeben [...] Wir denken das immer vom Inhaltlichen her [...] und daraus ergeben sich dann Anknüpfungen“. (GIW3_2017-07-26: 13 - 13)
Because our main, our decisive criterion for cooperation is that there is an interest from the scientific side. [...] We don't want to go into cooperation after meeting [person x] and thinking it would be nice to do something. Instead, we want to have a scientific interest. (GIW11)	“Weil das Haupt, unser ausschlaggebendes Kriterium für eine Kooperation ist, dass ein Interesse auf der wissenschaftliche Seite gibt. [...] Wir wollen nicht irgendwie in Kooperationen gehen, wo irgendwie [persons x] getroffen habe und dachte es wäre doch schön mal irgendwas zu machen. Sondern wir möchten ein wissenschaftliches Interesse haben“. (GIW11_2020-01-10: 66 - 66)
And in [location x] we don't participate. That is because it does not correspond to our interest. (GIW4)	“Und in [location x] bringen wir uns gar nicht ein. Also das, da liegen unsere Interessen halt nicht an dem Standort“. (GIW4_2017-08-10: 31 - 31)

Source: created by the author.

8.3.5. Precautionary Reasons

The interview data also reveals that precautionary measures are another reason why actors engage with the DWIH (see Table 18). Actors stress the importance of participating in these kinds of initiatives as they are long-term projects which are here to stay. The data shows that actors refer to participating due to a desire to be kept informed about the latest developments and to receive relevant information so that they can (potentially) influence decisions and developments in relation to the DWIH. Con-

sidering the DWIH’s actor-driven (representational) set-up, this finding is not surprising; actors explain their decision to participate in relation to strategic (governance) considerations. Furthermore, the data underpins the importance for actors of being in a position which allows them to potentially influence, or even prevent undesired developments. This might be an important enough reason to explain participation in the DWIH, even if there is a limited immediate added value for actors (see quote GIW9). The data underlines this and shows that the DWIH are viewed critically among some of the actors.

Moreover, the establishment of the DWIH was, in some cases, seen as an undesirable development since it competed with the actors’ own key missions. Whilst actors could not prevent such developments, it became strategically even more relevant for them to be in a position to exert influence and potentially minimise additional problems or disadvantages. This shows that an initial reluctance to participate in the DWIH (which is evident from the institutional struggles regarding competence division) was transformed into a deliberate choice in order to gain a strategic position and to exert impact. In a nutshell, some stakeholders maintain a watching brief to secure their position: they participate in the DWIH because no harm results from their participation. It can be assumed that actors who participate on this basis are not the most enthusiastic and engaged ones.

Table 18 Precautionary Reasons

(3) Precautionary Reasons		
Actor stresses that it is important to participate in these kinds of initiatives	So, we are not even passionate about this situation. It was not our idea. Again, but then if they are there, we were not interested in other [actors] creating such competitive things. (GIW9)	“Wir waren ja gar nicht mal so leidenschaftlich in der Sache. Das war nicht unsere Idee gewesen. Nochmal, aber wenn sie denn schon, dann war man gar nicht interessiert, dass die anderen [actors] so Konkurrenz-Dinger aufbauen.“ (GIW9_2020-02-11: 16 - 16)
	They are important in the sense that since there is this initiative, we need to urgently participate in it. We would like to be just as visible, together with other organisations, so that we can also say that we don't have to do everything alone; in co-operation with others, we can be even more visible as part of the Ger-	“Sie sind insofern wichtig, also da es diese Initiative gibt, machen wir sie dringend mit. Wir möchten gerne ebenso sichtbar sein mit den anderen Organisationen zusammen, so dass wir auch sagen, wir müssen das nicht alles alleine machen, sondern in Kooperation mit den anderen können wir eben noch sichtbarer sein als Teil der deutschen [...] [L]andschaft, wir

(3) Precautionary Reasons

	man [...] landscape; we try to get involved wherever possible. (GIW6)	versuchen uns einzubringen, wo immer es geht“. (GIW6-2018-03-27: 46 - 46)
Actor mentions that participation is useful to stay updated and be able to influence the development of DWIH	<p>And at the other locations we, by all means, made sure that [actor x] is at least on board, is informed and also on board so that we can positively accompany that. (GIW12)</p> <p>You have to look at it from two angles; the one that will always be the case is that we accompany the centres in an abstract way. And that takes place continuously. So, we participate in the programme committee. Our management participates in the board of trustees. And that will always be the case. That is not related to one case, but it continues. And that is actually the most important point for us. That we always keep an eye on this, always look at how this project is developing. (GIW10)</p>	<p>“Und dann in anderen Standorten haben wir dann tunlichst zugesehen, dass [actor x] mindestens mit im Boot, mit informiert sind und auch möglichst mit im Boot sind, dass das positiv begleiten können“. (GIW12_2020-01-13_mp3: 11 - 11)</p> <p>“Also man muss es ja immer auf zwei Schienen sehen. Das eine wird ja immer sein, dass wir eben die Häuser abstrakt begleiten. Und das ist kontinuierlich. Also wir sind eben im Programmausschuss vertreten. Unsere Leitung ist in dem Kuratorium vertreten. Das wird ja immer so sein. Das ist nicht fallbezogen, sondern läuft einfach weiter. Und das ist für uns eigentlich erst einmal der wichtigste Punkt. Dass wir eben das immer im Blick haben, immer schauen, wie entwickelt sich dieses Projekt weiter“. (GIW10_2020-02-10: 38 - 38)</p>
Actor mentions that participation does no harm	<p>So, in short, we are on board—but we are not the most engaged of participants. (GIW3)</p> <p>So [actor x] profits from it, or does not suffer any damage from it, which is probably even more important. (GIW12)</p> <p>So, our reasons for participating in this initially were that we said it could be that something develops from it, and if this is wanted politically, and it doesn't cost us anything, it won't do any harm, so let's give it a try. (GIW5)</p>	<p>“Also der kurze Überschriftensatz sozusagen, wir sind dabei - aber wir sind nicht die Engagiertesten“. (GIW3_2017-07-26: 7 - 7)</p> <p>“Also [actor x] profitiert davon, oder sie nimmt zumindest keinen Schaden, was vielleicht noch wichtiger ist“. (GIW12_2020-01-13_mp3: 47 - 47)</p>

Source: created by the author.

8.4. Sense of Collectivity

As discussed earlier in this chapter, actors choose to participate with the aim of improving their own (strategic) positions; furthermore, the analysis also reveals considerations that encompass actors' contributions to the general science and research landscape. Whilst actors are motivated by a desire to improve their own position mainly, the interview data reveals that the DWIH are seen as a frame of reference and actors argue that their participation in them benefits the overall German science and innovation landscape. This highlights a collective dimension. This is noteworthy since the DWIH's early development was characterised by conflict and a tug of war between the actors involved (see chapter 6). These points of conflict seem to have been overcome or at least pushed into the background for a common idea that is linked to the DWIH. Accordingly, the DWIH seem to represent a new point of reference and a common context: actors support the instrument due to their belief that, as a joint international presence, the DWIH will benefit them as individual actors but also promote Germany's visibility internationally.

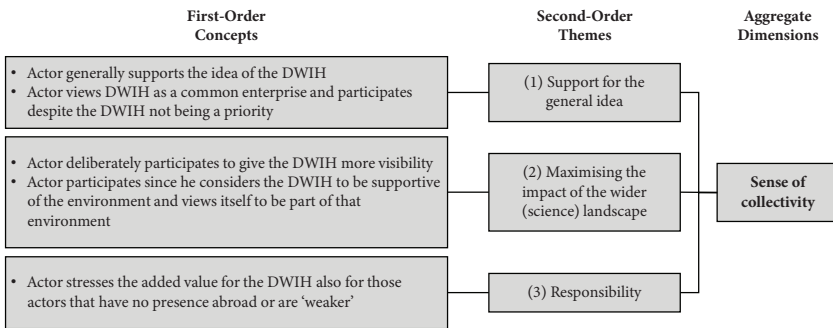
What is more, the interview data shows that actors support the DWIH for the sake of the DWIH. In other words, its concept and because of the ideas it encapsulates rather than looking only at the benefits for individual actors: in fact, these benefits sometimes appear to be of secondary importance (see Figure 9). The added value of the DWIH is highlighted in the context of their potential closure, which was discussed as an option in the light of the evaluative exercise in 2015/2016. The data shows that the potential closure of the network was considered to constitute a severe loss of face for both the German landscape and individual organisations abroad.

There was the question of what would happen if the DWIH would be eliminated. We [here: the Alliance of Science Organisations] all considered this to be a catastrophe since this would have implied a huge loss of face on-site. This would probably not have affected the AA much [here: Auswärtiges Amt], which is unknown on-site. However, if [actor x] and [actor y] and [actor z] suddenly pulled out and no longer cooperated, that would be catastrophic (interview GIW5).

This suggests that the DWIH have become institutionalised in some locations and that they have created a collective visibility, which is also beneficial for those actors who operate abroad. The analysis identifies three aspects which reveal actors' sense-making in terms of collective participa-

tion: (1) general support for the idea and their awareness of being part of a common enterprise, (2) maximising the impact of the wider (science) landscape and (3) a sense of responsibility for those actors that do not have an international presence.

Figure 9 Actor Rationales: Sense of Collectivity



Source: created by the author.

8.4.1. Support for the General Idea

The data reveals strong support for the DWIH's idea among its key actors; this is evident from the quotes below (see Table 19). Actors support the DWIH as a concept and because of the idea it encapsulates rather than only considering their individual benefits. The data suggests that actors support the instrument due to a belief that the DWIH are beneficial in promoting Germany's international visibility in a holistic way and that it also creates synergy effects and establishes a common platform. The data further shows that actors support this idea due to a sense of responsibility for those actors who do not have their own premises abroad. Participation is explained by a sense of solidarity: the DWIH are seen as an instrument that benefits the 'weaker' actors in the ecosystem. In other words, stronger actors use and support the DWIH to enable weaker actors to participate as well. Therefore, participation in the DWIH can be seen as constituting a common endeavour that benefits the ecosystem as a whole, rather than only putting only key actors in a better position.

This perception of being part of a common enterprise serves as a justification on its own. This seems to lead to new instances of cooperation and collaboration, which would presumably not have occurred in the absence

of the DWIH. The German–Brazilian Innovation Congress organised at the DWIH São Paulo is one example of this; it is considered a successful example of collaboration between different German actors, including some actors which are not primarily concerned with innovation. This underlines that the DWIH create a new frame of reference and a new context for joint action.

Table 19 Support for the General Idea

(1) Support for the General Idea

Actor generally supports the idea of the DWIH	We really have a situation where we can create synergies. And it is in fact because of the differentiation in the German higher education, research and innovation system that we thought, as science organisations, as the Alliance of Science Organisations, that it would be good to collate this diversity. (GIW8)	“Aber wir haben wirklich hier das, die Situation, dass wir Synergien schaffen können. [...] Und es ist tatsächlich auch durch die, ja die Diversifizierung des deutschen Hochschul- und Forschungssystems, dass wir auch gedacht haben, als Wissenschaftsorganisationen, als Allianzorganisationen, dass es gut ist das zu bündeln und das zusammen zu führen“. (GIW8_2018-05-04: 23 - 23)
	We do that, as already said, with conviction; we believe in a physical presence abroad and we participate actively. (GIW11)	“Wir machen das, wie gesagt schon mit Überzeugung, wir glauben halt auch an diesen, aber wir glauben auch an die physische Präsenz vor Ort und wir sind da auch aktiv mit dabei“. (GIW11_2020-01-10: 125 - 125)
	On the contrary, no, but the fact that we have a common platform also means that we can participate and contribute to it. And we do that whenever it is possible. (GIW12)	“Im Gegenteil, nein, aber die Tatsache, dass man eine gemeinsame Plattform hat heißt ja, dass man immer genau da noch was mit einbringen kann. Und das tun wir auch, wann immer es möglich ist“. (GIW12_2020-01-13_mp3: 41 - 41)
	Generally, I think the idea was considered to be reasonable, and we welcomed it. (GIW13)	“Grundsätzlich glaube ich, wurde der Gedanke zunächst hier im Hause durchaus irgendwie für sinnvoll gehalten und begrüßt“. (GIW13_2020-02-13: 4 - 4)
	For us it was clear that the DWIH as a window of the German science abroad could play an important role. And in terms of it being a one-stop-shop and enabling competences to be bundled on the German side, under one roof, it was an initiative that was certainly considered to be reasonable.	“Für uns war klar, dass die DWIH sozusagen als Schaufenster der deutschen Wissenschaft im Ausland eine wichtige Funktion erfüllen könnten. Und auch im Sinne des One Stop-Shop und der Bündelung der Kompetenzen sage ich mal, auf deutscher Seite, unter einem Dach

(1) Support for the General Idea

	Accordingly, we supported it from the very beginning. (GIW14)	wurde durchaus als sinnvolle Initiative angesehen. Von daher haben wir natürlich von Anfang an unterstützt“. (GIW14_2020-02-04: 19 - 19)
	Yes, a well-stocked shop window can never hurt in terms of international exchange, in international science. (GIW3)	“Ja, ein gut gefülltes Schaufenster kann niemals schaden im internationalen Austausch, in der internationalen Wissenschaft“. (GIW3_2017-07-26: 61 - 61)
	And there are discussions on whether to establish DWIH in other locations too. And we would actually welcome that. (GIW4)	“Und es gibt ja Überlegungen auch an anderen Standorten DWIHs zu schaffen. Das würden wir schon begrüßen“. (GIW4_2017-08-10: 51 - 51)
	Apart from that, we are part of the German science system [...] so we naturally need to participate where we realise an instrument is suitable for us. And this understanding exists [...] So, [actor x] also considers this to be relevant for the overall task. (GIW5)	“Abgesehen davon, wir sind ein Teil des deutschen Wissenschafts-systems [...] also müssen wir natürlich da, wo wir feststellen, ein Instrument ist geeignet uns auch beteiligen. Und die Einsicht ist auf jeden Fall da, [...]. Also auch [actor x] sieht schon, dass es sozusagen für die Gesamtaufgabe wichtig ist“. (GIW5_2016-01-02-00-48-16 part II: 26 - 26)
	Instead, I think we are doing the right thing by promoting Germany as a research destination and in terms of Germany's attractiveness as a research destination. And therefore, I think, we are part of the German research and science landscape, and therefore it is important that have a joint appearance. (GIW6)	“Sondern ich glaube wir tun gut daran als deutschen Forschungsstandort und auch für die Attraktivität des deutschen Forschungsstandorts zu werben. Und deswegen denke ich, also wir sind Teil des deutschen Forschungsstandortes und der deutschen Wissenschafts-landschaft und deswegen ist es schon wichtig, dass wir auch ein gemeinsames Auftreten haben“. (GIW6-2018-03-27: 48 - 48)
Actor views DWIH as a common enterprise and participates despite the DWIH not being a key priority	Because traditionally, [actor x] does not go abroad to hold a workshop on [topic x]; that is not our business. But in the context of the DWIH, you can do that, yes. (GIW14)	“Weil klassischerweise geht ja [actor x] nicht ins Ausland und macht einen Workshop zu [topic x], das ist ja eigentlich nicht unser Ding. Aber im Sinne des DWIH kann man das ruhig auch mal machen, ja“. (GIW14_2020-02-04: 44 - 45)
	There were cases where we said this is a really important event for the DWIH, although it is not our key priority. But we considered this event to be so important that we were willing	

(1) Support for the General Idea

to make a financial contribution to support it. So, yes, this kind of commitment exists. (GIW5)

Eventually, if you do it right, and I think we are doing it right now, it is a win-win situation for everyone [...] because the brand of Germany is larger than, for example, the brand of [actor x] or the brand of [actor y] or the brand of actor [z]. (GIW8)

Naturally the exchange as well, and that aligns with what I said, shifting one's respective individual interests from the national to the international level. (GIW3)

“Also, das ist letztlich, wenn man das richtig macht, und ich glaube, wir machen das jetzt richtig, ist es eine Win-Win-Situation für alle [...], weil die Marke Deutschland größer ist, als beispielsweise größer ist als die Marke [actor x] oder die Marke [actor y] oder die Marke [actor z]“. (GIW8_2018-05-04: 21 - 21)

“Natürlich auch Austausch, und das passt wieder zu dem was ich sagte, die jeweiligen Einzelinteressen von nationaler Ebene auf die internationale Ebene zu spielen“. (GIW3_2017-07-26: 51 - 51)

Source: created by the author.

8.4.2. Maximising the Impact of the Wider (Science) Landscape

In addition to the rationales described in the previous section, the data also shows that participation is explained by an attempt to maximise the impact of the national (education, science and innovation) ecosystem (see Table 20). The DWIH seem to provide a new point of reference which generates its own justification for participation: actors consider themselves to be part of a common enterprise and engage in activities which are not primarily beneficial for their very own interests or do not reflect their core tasks. Actors support the DWIH by participating in joint activities with the aim of maximising the impact of the wider ecosystem to which they belong. Thus, participation is also seen as providing credibility and visibility to the DWIH abroad; at the same time, international reputation and a strong (German) ecosystem are also ultimately beneficial to the individual actors. For the sake of supporting the concept of the DWIH, to some extent, actors even subsume their primary interests in favour of this collective idea. The quotes below illustrate this and indicate that certain implicit expectations may be at stake and explain why actors engage with the DWIH (due to being part of the system).

Table 20 Maximising the Impact of the Wider (Science) Landscape

(2) Maximising the Impact of the Wider (Science) Landscape		
Actor deliberately participates to give the DWIH more visibility	But the fact that we have a common platform means that you can always contribute something exactly there. And we do that whenever possible. (GIW12)	“Aber die Tatsache, dass man eine gemeinsame Plattform hat heißt ja, dass man immer genau da noch was mit einbringen kann. Und das tun wir auch, wann immer es möglich ist“. (GIW12_2020-01-13_mp3: 41 - 41)
	Also, doing something that is not directly of use to [actor x], because I think, I believe, we have a larger responsibility to make sure that we also support the organisation more strongly there. (GIW11)	“Auch mal was mitzumachen, was vielleicht nicht den direkten Nutzen für [actor x] hat, weil ich einfach, finde ich, habe mir eine größere Verantwortung zu gucken, dass wir auch, da tragen wir das halt mehr mit, das Haus“. (GIW11_2020-01-10: 32 - 32)
	We, because we participate in the DWIH, we give the other actors and the other organisations, give the DWIH visibility. (GIW14)	“Also wir, dadurch, dass wir uns am DWIH beteiligen, geben wir, auch die anderen Akteure, auch die anderen Mitgliedsorganisation, geben ja dem DWIH sozusagen eine Visibilität“. (GIW14_2020-02-04: 57 - 57)
Actor participates since they consider the DWIH to be supportive of the environment and views itself to be part of that environment	It is a question of how I see myself in the system. Am I [actor x] or am I a part of the German science system. If I consider myself part of the German science system, then I see that there is an added value in that and to achieve that added value, I participate as [actor x]. (GIW5)	“Das ist jetzt halt eine Frage, wie betrachte ich mich im System. Also bin ich [actor x] oder bin ich Teil des deutschen Wissenschaftssystems. Wenn ich mich als Teil des deutschen Wissenschaftssystems verstehe, dann sehe ich schon, dass es einen Mehrwert gibt, und um diesen Mehrwert zu erreichen, bringe ich mich als [actor x] ein“. (GIW5_2016-01-02-00-48-16 part I: 31 - 31)
	But yes, you have to see, we would be capable of acting, and doors would be opened for us without these centres. But as a part of the whole German research and science landscape, we are very happy about this opportunity, that we can do this with the partners on-site in each respective country. (GIW3)	“Aber ja, das muss man schon sehen, wir wären auch handlungsfähig und es würden uns Türen geöffnet werden ohne diese Häuser. Aber als Teil der gesamten deutschen Wissenschafts- und Forschungslandschaft sind wir sehr froh über diese Möglichkeit, dass dann mit den Partnern vor Ort im jeweiligen Land tun zu können“. (GIW3_2017-07-26: 65 - 65)

Source: created by the author.

8.4.3. Responsibility

Finally, the analysis identifies a sense of responsibility regarding those actors that do not have a presence abroad (see Table 21). This has partially been discussed in the previous sections; however, it is a significant and distinct consideration in its own right. While participation may not provide significant added value from an individual perspective, the data reveals that there is a sense of responsibility between actors. While, for some actors, engaging with the DWIH may lead to minimal changes in their own activities, there is evidence that a sense of responsibility and a collective environment leads to new interaction patterns, actor constellations and visibility.

Table 21 Responsibility

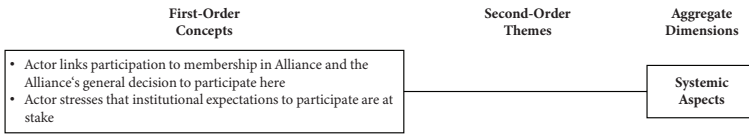
(3) Responsibility		
Actor stresses the added value for the DWIH, also for those actors that have no presence abroad or are 'weaker'	These synergies are very limited for us. [...]. However, if you look at it from the perspective of the wider science system, if we think that organisations such as [actor x], [actor y] or [actor z], which cannot easily create offices abroad, but are not included [...] and now also have representation there, then, for the whole German science system, it certainly has an added value. (GIW5)	“Synergien gibt es da für uns nur sehr bedingt. [...] Wenn man das fürs ganze Wissenschaftssystem betrachtet, wenn wir überlegen, dass es Organisationen wie [actor x], wie [actor y] oder [actor z], gibt, die halt nicht einfach Büros im Ausland gründen können, die aber jetzt mit einbezogen werden, [...] und dann halt auch eine Repräsentanz dort haben, dann hat es für das deutsche Wissenschaftssystem auf jeden Fall einen Mehrwert.“ (GIW5_2016-01-02-00-48-16 part I: 31 - 31)

Source: created by the author.

8.5. Systemic Aspects

The analysis reveals systemic rationales which account for participation (see Figure 10). More specifically the analysis identifies two elements: a) participation which is explained and linked to the actor's membership in the Alliance of Science Organisations and b) institutional expectations to participate.

Figure 10 Actor Rationales: Systemic Aspects



Source: created by the author.

To start with, the data points to the early state involvement of the Alliance of Science Organisations in the DWIH's launch. In the context of these deliberations the Alliance was approached by key political actors and asked to support the instrument. The data reflects that the Alliance took the decision to collectively participate and support the DWIH (interview GIW13). This decision still constitutes a source of legitimacy, a belief-principle which explains actors' participation. In other words, it constitutes a distinct frame of reference, which leads in turn to a certain degree of compliance. Despite this common decision, the data shows that individual actors stress and safeguard their autonomy:

Naturally also and because we are all independent actors. No one can tell either actor [a] or actor [b] or actor [b] or actor [c] or actor [d] or actor [e], you have to participate in this (interview GIW2)¹⁵⁶.

In a similar vein, the data reveals the existence of certain path-dependencies and system-eminent expectations (see Table 22). More specifically, it was mentioned that nested institutional structures explain participation. To give an example, actors had strong ties with the AA and accordingly referred to this institutional connectedness as a reason for participation in the DWIH (see interview GIW14). In other words, the data emphasises that an expectation is at stake that the actor will also participate in the DWIH. This is reflective of the nested (governance and) funding structure within Germany, where different ministerial actors issue (project) funding (cf. BMBF, 2020b). This ultimately seems to create strong linkages between them. Accordingly, participation in the DWIH can be understood as being a norm where compliance is expected and where non-participation would raise questions.

156 "Natürlich auch und vor allem, weil das unabhängige Akteure sind. Also niemand kann weder [Akteur a] noch [Akteur b] oder [Akteur c] oder [Akteur d] oder [Akteur e] sagen, ihr beteiligt euch da jetzt dran". (GIW2_2017-07-26, Pos. 92).

Table 22 Systemic Aspects

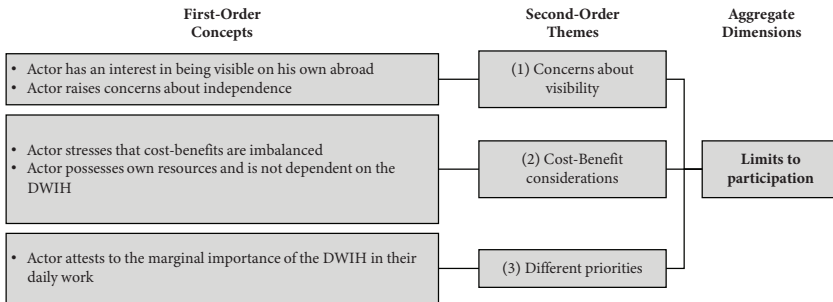
(1) Systemic Aspects		
Actor links participation to membership in Alliance and the Alliance's general decision to participate here	<p>And ultimately, also on the level of the Alliance, where they again and again talk about the German Centres of Science [...] and Innovation. It is a common, so to speak, decision to participate in them. (GIW6)</p> <p>For logical reasons, [actor x] was then, I think like all other organisations in the Alliance, asked to participate in the establishment or formalisation of this association (GIW13)</p>	<p>“Und letztlich auch auf der Ebene der Allianz, wo sie sich ja auch immer wieder über die deutschen Häuser der Wissenschaft [...] und Innovation besprechen. Das ist ja auch eine gemeinsame, sozusagen Beschluss, dass man sich daran beteiligt“. (GIW6-2018-03-27: 74 - 74)</p> <p>“[Akteur x] ist dann, wie glaube ich fast alle Allianz Organisationen, in sinnvoller Weise gebeten worden, bei der Gründung eben oder Formalisierung dieses Verbundes in Mitglied [...] zu werden“. (GIW13_2020-02-13: 2 - 2)</p>
Actor stresses that institutional expectations to participate are at stake	<p>It is very clear; I mean, we work directly, [actor x] works closely per se with the BMBF and also the AA in an international context, and, as I just mentioned, the initiative was not met with criticism or concern at our end. Hence, there were no doubts that we would participate. (GIW14)</p>	<p>“Ich meine, wir arbeiten direkt, [actor x] arbeitet per se im internationalen Bereich auch immer schon eng mit dem, sowohl dem BMBF wie aber auch mit dem Auswärtigen Amt zusammen und wie ich soeben sagte, stieß ja diese Initiative bei uns nicht in keinsten Weise auf Kritik oder Skepsis. Insofern gab's da auch keine Zweifel, dass man sich da dann einbringt“. (GIW14_2020-02-04: 21 - 21)</p>

Source: created by the author.

8.6. Limits to Participation

In the previous sections, considerations which explain actor participation were discussed. Similarly, the interview data also identifies reasons that constitute limits to participation. To some extent, these aspects invert the previous findings, but, not entirely. Three interrelated key themes have been identified and will be discussed in this section (see Figure 11): (1) concerns about visibility, (2) cost-benefit considerations and (3) different priorities.

Figure 11 Actor Rationales: Limits to Participation



Source: created by the author.

8.6.1. Concerns about Visibility

Concerns about visibility are a common and omnipresent limitation to participation among the DWIH's actors (see Table 23). This was already identified as a key element during the establishment and subsequent development of the DWIH, and it is also a relevant aspect which limits participation (in joint activities). Actors stress the need to be visible as distinct, individual actors and they decide on a case-by-case basis whether to be included under the DWIH umbrella (while, of course, a certain degree of participation is given, due to their involvement in the DWIH's governance). This reflects a clear hierarchy of interests where actors' individual strategic considerations are prevalent. More specifically, the interview data shows that actors deliberately and strategically hold events on their own and do not always wish to be subsumed under the DWIH label; this is evident from the quotes below. Actors need to maintain their own visibility, and this should be more prominent than that of the DWIH. While actors engage in certain activities to promote Germany's (or the DWIH's) visibility, the data shows that there are clear limits to this by referring to institutional interests which take precedence. The data reflects that safeguarding individual visibility is a common concern among actors. What is more, this is acknowledged and respected between actors (see quote below from interview GIW8). In a similar vein, the data also reveals that actors take deliberate decisions to maintain autonomy and that they prefer to remain in charge of their own (strategic) resources.

Table 23 Concerns about Visibility

(1) Concerns about Visibility		
Actor has an interest in being visible on his own abroad	<p>We cannot do everything under the roof of the DWIH. We also want to keep our own visibility in the countries. (GIW14)</p> <p>There are a few events, but only a few, where we deliberately say that we don't want to have another logo on it, and it should only be [actor x] on it. (GIW5)</p> <p>And therefore, it is the case that we of course, along with all other organisations, have the natural need to be supported by this strong brand but to similarly be visible on our own and be recognised as [actor y]. (GIW8)</p> <p>Where they are, [actor x] has to be careful not to be dwarfed by the Science Centres. (GIW15)</p>	<p>“Wir können ja nicht alles unter dem Dach der DWIH machen. Wir wollen ja auch unsere eigene Sichtbarkeit in den Ländern wahren“. (GIW14_2020-02-04: 57 - 57)</p> <p>“Von daher gibt es, ist es so, dass wir natürlich, und das haben alle Organisationen, ein natürliches Bedürfnis haben mit der starken Marke im Rücken gewissermaßen sichtbarer zu sein aber auch erkennbar zu sein als [actor y]“. (GIW8_2018-05-04: 45 - 45)</p> <p>“Wo es sie gibt, muss [actor x] aufpassen, dass [actor x] nicht in den Schatten der Wissenschaftshäuser gerät“. (GIW15_2020-02-21: 27 - 27)</p>
Actor raises concerns about independence	<p>For us, it was important to have an equal partnership and while there is someone who can coordinate this, we did not like the idea of hiring someone to coordinate all of this. (GIW5)</p>	

Source: created by the author.

8.6.2. Cost-Benefit Considerations

Cost-benefit considerations emerged as a significant element which influences actors' decisions on whether to participate in the DWIH (see Table 24). Three elements are identified in the analysis. Firstly, actors refer in general to an imbalance between cost and benefits, which poses a limit to participation. More specifically, the data reveals that this consideration relates to the absence of synergy effects or to aspects of proportionality in terms of time and outcomes. Secondly, the analysis highlights that those actors who have access to their own distinct resources are less inclined to

participate in the DWIH. The data identifies the DWIH's limited added value for actors with their own offices abroad. To pursue this further, clear reasons need to be found for the actor to participate nevertheless (the previous sections identified a number of reasons, such as general support or aspects of collectivity). Furthermore, the quotations below indicate that actors with access to, for instance, selected networks or cooperation are independent and are able to operate without the DWIH. Accordingly, the data shows that actors' decisions about whether to participate in the DWIH are influenced by the availability of their own resources. Furthermore, the data indicated tendencies that those actors who possess their own resources tend to view the DWIH as being of marginal importance to their own work.

Table 24 Cost-Benefit Considerations

(2) Cost-Benefit Considerations	
Actor stresses that cost-benefits are imbalanced	<p>Synergies are very limited for us. Cost-benefit considerations, I would say, do not really pay off. (GIW5)</p> <p>You cannot fly for a three-hour advisory board session from here to [DWIH location]. That is not possible, that does not relate to the cost. (GIW14)</p>
	<p>“Synergien gibt es da für uns nur sehr bedingt. Also Kosten-Nutzen Betrachtung würde ich sagen, lohnt nicht wirklich“. (GIW5_2016-01-02-00-48-16 part I: 31 - 31)</p> <p>“Also man kann nicht von hier für eine dreistündige Beiratssitzung nach [DWIH location] fliegen. Also, das geht nicht, das ist einfach, da steht, das würde nicht im Verhältnis stehen vom Aufwand her“. GIW14_2020-02-04: 47 - 47)</p>
Actor possesses own resources and is not dependent on the DWIH	<p>There is a limited added value of the DWIH for those actors such as [actor x] or [actor y] who already operate abroad. (GIW5)</p> <p>And there is one fundamental difference: we have a network [...]. We can use this to position and participate. And others do not have that. (GIW12)</p> <p>We are lucky that we have a partner in every country. [...] We have a door which we can knock on and go through [...] For us, what we want to do is not essentially dependent on</p>
	<p>“Und dann gibt es einen entscheidenden Unterschied wir haben dieses Netzwerk [...]. Darüber können wir uns mit positionieren oder einbringen. Und das haben die nicht“ (GIW12_2020-01-13_mp3: 64 - 64)</p> <p>“Haben wir natürlich das Glück in jedem Land einen Partner zu haben [...] Wir haben also eine Tür, an die wir klopfen können und durch die wir gehen können. [...] Für uns ist also das, was wir tun wollen, ist jetzt</p>

(2) Cost-Benefit Considerations

the Deutsche Wissenschafts- und Innovationshaus. (GIW3)	nun nicht essenziell auf das deutsche Wissenschafts- und Innovationshaus angewiesen“. (GIW3_2017-07-26: 65 - 65)
We have long-established examples of cooperation that are also very autonomous [...] and are not dependent on the intervention and support of an intermediary such as the DWIH. (GIW4)	“Wir haben/sind langjährige Kooperationen, die auch sehr autonom [...] und somit jetzt auch nicht die Intervention oder die Unterstützung eines Mittlers, wie das DWIH, benötigen“. (GIW4_2017-08-10: 15 - 15)

Source: created by the author.

8.6.3. Different Priorities

Finally, the findings suggest that actors are reluctant to participate in the DWIH if they consider the DWIH’s portfolio to only be of marginal importance to their regular activities (see Table 25). While previous sections have shown that the DWIH are seen to be strategically relevant for actors, this perception is not shared by all actors. More specifically, the interview data refers to different regional priorities. In other words, certain DWIH locations might be of less relevance for actors, and this can be considered to limit their participation (see quotes below). What is more, some actors consider the concept and work of the DWIH itself to be less relevant to their key missions. The latter finding is not surprising since one would assume a functionally divided and organised ecosystem to be in place that will be able to survive even in the absence of the DWIH.

Table 25 *Different Priorities*

(1) Different Priorities

Actor at- tests to the marginal importance of the DWIH in their daily work	So, I have to say, as I already said, that is only a topic of marginal importance to us. (GIW13)	“Also wir haben, ich muss sagen, so, ich sagte ja schon, das ist für uns eher ein Randthema“. (GIW13_2020-02-13: 32 - 32)
	Probably, as regards our strategic profile, the DWIH are not necessarily relevant, I would say. (GIW14)	“Also wahrscheinlich, was unser strategisches Profil betrifft, sind die DWIH nicht unbedingt relevant, würde ich mal sagen“. (GIW14_2020-02-04: 61 - 61)

(1) Different Priorities

And we don't participate in [location x]. That is because it does not correspond to our interest. And also, not in [location y]. (GIW4)	“Und in [location x] bringen wir uns gar nicht ein. Also das, da liegen unsere Interessen halt nicht an dem Standort. Und ebenfalls in [location y]“ (GIW4_2017-08-10: 31 - 31)
---	---

Source: created by the author.

8.7. Findings and Discussion

This chapter identified the rationales that are tied to the DWIH, namely, ministerial and key stakeholder rationales. This added another layer of insights to the (gradual) institutionalisation of the DWIH and thereby helped to position and enable a better understanding of the DWIH's key developments and design principles. At the same time, this also provided insights into the DWIH's instrumentation and provided an actor-centred perspective. The analysis enables the following conclusions to be drawn: the DWIH's political objectives remain relatively stable and primarily address branding and visibility aspects. Over time, layering became evident and considerations relating to cooperation, competition and economics were observed. In addition, more recently, notions of global responsibility and international solidarity have emerged. In combination, the analysis provided a more refined and nuanced understanding of the political rationales which are tied to the DWIH. One aspect has remained relatively unchanged: as an instrument, the DWIH are still firmly situated in the realm of foreign policy.

In addition, the analysis of stakeholder rationales was carried out using an aggregated approach to data presentation; this showed the wealth of considerations that ultimately account for an actor's decision to participate in the DWIH. For reasons of anonymity, there was a deliberate decision not to focus on the level of the individual actors. The analysis identified the following three themes as being relevant to participation in the DWIH (see Table 26). Strategic considerations, i.e., those which aim to maximise the impact of the actor were discussed as being explanatory. In addition, reasons were identified which refer to a sense of collectivity and reasons which are explained by systemic characteristics. Furthermore, the analysis identified factors that limit participation. The findings suggest that the forms of logic that drive participation in the DWIH primarily relate to the actors' own interests and agendas and that they are mainly reactive.

Depending on their point of departure¹⁵⁷, the DWIH were evaluated differently by actors: either as a useful instrument that facilitates international outreach or as an instrument which is of marginal importance, to show the two extremes¹⁵⁸. Thus, the (perceived) importance of the DWIH can be seen as an influential factor in actors' decisions to participate¹⁵⁹. What is more, the findings revealed that actors use the DWIH as a strategic resource for repositioning themselves and engaging in fields which are not part of their core mission. Therefore, the DWIH can be seen as having a lasting impact on actors' ways of operating. In summary, the data found a clear hierarchy of interests in favour of actors' individual strategic interests.

Despite participation securing actors' individual benefit, the data showed that collective considerations also played a role. More specifically, the analysis found that the DWIH created distinct actor constellations and moments of interaction because actors collaborated for the sake of supporting the idea of the DWIH and the concept it encapsulates; thus, some actors showed a general willingness to support the instrument. In addition, a strengthening of the DWIH's international presence was viewed as beneficial for the wider German science ecosystem (and the potential closure of the DWIH network was considered as a loss). Furthermore, the data showed that there was a sense of solidarity towards those actors who did not have their own presence abroad. These findings emphasise the distinct added value of the DWIH, which extends beyond individual actors' considerations.

The data revealed a third set of rationales for participation, such as institutional expectations from political actors and aspects of institutional embeddedness. More specifically, actors took collective decisions to participate in the DWIH through their membership of the Alliance of Science Organisations. Among the elements which limited participation, the data referred to actors' concerns about losing their individual visibility, cost-ben-

157 The data points to the fact that an actor's sense-making and use of the DWIH strongly depends on their points of departure. These differ between the DWIH's key stakeholders in terms of having their own resources, international outreach and more generally their key mission.

158 The aspect of marginal importance, however, does not necessarily have a negative connotation but may rather reflect a functionally divided ecosystem.

159 This reinforces the findings of Lubell (2003), who observes that stakeholders are likely to participate in collective action in those cases where the effectiveness of the instrument is perceived (belief-systems). In other words, stakeholders are more likely to participate and use the DWIH if there is a perceived value attached to the instrument.

efit considerations and different priorities. These findings reaffirm the assertions made in chapter 7 regarding the institutionalisation of the DWIH: strong organisational interests are at stake and actors predominantly act strategically (however, a general willingness to support the instrument was also observed). The following sections discuss instrumentation effects in more detail.

Table 26 Overview: Rationales for Participation

DWIH	
Maximise (and Reinforce) Own Impact	<ul style="list-style-type: none"> (1) Increasing international visibility (2) Access to resources (3) Opportunities for strategic (re-) positioning (4) Thematic fit and synergies to own work (5) Precautionary reasons
Sense of Collectivity	<ul style="list-style-type: none"> (1) Support for the general idea (2) Maximise the impact of the wider (science) landscape (3) Responsibility
Systemic Aspects	<ul style="list-style-type: none"> (1) Institutional expectations (2) Nested organisational embeddedness (membership in Alliance)
Limits to Participation	<ul style="list-style-type: none"> (1) Concerns about visibility (2) Cost-benefit considerations (3) Different priorities

Source: created by the author.

8.7.1. Interim Analysis of Case Study (I): Instrumentation Effects

This chapter presented the empirical data that forms the basis of the German case study, which is a manifestation of the representation model. This section attempts to draw conclusions and provide an interpretation of the DWIH's instrumentation. The data indicates that the instrumentation effects that were encountered over time consolidate each other and reinforce

the (gradual) institutionalisation of the DWIH. Despite initial struggles during the DWIH's establishment, the (gradual) institutionalisation of the instrument has been reinforced by the appropriation of key stakeholders (see Table 27).

Table 27 Instrumentation Effects: DWIH, Germany

DWIH	
Aggregation Effect	<ul style="list-style-type: none"> * Strong stakeholder involvement and severe struggles among key players in the genesis that ultimately led to the creation of the DWIH * Inertia & longevity of the instrument despite a critical audit
Representation Effect	<ul style="list-style-type: none"> * Stable (political) framing of DWIH as facilitating foreign policy goals
Appropriation Effect	<p>Affirmation of new competences</p> <ul style="list-style-type: none"> * Instrument serves as a platform for AA to expand their portfolio * Instrument is strategically used by actors to approach new topics <p>Reformulations</p> <ul style="list-style-type: none"> * Shift of power due to the reorganisation (DAAD in charge of the network) <p>Resistance</p> <ul style="list-style-type: none"> * Development of the instrument is constrained by strong actor preferences

Source: created by the author.

8.7.1.1. Aggregation Effects

The trajectory of the instrument reflects aggregation effects, which are most evident from the DWIH's longevity and inertia (Lascoumes & Simard, 2011, p. 14). Despite certain critical junctures and pressures, such as audit exercises and governmental struggles, the instrument remains firmly in place. This can be explained by an aggregation effect. The theoretical premise assumes that aggregation effects occur if a heterogeneous group of actors group is brought together to work on a particular topic. Despite them having different initial positions, learning activities take place which lead to an alignment of preferences for the sake of the instrument. In

the case of the DWIH, the data provided evidence of this in relation to the tug of war which occurred between actors, as well as the different positions and perceptions regarding how the DWIH should be used. The DWIH's establishment reflected a process which is characterised by nested governance structures and strong stakeholder preferences. However, these tensions were overcome, and actors situated themselves in relation to this new instrument and adapted their initial positions.

This can be seen to explain the instrument's resistance to change. In addition, to underline this aggregation, the data aligns with Ravinet's findings that *"in some cases, an instrument can be put in place even when the actors have not really settled on how it should be used. They may discover the functions they attribute to it during the course of its development"* (2011, p. 38). This applies to the case of the DWIH as during its establishment, there were intense discussions and disagreements concerning its core themes. While Swissnex was used as an inspiration for the DWIH (given the policy transfer which took place), the DWIH had to find its role and context-specific functions beyond this 'shell'; furthermore, actors had to find their ways of using the instrument (and they did this in complex and distinct ways, as is described earlier in this chapter).

8.7.1.2. Representation Effects

In addition, representational effects were observed. The DWIH are used as a platform for political goals, which have remained relatively stable and which frame the instrument to a certain degree. This is in line with previous studies (Epping, 2020) and suggests that a representation effect can be observed. More specifically, the core notions and objectives that are attached to the DWIH remain unchanged: the DWIH contribute to wider political and foreign affairs goals and are seen as instruments which facilitate Germany's international visibility abroad. This way of framing has been relatively stable; nevertheless, over time layering and slight modifications to these initial objectives have been observed, which could probably be seen as expressions of politically relevant themes at the time. Furthermore, it reflects the key assumption that instruments are subject to changing goals over time. In combination, these aspects can be interpreted as a representation effect since the DWIH firmly constitute and have been acknowledged as an instrument that promotes foreign policy goals. Accordingly, for key stakeholders, the DWIH seem to have a direct cognitive effect. Moreover, the DWIH's international reputation can also be considered to

have grown; this is most evident from the data which suggests that closing down the DWIH would be considered a loss of face.

8.7.1.3. Appropriation Effects

What is more, the data provides evidence of distinct appropriation effects by its key actors. More specifically, a degree of professional mobilisation was observed, which created a new context: the AA proposed establishing the instrument in order to expand their portfolio and acquire new competences. Similarly, the DWIH's establishment reflected a process which was characterised by nested governance structures and strong stakeholder preferences. Some of the key actors also aimed to acquire new competences and power. In addition, the data points to instrumentation effects, such as reformulations and resistance; the reorganisation of the DWIH led to a fundamental shift in power among key actors and the DAAD took on a more prominent role (overseeing the day-to-day management of the network, while officially heading the DWIH locations; this was an earlier goal of the DAAD). Furthermore, the establishment of the DWIH also reflected resistance: the development of the instrument was constrained by strong actor preferences and mistrust between key stakeholders, as well as actors who did not want to give up their initial positions. This underlines structural elements and key principles of the German science and innovation policy landscape, such as autonomy and institutional differentiation (Edler et al., 2010; Simon & Knie, 2010).

In addition, the DWIH seem to have constructed a new frame of reference, which constitutes its own legitimation. This has not been conceptualised in scholarly literature; however, it can be considered a distinct effect. Some actors use the DWIH as a new arena in which to conduct strategic activities and address new topics. In some cases, new patterns of interactions and new commitments have arisen due to this new arena. The instrument has brought (and continues to bring) together a range of different actors with differing perspectives and wishes, which are projected onto the DWIH. While this issue was of marginal importance for some actors, those same actors also emphasised that new forms of cooperation with other (national) actors had emerged or that they addressed topics which were not their key focus in order to support the DWIH.

Hence, new commitments were established. This aligns with the findings of Selznick (1966), who was quoted in Mayntz & Scharpf (1995, p. 42) as

follows: *organisations might over time, though created as instruments, create their own value for actors and members*¹⁶⁰. In the words of Le Galès, they are subject to interpretation by their main actors and fuel institutionalisation dynamics (2011): the DWIH create their own contexts, and actors use them in line with their own agendas (leaving aside wider political objectives). In a similar vein, it became evident that the DWIH are held together by wider support for the concept. This creates a new frame of reference and indicates that a common interpretation of the instrument has developed among actors. Key actors perceive themselves as being part of a common enterprise that aims to push the international visibility of the general science and innovation landscape. This shows that new configurations of actors emerge and that they also create new interaction patterns.

Furthermore, the data shows that the potential closure of the DWIH is viewed as significant, not in relation to actors' individual positions, but rather for the science and innovation landscape as a whole. This suggests that a common narrative and added value has evolved in relation to the DWIH. This common idea seems to be a driver for the DWIH's institutionalisation. In some cases, actors even supported activities because of a collective interest, even if the topics were not related to their core themes. To conclude, it can be observed that distinct effects can be attributed to the instrument or have been created by the instrument. Examples of these instrumentation effects include the creation of a new arena for actors to position themselves (ministries and other actors), a new context which enabled a sense of collectivity to emerge, and a new platform for the cooperation of heterogeneous actors. However, inertia tendencies and resistance to change were also encountered. The DWIH's institutionalisation can therefore also be explained by distinct appropriation effects.

160 "daß Organisationen zwar als Instrumente geschaffen werden mögen, dann jedoch in der Regel für ihre Mitglieder und für Akteure in ihrer Umwelt einen Eigenwert gewinnen" (Mayntz and Scharpf (1995, p. 42)).

Case Study (II): Service-Oriented Model—Swissnex, Switzerland

The second case study in this study is the service-oriented model, which is manifested in Swissnex, Switzerland's global network for education, research and innovation. This case study follows a similar structure to the previous one. First, a solid description of Swissnex ¹⁶¹ is provided, which facilitates a scholarly understanding of the instrument and supports the interpretation of data (chapter 9). The second part of this case study traces the historical development of Swissnex over time in order to bring its (gradual) institutionalisation to the fore (chapter 10). In line with the heuristic framework, attention is paid to the inception phase, as well as to critical junctures throughout the instrument's development (for a definition of critical junctures, see section 4.2.3). This makes it possible to outline the factors which explain the instrument's current form. The third part of this case study (chapter 11) presents the results of an analysis of the rationales which guide actors to participate in Swissnex. In line with the conceptual framework, this adds an additional layer to the institutionalisation of the instrument and describes its instrumentation. Finally, an interim conclusion is drawn, which brings together chapters 9, 10 and 11 and highlights the instrumentation of the instrument (section 11.7.1).

161 Please note: *Swissnex* and *swissnex* are used interchangeably in official documentation.

9. Description of the Current Swissnex Network

Switzerland can be considered a pioneer country in terms of SICs. The Swissnex network was established more than 20 years ago and has steadily evolved since that time. There are currently Swissnex nodes in five different regions of the world, constituting strategically relevant locations: Brazil (Rio de Janeiro), China (Shanghai), India (Bangalore) and the USA (Boston, New York and San Francisco) (see also chapter 3). In addition, another Swissnex location will be opened in Japan (Osaka) in 2022 (Swissnex, 2021d). Swissnex's core mission is to “*support the outreach and active engagement of our partners in the international exchange of knowledge, ideas and talent*” (Swissnex, 2019), while it also aims to convey the image of Switzerland as a highly innovative country that “*connects tomorrow*”¹⁶². Swissnex is seen as a distinct instrument that reinforces Switzerland's international competitiveness (Schweizer Bundesrat, 2020a), while it is also similarly perceived to be an institution which plays a crucial role in terms of trend scouting and horizon scanning for Swiss science, education and innovation actors (ibid.).

Its global spread (Hertig, 2015), agility and openness to experimenting are seen as key factors in its success. Furthermore, in particular, these aspects serve to demarcate Swissnex from other existing institutions, such as embassies and consulates (interview SNX3). Swissnex is officially linked to Switzerland's external network abroad, which lies in the administrative realm of the Federal Department of Foreign Affairs (FDFA). In that respect, the network maintains close ties to the country's diplomatic representation body. This connection to diplomacy is furthermore underlined by the fact that Swissnex's CEOs have diplomatic status. Moreover, the different Swissnex locations are, to a varying degree, also linked to and embedded in the consular representation (though Swissnex largely has its own offices)¹⁶³. On a general note, it should be mentioned that each Swissnex location is deeply rooted in its respective context. This also explains why the focus and service differ slightly at each Swissnex location.

162 In the past, the Swissnex motto was “*connecting the dots*”, but this was changed to “*connecting tomorrow*” in about 2020. This is reflective of a re-branding exercise, in which Swissnex also received a new logo (cf. Swissnex (2021a)).

163 For an overview, see Swiss Federal Audit Office (2016, p. 15).

In other words, certain topics are more relevant in some regions than in others; for example, start-ups and technological developments are key topics in the USA (interview SIW2), while the focus in India or Brazil is completely different (interview SIS2). Accordingly, their exact thematic coverage is strongly context-driven¹⁶⁴.

9.1. Principal Actors

The principal actors that are relevant for Swissnex are primarily ministerial actors: the State Secretariat for Education, Research, and Innovation (SERI¹⁶⁵) and the Federal Department of Foreign Affairs. SERI thematically oversees Swissnex and is responsible for the network's daily operations and strategic direction (Swissnex, 2021b). However, the FDFA also plays a key role because Swissnex is part of Switzerland's official network abroad¹⁶⁶. In addition, the FDFA provides a framework to strengthen Swissnex's work, such as granting diplomatic status to Swissnex's CEOs¹⁶⁷. Swissnex CEOs typically maintain close ties with the respective Swiss ambassadors and the Science and Technology Counsellors. Furthermore, there is a certain level of reporting by CEOs to the ambassadors. In addition to these two minis-

164 For an overview of Swissnex's activities and its perceived impact, see the annual reports (cf. SERI (2017, 2016)) and evaluation (cf. Oxford Research A/S (2020)).

165 Translation of *Staatssekretariat für Bildung, Forschung und Innovation*. Until 2005, there were two departments: the Swiss Science Agency (*Gruppe für Wissenschaft und Forschung*), which focused mainly on international activities, and the Federal Office for Education and Science (*Bundesamt für Bildung und Wissenschaft*). In 2005, these departments merged and became SERI. In 2013, another merger took place and the department for vocational education and technology joined SERI. For a more detailed history of SERI, see *Staatssekretariat für Bildung, Forschung und Innovation: SERI* (2020, p. 16).

166 The network was previously called the ERI network (Education, Research, and Innovation Network). In addition to Swissnex, Switzerland's network abroad also includes Science and Technology Counsellors, who are stationed at various Swiss embassies (see chapter 3). Funding for these counsellors is divided between SERI and the FDFA.

167 This constellation was at times contested and proved to be a cause of dissent in the past (cf. interviews SNX3, SIS7, SIW2). Traditional career diplomats find themselves operating in a comparatively strict diplomatic corset in contrast to Swissnex employees, who are financed by SERI and given more autonomy (cf. interviews SIW1, SIS7). On a side note, the financing of science and technology attachés has similarly been subject to criticism in the past, given their perceived second-best role and payment according to local rather than Swiss standards (cf. Stoll (2018)).

terial actors, Swissnex's work is also supported by a Swissnex committee, which acts as a sounding board, providing informal advice to the ministerial actors (interview SIS2). The committee comprises key representatives from education, research and innovation institutions, representatives from business enterprises, parliamentarians, as well as SERI and FDFA members (Swissnex, 2021b). In about 2008, the committee was introduced as a structuring element to Swissnex's work (interviews SIS7, SIW1)¹⁶⁸; moreover, it advises SERI on various matters in a non-binding way. The research data revealed that even sensitive issues are discussed in this committee, such as the distribution of state funding among SERI's key stakeholders (interview SIS7). What is more, the committee even seemed to have been involved in internal evaluations in the sense that committee members visited Swissnex's locations in 2010 and 2015 (Swiss Federal Audit Office, 2016, interview SIW1). The committee seems to operate on a consensus-basis (interviews SIS7, SIW8) rather than on the basis of power struggles (SIW8):

*Everyone sacrifices a little in terms of the general budget distribution, everyone uses the services and everyone can exert an influence*¹⁶⁹ (interview SIS7).

The composition of the committee is ad personam (interviews SIS2, SIW1) and currently comprises the following 10 members and institutions¹⁷⁰ (Swissnex, 2021b):

- Christine Bulliard-Marbach, National Council, Swiss Parliament
- Tania Cavassini, Head of Directorate for Resources, FDFA (ex officio)
- Matthias Egger, President of the National Research Council, SNSF (ex officio)
- Beatrice Fasana, Managing Director Sandro Vanini SA and member of the ETH Board

168 The data reveals that the introduction of the Swissnex Committee is explained by an initiative that goes back to State Secretary Dell'Ambrogio. The committee was installed as a structuring element quite soon after he took office to a) formalise stakeholder involvement (concerning key science actors but also other governmental actors such as FDFA) and b) strengthen the legitimacy of Swissnex.

169 "Jeder opfert ein bisschen in der großen Geldverteilung, alle benutzen die Dienste und alle können beeinflussen" (interview SIS7).

170 Membership of the Swissnex committee does not require an individual to have collaborated or prospectively collaborate with Swissnex (interview SIW8). Instead, the composition is determined by including members that can reflect a (potential) user perspective and provide a sounding opportunity.

9. Description of the Current Swissnex Network

- Yves Flückiger, President swissuniversities (ex officio)
- Michael Hengartner, President ETH Board
- Pascal Marmier, Secretary General, The Economy of Trust Foundation
- Maria Peyro Voeffray, Head of International Relations a.i., SERI
- Nicola Thibaudeau, CEO MPS Micro Precision and member of the Innosuisse Board (ex officio)
- Pascale Vonmont, CEO Gebert Rüt Stiftung and member of the Swiss Foundations Board.

9.2. Governance Architecture

To expand on the previous section, the governance architecture of Swissnex consists of a lean structure with central governance from the headquarters in Bern, while individual Swissnex locations are relatively autonomous (see Table 28). Each Swissnex location is run by a CEO, who is supported by a team composed of Swiss nationals and locals (teams vary in size at different locations)¹⁷¹. Bottom-up governance is a key principle that characterises Swissnex's governance and funding arrangements (see section 9.4.1). While SERI oversees the network thematically and determines its broader terms, individual locations operate according to a bottom-up principle and have significant autonomy. To give an example, individual Swissnex locations have significant room to manoeuvre; however, there is also an expectation that they position themselves according to regional needs and that they create an impact. This governance architecture allows each location a significant degree of autonomy and is considered an explanation for Swissnex's success (interviews SNX3, SIS6).

The work of Swissnex is monitored by two main instruments: a four-year annual development plan (Service Level Agreements), which sets the general direction and formulates objectives for each location, and annual agreements which define selected priorities and are set out in the *Lettres des Mission* (Oxford Research A/S, 2020, p. 8; SERI, 2015a). The interview data also refers to individual performance agreements, which are agreed between SERI and each CEO. In addition, CEOs were asked to design a strategic development plan for the location they presided over (interview

171 The data reflects that, in the early years, certain locations such as Boston had installed an advisory board (cf. SHARE Boston (2000)). The interview data could not reveal similar structures to be in place as of today.

Table 28 Organisational Structure: Swissnex

	Key actors	Role
Governance of the Network	SERI	* Sets out strategic direction, oversees and controls the network (performance indicators)
	FDFA	* Formally involved since Swissnex is part of the official external representative body of Switzerland * Formal role: providing, for instance, diplomatic status to CEOs
	Swissnex Committee	* Strategically advises on the development of Swissnex * Non-binding role * Ad personam composition * Key stakeholders in the research, science and innovation system, members of parliament, ministerial players (n=10)
On-Site Governance	CEO, supported by local team	* Daily & strategic management of Swissnex on-site * Reports to Bern

Source: created by the author.

SIS6). In the past, there were rotations of CEOs across the Swissnex network; however, it was not possible to identify a regular pattern to these changes from the available data¹⁷². To sum up, to a large degree, each Swissnex location operates independently in terms of defining topics, themes and formats, which should, however, align with the network's general framework and objectives. Thus, Swissnex's actual work appears to be customer-driven and, to a large extent, reflects developments in the field. This bottom-up character seems to replicate the Swiss research and science ecosystem (see section 9.4) and is an inherent characteristic of Swissnex's gradual institutionalisation.

9.3. Funding

This bottom-up approach is also reflected in the underlying funding mechanisms of Swissnex: it runs on a public-private partnership model. While SERI provides basic funding to cover general operating costs, such as rent (this accounts for around a third of the costs), the remaining amount

¹⁷² Some sources point to the anticipated four-year rotation of Swissnex CEOs (interviews SNXI, SIS7); however, this could not be confirmed. Despite this, the regular rotation of CEOs is viewed as underlining the innovativeness that Swissnex aims to represent (cf. interview SNXI). According to the annual report, recent rotation (and exchange) of CEOs took place in 2021 (cf. Swissnex (2021a)).

(two thirds) must be earned by each Swissnex location. The interview data shows that certain tasks are delegated to Swissnex by key stakeholders on a regular basis. This is manifested in annual mandates (interviews SIW2, SIW7). Apart from these annual agreements, Swissnex also has ad hoc contracts with key stakeholders, such as business representatives and other actors in the ecosystem, such as higher education institutions or the Swiss National Science Foundation (SNF), to name a few¹⁷³. This public-private partnership model is deeply rooted in the genesis of Swissnex and can be traced back to its inception (see section 10.1.4). This funding arrangement is perceived to be responsive to market needs, reflects its “customer-centric” character (interview SNX3) and underlines Swissnex’s classification as an ideal type of service-oriented SIC¹⁷⁴.

This funding mechanism is similarly considered to be an effective evaluation criterion for the work of Swissnex (interview SIS6). The underlying assumption is that if Swissnex is able to generate its own funds, this demonstrates a need and a demand for its work from its customers’ perspective. This eventually provides a layer of legitimacy for Swissnex’s work (interview SIS6). These funding arrangements constitute a distinct design principle of Swissnex; however, the division of funding is not uncontested. To give an example, the funding model could be problematic if Swissnex expands (interview SNX3). This is because there would be increased competition between Swissnex locations to generate income and cooperate with clients in Switzerland. If funding conditions remain unchanged, this would lead to a higher number of Swissnex locations chasing after the same money¹⁷⁵. Another point of criticism relates to funding through third parties; critics argue that the federal financial contribution could be paid directly to Swissnex, which would enable the network to ensure a better planning capability. In total, approximately 5.5 million Swiss Francs are provided by SERI for the operation of Swissnex (interviews SIS2, SIS6 and (SERI, 2015b)), which is a relatively small amount in relation to the overall budgets of SERI and the FDFA¹⁷⁶.

173 For an overview of these activities, a visit to the Swissnex website is recommended.

174 Elsewhere this is reaffirmed in the sense that: “Stakeholders define the scope of activities, while partners contribute to and benefit from what swissnex [...] does” (Marmier and Fetscherin (2010, p. 101)).

175 Sources suggest that, apart from federal funding, the ETHs and higher education institutions are Swissnex’s main (paying) clients (cf. SERI (2015b)).

176 To contextualise this, see the most recent *Botschaft* (Schweizer Bundesrat (2020b)), which specifies in detail how public funding is distributed to promote international

9.4. Contextualisation

9.4.1. Bottom-Up Principle for Policy-making

The development of Swissnex must be understood alongside a key principle that is inherent in Swiss politics: pragmatic bottom-up policy-making (cf. Pasternack et al., 2016; Seeber, 2014; Weingart, 2018, p. 11). According to the Swiss perception of research and science governance, the role of the state is to provide a good framework while intervening as little as possible so that stakeholders can operate on their own (interviews SIS1, SIS2, SIS5, SIS6):

We believe that science knows best what it needs, where it is strong and where it can develop well. And that is a key principle in Swiss science policy: let the stakeholders take over [...] As said, bottom up is our main principle and we only intervene where the stakeholders need it. But certainly, it is our role to provide good framework conditions. That is the role of the state, nothing more (interview SIS5)¹⁷⁷.

This bottom-up governance approach to science and technology policies has, however, been challenged in recent studies (Hofmänner, 2018, p. 61); it is seen as skewed and considered to reflect a somewhat self-created image which is promoted by the actors themselves (cf. Netzwerk Future, 2019, p. 3). In response, there were calls to revise the national science and technology policy approaches and to classify them as both bottom-up and top-down (Hofmänner, 2018, p. 61; Weingart, 2018). Nonetheless, this (self-defined) bottom-up approach has significantly impacted the development of Swissnex, as will become evident in the following sections.

research and innovation collaboration. The former State Secretary Dell'Ambrogio is quoted in Rittmeyer and Forster (2013, p. 67) and claims that in comparison to the budgets of the FDFA, Swissnex is a small yet agile dwarf: *„Verglichen mit den Budgets des Auswärtigen Departements und des Staatssekretariats für Wirtschaft (Seco) ist swissnex ein kleiner, agiler Zwerg“.*

177 *“Wir sind der Meinung, dass die Wissenschaft selber genau weiß, was sie braucht, wo sie stark ist und wo sie sich gut entwickeln kann. Und das ist ein Grundprinzip der Schweizer Wissenschaftspolitik: lassen wir die Stakeholder arbeiten. [...] Wie gesagt bottom up ist unser Prinzip und wir intervenieren nur, wo die Stakeholder es brauchen. Aber natürlich unsere Rolle ist gute Rahmenbedingungen zur Verfügung zu stellen. Das ist die Rolle des Staates - mehr nicht“ (interview SIS5).*

9.4.2. Demarcations to Similar Institutions

In the Swiss ecosystem, Swissnex is situated alongside other institutions that are generally considered to operate in the public diplomacy realm, such as the Pro Helvetia institutes¹⁷⁸ and Presence Switzerland (see section 3.3.6). In addition, the landscape also includes other actors with a focus on the promotion of innovation activities. These are Innosuisse, Switzerland Global Enterprise and the Greater Zurich Area¹⁷⁹. The interview data suggests that, in practice, boundaries and the division of tasks are not always clearly defined, which can be a source of friction (interview SIW2). Nevertheless, an attempt is made to position and demarcate Swissnex from other institutions. To start with, the core task of *Pro Helvetia* is to promote Swiss culture and facilitate bridge-building activities between Switzerland and the host countries. Swissnex, on the other hand, is mainly concerned with education, technology and innovation (cf. Eggenberger, 1986; Kowner, 1993), although, admittedly, culture also plays a role in some locations. *Pro Helvetia* also operates abroad in selected countries, which sometimes geographically overlap with Swissnex locations, such as India (New Delhi, the Swissnex office is located in Bangalore), China (Shanghai)¹⁸⁰ and the USA (New York). Furthermore, the research data reveals that *Pro Helvetia* in fact supports the work of Swissnex financially (cf. Schweizer Bundesrat, 2020a, p. 3173)¹⁸¹. In the past, these two actors were also involved in joint projects (Schweizer Bundesrat, 2007, p. 1347) in such a way that in official documents, the work of *Pro Helvetia* and Swissnex is described as complementary and the organisations are considered to enrich each other (Schweizer Bundesrat, 2020a).

Presence Switzerland is a Swiss-based institution that is attached to the FDFA. Its key mission is to create and promote a positive image of

178 For more information, see: <https://prohelvetia.ch/de/> (accessed 20.01.2022).

179 Greater Zurich Area aims to promote the economic potential of the Zurich area abroad (for instance in the USA).

180 On a side note, in some cases there are close ties between *Pro Helvetia* and Swissnex. The research data reveals, for instance, that Swissnex Shanghai intentionally drew on close cooperation with *Pro Helvetia* during the process of establishing itself (cf. Max Dohner (2019)).

181 The official report mentions co-funding of San Francisco. It does not, however, specify whether this is ad hoc support or refers to annual mandates.

Switzerland abroad (cf. Rittmeyer & Forster, 2013)¹⁸². As such, Presence Switzerland also showcases Swiss innovation and technology; however, it does not interfere in Swissnex's realm due to a different thematic set-up (interview SIS6). At first glance, the demarcation lines for Innosuisse do not appear to be strong. Innosuisse is the Swiss Innovation Agency and a federal entity that aims to promote innovation activities in the interest of the Swiss economy and society¹⁸³. However, it mainly operates nationally (cf. Schweizer Bundesrat, 2020b, pp. 3716; 3809 ff.). Despite this, a shared role is taken on by Swissnex and Innosuisse when it comes to facilitating the work of start-ups aiming for international outreach and expansion (Schweizer Bundesrat, 2020b, p. 3814). Although this shared responsibility might lead to overlaps and blurred boundaries, this is (generally) not viewed critically by key actors; rather, it is viewed as complementary (cf. interview SIS6).

What is more, collaboration is seen as the best way to deal with intersecting domains; for example, Innosuisse is a member of the Swissnex committee as a stakeholder (see, section 9.1). Switzerland Global Enterprise¹⁸⁴ is the official organisation promoting exports and investments; it helps small and medium-sized enterprises to gain international exposure and promote their businesses. Hence, they also operate abroad. Lastly, the Greater Zurich Area¹⁸⁵ should be mentioned; this organisation is supported by nine cantons and aims to present the Greater Zurich Area abroad. While some of the institutions described above work on a national basis, others operate internationally, in a similar way to Swissnex. The interview data reveals different views on this situation: on the one hand, these organisations are considered to have a reinforcing impact on each other (interview SIS6), particularly also in the early stages of Swissnex (see next sections), while on the other hand, there are also more critical views and questions are raised regarding demarcations (interview SIW2).

182 Presence Switzerland is viewed as a PR agency that aims to spread a positive image of Switzerland abroad: "PR-Büro, um im Ausland ein positives Image der Schweiz zu verbreiten" (Rittmeyer and Forster (2013, p. 66)).

183 For more information, see <https://www.innosuisse.ch/inno/en/home/about-us/mision.html> (accessed 20.01.2022).

184 <https://www.s-ge.com/de/wer-wir-sind> (accessed 10.03.2022).

185 <https://www.greaterzuricharea.com/de/public-private-partnership> (accessed 10.03.2022).

10. (Gradual) Institutionalisation of Swissnex

Following the description of the instrument (previous chapter), this chapter analyses the *long-term career* of Swissnex. The (gradual) institutionalisation and the development of Swissnex are described by paying close attention to the inception phase (section 10.1). This is because it is assumed that key design principles were laid out during this phase. In addition, critical junctures throughout the instrument's career, which also led to changes in the instrument's composition (section 10.2), are identified. To summarise, adopting this historical perspective serves as a lens to explain Swissnex's current shape and provides an insight into the wider rise of SICs.

10.1. Genesis of Swissnex

In 2000, the development of what is today known as the Swissnex network gained public awareness with the opening of a “*Swiss House*” in Boston (swissinfo.ch, 2000), which at the time was better known as SHARE Boston (Swiss House for Advanced Research and Education) (European Commission, 2004). The emergence of SHARE Boston, then a novelty, must be considered in relation to the context and the prevailing situation at the time. Emergent societal megatrends created a window of opportunity and political momentum that enabled the idea to develop. A supportive political environment (i.e., SERI, the State Secretary and the Parliament) promoted the idea, acknowledging the need for new responses in changing times. Thus, the idea was welcomed and was consolidated in a way that led to the rise of a unique and distinct instrument, which also inspired many other countries (Germany among them). In addition, among the factors that were singled out in the analysis as determining and shaping the rise of the network, the role of policy entrepreneurs who had triggered this bottom-up initiative should be mentioned. In addition, a timely private investment made a difference. In other words, contingency aspects (i.e., the interplay of certain events which had a major impact) as well as appropriate timing seem to have been relevant in the instrument's early stages (for a definition, see section 4.1.3).

10.1.1. Societal Developments

The launch of SHARE Boston must be understood in light of two wider emergent societal developments at that time, which paved the way for this novel institution to arise: globalisation and internationalisation, as well as brain drain tendencies.

10.1.1.1. Globalisation and Internationalisation

The start of the new millennium was dominated by a peak in globalisation and calls for the internationalisation of higher education and research. Technological developments had gathered speed and new communication technologies, such as the Internet, had gained significance. This opened up new avenues for development, while changing current patterns of cooperation and thinking (cf. interview SNX3). A significant number of Swiss companies had, or were about to, set foot in the United States. Similarly, internationalisation had become a major (governmental) concern (cf. interview SIS4, Schweizer Bundesrat, 2002), and an increasing number of countries started to initiate internationalisation processes and devise strategies to account for this new interconnectedness (Huisman & van der Wende, 2005). Internationalisation efforts in Switzerland were scattered at that time, and consolidated internationalisation policies, not to mention examples of institutional presence abroad, hardly existed (apart from a couple of Swiss research institutes that were opened in selected regions (cf. Kleiber, 2000)).

In terms of an international institutional presence, the opening of SHARE Boston thus marked a new milestone (Schweizer Bundesrat, 2002). Furthermore, at that time, Swiss international activities largely had a European focus, and attempts centred on participating in European programmes (Hofmänner, 2018, pp. 30–31). Accordingly, it proved to be one of the key tasks of the newly appointed SERI¹⁸⁶ State Secretary, Charles Kleiber, to respond to these developments (interview SIS4) in line with the political framework conditions (i.e., cantonal policy, see section 5.2.4). In a similar vein, the Swiss Parliament at that time also acknowledged these

186 In 1997, Charles Kleiber was appointed State Secretary of the Swiss Science Agency, succeeding Heinrich Ursprung. Please note, the Swiss Science Agency was renamed later as what is now called SERI (SBFI) (cf. SERI (2020)). For simplification and consistency reasons, reference is made to SERI throughout this study.

changing environments and placed emphasis on formulating an appropriate response (Kleiber, 2021, p. 4).

10.1.1.2. Brain Drain

In the late 1990s, Switzerland was confronted with a brain drain situation, which was possibly reinforced by increased internationalisation developments (Simm, 2021; ThinkSwiss, 2010). It became apparent, for instance, that a significant number of Swiss scientists had moved to the Boston area to advance their careers (Lombard Odier, 2011; Marmier & Fetscherin, 2010; Swiss Federal Audit Office, 2016; swissinfo.ch, 2000; von Arb, 2004, interviews SNX2, SNX3, SIS4, SIS5). While the USA had always been considered a relevant destination for researchers worldwide (interviews SNX2, SIS4) and exchanges were not uncommon, it became evident that many scientists who had been educated in Switzerland chose to remain in the USA; this triggered a brain drain situation. A significant number of Swiss scientists resided in the Boston area (and its Ivy League institutions), while Silicon Valley also became an attractive destination for computer science graduates (Simm, 2021, p. 36). In combination, these two developments can be seen to have prepared the ground for further action.

10.1.2. Political Momentum

The megatrends of globalisation and internationalisation, and in particular the rise of the Internet, created political momentum and a political need to tackle these issues. The trajectory of Swissnex's development must therefore be understood in the light of increased political awareness of the importance of science and technology, in particular because Switzerland is a small country that had to find a niche for its international positioning. On the one hand, this aimed to eventually secure Switzerland's success internationally (interview SIS2), while on the other hand it was viewed as offering a new path to diplomacy by using it as a vehicle to showcase Switzerland and create visibility¹⁸⁷. Despite Switzerland's long-standing tradition of having science attachés at its embassies (cf. Jost, 2012) (see chapter 3), in 1995, there were only three science attachés in total, stationed at the embassies

187 Swissnex aimed to “*invent a new diplomacy*” (Kleiber (2021, p. 4)), a “*future-oriented diplomacy, dedicated to science and technology*” (SHARE Boston (2000, p. 3)).

in Washington, Tokyo and Brussels (Swissnex, 2017; von Arb, 2021). Given the changing conditions, it was viewed as being strategically relevant for this network of science attachés to be strengthened and expanded (cf. ThinkSwiss, 2010, p. 3; von Arb, 2021).

The data is slightly ambiguous on the subject of who proposed expanding the network and relocating the Washington attaché position (SERI or the policy entrepreneur Comtesse (Comtesse, 2021, p. 7; von Arb, 2021)). Irrespective of this, the idea of creating new posts proved to be challenging, due to financial constraints on the one hand and the FDFA's reluctance on the other. The issue of financial support, however, was resolved in the short term, since the ETH Board was able to provide funding for an additional science attaché to take up a post in San Francisco in 1997 (ThinkSwiss, 2010; von Arb, 2021). This newly created position was also the first one outside a capital city. With the ultimate approval of the FDFA, the network of science attachés evolved quite rapidly and had expanded to 15 by the end of the late 1990s (von Arb, 2021). These developments and discussions prepared the ground for Swissnex to evolve, because there was already a certain degree of political momentum and an increased awareness of the need for change; and thus, things were on the move. A final element underlining the political momentum was the appointment of the new SERI secretary of state in 1997 (Charles Kleiber). He was viewed as visionary and internationally oriented; furthermore, he was seeking a niche to make his political mark. Similarly, the Swiss Parliament acknowledged the changing environment. In combination, these elements should be viewed as favourable conditions for the incremental development of Swissnex.

10.1.3. Policy Entrepreneurs

Parallel to this political momentum, the idea of Swissnex developed due to the initiative and pushing of a few visionary policy entrepreneurs, who seized this opportunity. The condensed data assigns a crucial role to the scientific attaché at the Washington embassy at that time, Xavier Comtesse (as of 1996), and the scientific attaché in San Francisco, Christian Simm (as of 1997). Both attachés found themselves in an unprecedented situation where they saw room for action to fulfil their core task, i.e., representing Switzerland in a changing environment. Thus, the idea of creating a new institutional response in the USA emerged. The data depicts a certain

ambiguity about how this idea developed further in interplay between the two policy entrepreneurs. What is known, however, is that the idea first started to manifest itself and publicly take shape in Boston¹⁸⁸. Hence, this development is portrayed in this study first, before the case of San Francisco is discussed.

10.1.3.1. Boston

In 1996, the newly appointed science attaché at the Washington embassy soon became aware of a brain drain situation for Switzerland (see section 10.1.1) and he attempted to tackle and reverse it^{189,190} (Marmier & Fetscherin, 2010). A significant number of Swiss nationals were living in the USA at that time, with estimates ranging between 2000 and 8000 (interview SNX2, Comtesse, 2021). The acknowledgement of this situation set the ball rolling. It further became clear that Washington was not the best location for a science attaché to address this brain drain, as the majority of Swiss expats were based in the Boston area. In addition, the Boston area seemed more relevant for a science attaché due to the Ivy League institutions there and

-
- 188 The data is ambiguous on how the idea developed in the first place and who the founding father was. While some sources suggest that the early discussions developed simultaneously and as a result of intense interaction between the two key policy entrepreneurs in Boston and San Francisco (cf. ThinkSwiss (2010)), other sources give sole credit to the Washington science attaché and consider him to be the founding father. Other sources claim that ministerial bureaucracy was also involved in developing this idea. This study acknowledges the ambiguity of this situation; a clear answer to this question cannot be provided and is also not of the utmost analytical importance to this study. However, the data is consistent in the sense that exchange took place between these two attachés, who had divided the USA geographically between themselves and were considered to be in competition with each other to some degree (interviews SNX2, SNX3; ThinkSwiss (2010, p. 4)). The opening of the San Francisco location (and also the issue of funding) has been less prominently dealt with in scholarship and in the media compared to the Boston opening (see chapter 10.1.4).
- 189 In a later publication, he admits that he used the brain drain narrative to secure political support for the idea of creating positions in Boston and San Francisco to help reverse this brain drain and encourage Swiss scientists to return to Switzerland (Comtesse (2021, p. 7)).
- 190 Comtesse realised that a significant number of Swiss nationals held positions in academia, such as post-doc positions although they had been educated in Switzerland. Back then, the cost of doing a PhD in Switzerland was estimated to be one million Swiss Francs (cf. Comtesse (2021)). The loss of such students to US universities thus resulted in Switzerland incurring an immense financial loss.

a large science community in that region. With this in mind, an innovative idea developed (presumably in interplay with various actors) to create a scientific consulate in Boston, which would be the first of its kind. More specifically, the idea was to create a platform that would provide a “roof” (interview SIS4) for the local Swiss expat community and keep them engaged with Switzerland (swissinfo.ch, 2000; Waldvogel & Huang, 1999).

What is more, this platform was intended to work as a contact liaison for Swiss actors in education and science but also for companies, with the goal of ultimately facilitating the creation of new collaborations (interview SIS4). This underlined the importance of science and technology for the development of Switzerland and its diplomacy (cf. SHARE Boston, 2000, p. 3). While matters of science are typical of a consular portfolio, at the time it was uncommon to create a unit with consular status that focused on science only (cf. interview SNX2, Comtesse, 2021, p. 7). This development triggered a form of “future-oriented diplomacy” (SHARE Boston, 2000, p. 3) that responded to worldwide developments (cf. Kleiber, 2021) and showcased Switzerland’s efforts to become a forerunner in science, business and technology (interviews SIS2, SNX2). Despite a certain level of ambiguity¹⁹¹, the data points to the incontestably crucial role of the science attaché Comtesse in these early phases of Swissnex; in fact, he was considered to be the “incarnation” of the project (interview SIS4).

Accordingly, Comtesse pushed for and promoted this idea among key actors and the US government (ThinkSwiss, 2010), while also engaging with the media¹⁹². Despite the political momentum, this idea disrupted what had been in place so far (interviews SNX2, SIS4). The novelty also lay in the fact that SHARE served a multitude of innovative goals, such as being an incubator for start-ups, a portal with which to showcase Switzerland, a one-stop-shop and a door-opener for companies wishing to operate overseas. It further pushed the digital boundaries of that time by drawing on new technologies, such as interactive digital walls (for an overview of

191 To underline this, the data points in different directions as to who was in charge and who initiated the idea. This might be explained a) by the interviewees’ skewed memories but also b) by their attempts to make themselves look better in retrospect and c) by their desire to take some of the credit for this pioneering exercise (see chapter 5.5 regarding the limitations of interviews).

192 Engaging with the media was a new element for diplomats. Traditionally, diplomacy would operate in the background and not actively engage with the media. In light of this the new idea, this also changed with the aim of establishing and positioning SHARE Boston (see Comtesse (2000)).

the various activities, see Waldvogel & Huang, 1999). By subsuming these activities under the official diplomatic umbrella of a scientific consulate, the aim was to keep the official character as discrete as possible and to focus instead on conveying an entrepreneurial and innovative character (interview SIS4). The idea of creating a consulate focusing on science only was ultimately approved by the US government and also resonated similarly well with SERI and at the federal level^{193 194}.

This positive resonance can be attributed both to the political openness to change which was described earlier and a favourable constellation of staff at SERI. Comtesse took over as science attaché (in Washington) from Christoph von Arb, who in turn moved to SERI headquarters to run the international affairs section. This constellation can be identified as advantageous, since van Arb was presumably well acquainted with both ways of thinking and perspectives: science and diplomacy, and Bern and Washington (Comtesse, 2021, p. 7; von Arb, 2021). Ultimately, support for this initiative was secured in the political realm, while the issue of funding remained critical (section 10.1.4). There was also initial reluctance among key stakeholders, such as the academic community and the FDFA (cf. Von Arb, 2021) (see section 10.1.5). For instance, matters of science were traditionally part of the embassy's portfolio, and the FDFA was not generally supportive of this change since it was perceived as a loss of competence.

10.1.3.2. San Francisco

In response to the objective of expanding the network of science attachés, the focus was shifted to San Francisco. San Francisco stood out as the right place due to its gradual emergence as a technology hub and an attractive destination for Swiss computer science graduates (Simm, 2021). With the help of the ETH board, financial support was secured for the creation of a science attaché position, which was established in 1997. It became apparent that something other than a traditional consulate was needed on the West Coast, too. In order for a small country, such as Switzerland, to partake

193 Ruth Dreifuss, who was the responsible Federal Councillor at the time, supported the idea (cf. Von Arb (2021, p. 26); ThinkSwiss (2010)). Therefore, she is also referred to as the 'godmother' of Swissnex (Swissnex Boston and New York (2010)). However, there were also reports of a struggle between the State Secretary and the Federal Councillor (cf. Lombard Odier (2011, p. 12)).

194 The opening of SHARE Boston marked a milestone in Swiss internationalisation efforts (cf. Hofmänner (2018, p. 31)).

and position itself in the fast-moving Silicon Valley, new approaches and offers had to be invented to make an impact and stand out from the other countries which were present in the area. In a world that was increasingly developing towards remote interaction, a deliberate decision was taken to create a physical place for people to meet in line with the Boston example (Simm, 2021).

Rather naturally, the idea evolved to join forces with the other Swiss actors (cf. Simm, 2021) that were already located in Silicon Valley. This aimed at generating a bigger impact and creating a common appearance and a space which would ultimately reinforce Switzerland's position as a key player in the ecosystem (interview SNX3). In a similar way to the Boston case, from the start, the San Francisco idea was strongly supported by stakeholders who contributed financially (Simm, 2021). To sum up, the idea of creating Swissnex is deeply interwoven with the efforts of policy entrepreneurs, who seized opportunities and lobbied for an idea that they believed in and considered valuable for Switzerland. The project therefore cannot be seen as having originated from a broader political agenda. Yet, it seemed to be fitting in the sense that it addressed the wider trends of “*cooperation and competition*” (Kleiber, 2000, p. 4), while reasserting Switzerland's profile internationally. At the time, the idea was not anchored and formalised in Swiss politics but was legitimised by the support of the State Secretary (though significant financial means had not been secured by the administration).

10.1.4. Private Funding

While the idea of SHARE Boston evolved, the question of funding also arose. Given that the idea a) was not primarily a political one and b) developed outside the regular budget rounds (interview SNX3), a key challenge was to find adequate funding for this initiative to grow in Boston¹⁹⁵. Rather atypically for that time, private investments came into play¹⁹⁶. The

195 See previous footnote on the data and chronology of the Boston and San Francisco projects.

196 The data is ambiguous on how these private bankers were approached. While some sources refer to a link between Comtesse and Thierry Lombard, other sources stress the trustworthy connection between State Secretary Kleiber and Lombard (see Lombard Odier (2011); Lombard (2021), interviews SNX2, SIS4). Some other sources even suggest links to other SERI staff members (cf. Von Arb (2021)). Also,

private bankers Lombard Odier & Cie were willing to support the initiative, since it was also their bank's 200th anniversary and they were looking for an opportunity to make “*a significant contribution to the Swiss nation and to the generations of tomorrow, their creativity, knowledge and greater understanding*” (Lombard Odier, 2011, p. 3). The vision that Swissnex seemed to convey presented a good prospect for such an investment. In addition, SHARE Boston was viewed as offering the funding-worthy potential to be “*a bridge between two continents*” (Lombard & Odier, 2000, p. 7).

The private bankers agreed to provide two million US dollars to support this initiative, on the condition that the money had to be returned by the confederation if the project was discontinued within its first ten years (Lombard Odier, 2011). This generous funding was remarkable at the time and seemed to have created a certain level of pressure to support the project among those with political responsibility, or at least not counteract the project, due to the financial commitments involved. Furthermore, this support created a certain degree of autonomy for SHARE Boston (and the general idea) to develop its impact, since certain basic funding was in place. Having overcome various administrative obstacles (cf. Lombard, 2021; Lombard Odier, 2011, p. 12), the money was ultimately used to purchase an old grocery store, which, with the help of two Swiss architects, was transformed into the first one-of-a-kind innovation and digital consulate (SHARE Boston, 2000; swissinfo.ch, 2001)¹⁹⁷. This trust in and the support from private sources in the very early stages seem to have left their mark on the DNA of Swissnex and continue to remain a key principle of its governance and funding¹⁹⁸ (cf. section 9.2).

10.1.5. Anticipation of the Model

In line with the political momentum at the time, there was general support for the idea of securing Switzerland's future development and compensating for its lack of natural resources. Hence, the investment in “*brains*”

the role of the *Latsis Bavois Forum* has been mentioned. This ambiguity in the data is acknowledged but not crucial to the analysis here.

197 The data reflects, however, that the idea of SHARE Boston was viewed critically in its respective neighbourhood. A certain level of (high-level) persuasion and mediation on the part of Switzerland was required to resolve this issue (interview SIS4).

198 Sources specify that Swissnex had to start earning its own income as of 2007 (Schweizer Bundesrat (2007, p. 1347)).

proved to be a valuable way forward (interviews SIS4, SIS5). The consolidated data reveals, however, that the anticipation of the model back then was not entirely positive, an often-neglected aspect of the instrument's narrative. Despite a feeling that "*the idea was in the air*" (interview SIS4), it was accompanied by initial reluctance on the side of key higher education stakeholders, as well as the FDFA's critical stance (in addition to previously mentioned obstacles in the administration which were linked to the private funding (Lombard Odier, 2011, p. 12)).

10.1.5.1. Struggles With the FDFA

The creation of SHARE Boston was initially viewed sceptically among the diplomatic community (interviews SIW1, SNX3, ThinkSwiss, 2010). Since science is traditionally a part of the portfolio that embassies deal with, the creation of a distinct scientific consulate in Boston (and later in San Francisco) gave rise to questions and criticism from the FDFA, presumably linked to a fear of loss of competence¹⁹⁹ (interviews SIS4, SNX2, SNX3), while capacity issues were also at stake—the creation of these new units was (politically) linked to a reduction in the number of full-time science attachés (Schweizer Bundesrat, 2002, p. 2458). In addition, these two novel institutions in Boston and San Francisco were reflective of a new habitus of (science) diplomacy, since they were constrained to a lesser degree by the strict diplomatic corset: these new institutions were conceived as conducting "*the cool*" (interview SNX3) activities. The data furthermore indicates that, in addition, the project originated at a time when Switzerland was exposed to negative international publicity²⁰⁰. Hence, the project was viewed as a means of counteracting this negative media attention (interview SNX2).

The data shows that despite this initial scepticism and reluctance, the FDFA subsequently supported the general idea (interview SIS4), since the FDFA would also benefit from this institution (given that the instrument

199 In addition, the combined data indicated that other topics, such as tourism, had also left the embassy's realm (interview SNX3). This development must also be understood in light of the changing roles of foreign ministries in recent years, particularly reflecting a loss of their core activities to other (state) actors (cf. Moses and Knutsen (2001); Lequesne (2020)).

200 The data suggests that this was linked to the World Jewish Congress lawsuit against Swiss banks that took place at the end of the 1990s (cf. interview SNX2).

aimed to improve Switzerland's image internationally). Eventually, the FDFA provided administrative support, although they were not yet able to exert control over the work of Swissnex themselves. From a more recent perspective, the data suggests that there is ongoing support and structured interaction²⁰¹ between Swissnex and the FDFA, for instance through the Swissnex committee, but also on the ground with the science and technology counsellors based within embassies (SERI, 2015a). Still, friction was reported in relation to the (presumably) looser ties that determine the work of Swissnex (interviews SIW1, SIW2, SNX3, SIS2) in comparison to the tight diplomatic corset. In addition, aspects of budgetary allocation and struggles for financial resources between the ministries²⁰² appear to be an ongoing source of conflict (interview SIS7). The data furthermore suggests that by means of the regular exchange mechanisms (such as the Swissnex committee), tensions were able to be decreased (interview SIW1), since a common understanding among all stakeholders and their ways of thinking could be gained, which aimed to limit potential friction (interview SIS7).

10.1.5.2. Reception Among Other Actors

In relation to other key actors, the scientific landscape needs to be mentioned in particular. The interview data reflects that, initially, the Swiss Rectors' Conference was not very happy and this idea, while cantonal universities were sceptical, too²⁰³ (cf. interview SIS2). The criticism mainly concerned the instrument's (perceived) lack of added value and may also be linked to actors' different funding priorities, presumably paired with a certain level of scepticism towards the new model (interview SIS2). This scepticism did not seem to have an impact on the setting up of SHARE

201 In some regions, close collaboration between Swissnex and the embassy is even required, since the embassy is viewed as the nucleus/door-opener that grants legitimacy to certain activities (interview SIW1). In other words, while in some regions the diplomatic umbrella is key to operations, in other regions it is considered to hinder the activities of Swissnex, since it creates barriers and reflects a different habitus (interviews SIS2, SIS5).

202 This points to the competition between ministries which is referred to in scholarly literature (cf. C. M. Jones (2010) and Mai (2016, p. 204) on *jurisdictional egoism*).

203 In contrast, there seemed to be less scepticism among the ETHs, presumably given the importance of the Ivy League institutions to EPFL Lausanne and ETH Zürich.

Boston²⁰⁴. The data indicates that a few years after SHARE Boston was established, the initial scepticism was overcome, as was certain actors' sense of not being well represented (i.e., in case of the German-speaking regions of Switzerland, (Marmier, 2021, p. 30)), and there was general support for the instrument (interview SIS2).

This raises a more general issue in relation to Swissnex: while Swissnex had gained ground and built up a reputation abroad, its appeal within Switzerland was in need of improvement, since it was less known and familiar in Switzerland itself (interview SIW1). However, in light of the support of key actors, such as EPFL, wider support gradually increased and the initial scepticism disappeared (Marmier, 2021). The data furthermore suggests that key actors in the wider science ecosystem, such as the Swiss SNF, were also sceptical at first²⁰⁵ (interview SNX2), although it was mentioned that these actors would support the setting up of the first houses²⁰⁶ (Schweizer Bundesrat, 2002, p. 2421). In addition, a certain degree of disapproval at paying for Swissnex's services existed. As Swissnex is financed by public money, there was an expectation that it should provide a free service (interviews SNX3, SIW7). While these aspects and discussions were relevant during Swissnex's inception, they never seem to have had a severe impact on the instrument or even presented a challenge to its creation.

10.2. Critical Junctures in the Instrument's Development

The opening of SHARE Boston marked the beginning of an incremental evolution of the network, which can be divided into the following phases (see Table 29): launch phase, expansion phase, consolidation and a second expansion phase. The principle of bottom-up governance thereby continued to constitute a design principle. While the first locations were clearly bottom-up initiatives due to having policy entrepreneurs in the driver's seat, the subsequent development of the network seems to also be charac-

204 This differs from the German case, which experienced considerable tensions that shaped the instrument's set-up. These differences may point to the different mentality and the Swiss way of dealing with these matters, although it is certainly reflective of the principles of autonomy which guide the science sector.

205 On an interesting side note, the secretary general of the SNF at the time of SHARE Boston's inception played a key role in setting up Swissnex Shanghai later on (cf. Max Dohner (2019)).

206 Please note, in the beginning there was no shared name: SHARE Boston, the Swiss House Singapore and Swissnex San Francisco.

terised by top-down decisions which led to events that were politically triggered (while leaving the on-site bottom-up governance unchanged). For a complete graphical overview, see the end of this section (Figure 12, p. 203). Despite political will on the one hand, the interviews stressed that the decision about adding new locations to the network is also driven by stakeholder interests (interviews SIW2, SIS7). This is because Swissnex is seen as a collective that belongs to its stakeholders. However, the extent to which this aligns with (political) reality is contested (interview SIW2).

Table 29 Evolution of the Swissnex Network^{207 208}

	Locations & Development
Launch Phase (2000-2005)	United States of America Boston: opened 2000 San Francisco: opened in 2003 Singapore: opened 2004/2005
Expansion Wave (2005-2014)	China Shanghai: opened 2007 India Bangalore: opened 2011 Brazil Rio de Janeiro: opened 2014
Consolidation (2015-2022)	Closure Singapore (2015) New Formats/Outposts USA: New York China: Guangzhou (Outpost) Brazil: Sao Paulo (Outpost)
Expansion Wave (2022)	Japan Osaka: opening planned for 2022

Source: created by the author.

207 The data is unclear concerning the opening and duration of Swissnex Singapore. While some sources refer to its opening taking place in 2004 and the fact that it ran for 11 years (swissinfo.ch (2015); Der Bundesrat (2015)), other sources claim that it operated for 10 years, which thus suggests it opened in 2005 (Swissnex (2021c)).

208 The outpost in China seemed to have closed again, in line with its temporal character (see chapter 10.2.3).

So the idea that this external network belongs [...] one can say almost extremely, not to the federal government but belongs to the stakeholders. There is almost a cooperative structure of Swiss stakeholders in education and research²⁰⁹ (interview SIS7).

10.2.1. Launch Phase (2000–2005): The Policy Entrepreneurs Era

As mentioned earlier, the opening of SHARE Boston marked a change in existing practices and was accompanied by intense media attention²¹⁰ both in the USA and in Switzerland; this was also closely monitored by other countries²¹¹. SHARE Boston was conceived as being a first-of-its-kind scientific consulate (Burkhalter, D., 2010; swissinfo.ch, 2000) that signalled the dawn of a new era: diplomacy in the name of science (von Arb, 2004). In a similar spirit, a counterpart of SHARE Boston was launched in San Francisco on the West Coast only three years later in 2003; it was called Swissnex. While sharing the same idea, the two locations made sure that they primarily responded to and developed in line with their respective regional needs (SBF, 2006). The success of these two locations quite soon led to a political intention to explore opportunities to further increase this network (Schweizer Bundesrat, 2002, p. 2458):

“This is a new instrument that, for very little investment of taxpayers’ money, actually bears a lot of truth and gives Switzerland a pretty amazing visibility” (interview SNX3).

Inspired by the blueprints in the USA, in 2004 a third location opened in Singapore (European Commission, 2004). The data again presents a hybrid picture as to who initiated the project (policy entrepreneur vs. political actors). Some interview sources claim that this can be traced back to the

209 “Also die Idee, dass dieses Außennetz gehört [...] kann man sagen, fast extrem nicht dem Bund sondern gehört den Stakeholdern. Es ist fast eine genossenschaftliche Struktur der Schweizer Stakeholder im Bildung- und Forschungsbereich“ (interview SIS7).

210 For more information, see Dufour (2000b, 2000a, 2000c); Comtesse (2000).

211 Data from the German case study reveals that this development was closely monitored by relevant key actors from the German science sector (cf. interview GIW15). In addition, the data reflects that members of the German parliament were eager to learn about SHARE Boston and addressed a request to the government to examine whether there was a need to create a similar model in Germany (cf. Von Arb (2004, p. 2)).

initiative of a policy entrepreneur (interviews SIW1, SIS4), who secured financial support in line with the centre's US siblings. Other sources (cf. Lombard Odier, 2011, p. 16) suggest that the idea of opening a location in Singapore was politically triggered²¹² by the State Secretary at the time, and that it was put into action by an embassy staff member who was already in Singapore.

Compared to its two sibling institutions in the USA, the Swiss House Singapore was smaller (interviews SIS4, SBF, 2006) but still equipped with sufficient autonomy to develop distinct offers (interview SIS4)²¹³. For the overall network, Singapore represented a special case at that time as it was conceived as a door-opener and hub for the rest of Asia (interviews SIS4, SIS7). In addition, there was a growing interest among key stakeholders in Swiss higher education in cooperating with the academic community in Singapore.

10.2.2. Politically Initiated Expansion (2007–2014)

Another milestone in the (gradual) institutionalisation of the instrument is marked by its re-branding, which started in 2007/2008 (SBF, 2006; Schweizer Eidgenossenschaft, 2010, p. 11; SERI, 2015a). This re-branding was partially due to an evaluative exercise²¹⁴, which called for stronger coherence. In addition, there was political will to enlarge the network (cf. request by member of parliament Fathi, 2012) in cooperation with relevant stakeholders (Schweizer Bundesrat, 2007, p. 1347)²¹⁵. Accordingly, the Swiss Houses and Swissnex San Francisco were, on the initiative of State Secretary Kleiber, to be consolidated by a common identity, with the aim of increasing the visibility and the impact of the network (cf. Simm, 2021). To that end, the logo and slogan “*connecting the dots*”, which

212 Sources show that this was in line with the broad political lines (Schweizer Bundesrat (2002, p. 2458)).

213 For an overview of the various activities and the financial set-up of these three locations, see SBF (2006).

214 To explain this further, in 2006 an evaluation took place that identified, among other things, the need to create a joint appearance of the three units in Boston, San Francisco and Singapore (Schweizer Bundesrat (2007, p. 1347)).

215 This policy document refers to India, South Africa and Russia as potentially relevant destinations to be explored (in close cooperation with *Pro Helvetia*) (see chapter 9.4.2).

had successfully driven Swissnex San Francisco early on (Simm, 2021), were adopted and thus provided a corporate identity for the developing network. This re-branding exercise underlines the political significance that was increasingly tied to the network. This is similarly expressed by the anticipated political goal of enlarging the network in the direction of the BRICS countries (interview SIS2). As a first step, this was accomplished with the opening of a location in China (Shanghai)²¹⁶ in 2007/2008²¹⁷. In a similar vein, in 2007/2008 there was a decision to open an office in India (Bangalore), although it did not start its actual work until a couple of years later (interview SIS5).

The last step in this politically anticipated expansion phase signalled the opening of an office in Brazil (Rio de Janeiro) in 2014 (although other locations were also discussed at the time). The data suggests that the combination of the football World Cup and the Olympic Games created momentum to reinforce Switzerland's presence in Brazil and paved the way for the decision to open a Swissnex office there (interview SIS2). Accordingly, over time, the network was increasingly regarded as a valuable instrument that moved more strongly into political focus. Thus, while the Swissnex locations enjoyed relative autonomy in their early phases²¹⁸ (interviews SNX2, SNX3), as the network expanded, this also led to an increase in monitoring from ministerial bureaucracy (interview SIS6). In addition, a certain degree of competition between the locations was observed, since more locations were seeking access to the same resources (at least within Switzerland) (interview SNX3).

10.2.2.1. The Swissnex Committee

Around 2008, coinciding with the opening of new locations, the Swissnex committee was established as a structuring element. While previously loosely coupled stakeholder consultations had taken place, the establish-

216 For more insights, see an interview with former Shanghai CEO, Peter Hertig, by Max Dohner (2019).

217 The documentation concerning the opening dates is inconclusive. Some sources refer to the opening of Shanghai in 2007, while others refer to 2008 (cf. Schweizer Bundesrat (2007)). The same holds true for Swissnex India and Swissnex Brazil (cf. Swiss Federal Audit Office (2016, p. 15)).

218 Despite a significant degree of autonomy, the documents stress that all three locations operated on the basis of target agreements (between 2004–2007) (cf. Schweizer Bundesrat (2007, p. 1347)).

ment of the Swissnex committee can be explained by a leadership change at SERI. With the retirement of Kleiber as State Secretary, the founding father of Swissnex, a new arena of discussion emerged which questioned the legitimacy and purpose of the project. The implementation of the Swissnex committee by the new State Secretary was seen as a clear attempt to counteract these tensions (interviews SIW1, SIS7). In addition, setting up an advisory body for Swissnex's work was seen as placing the network, which had often been viewed as being a "*Kleiberian heritage*" (interview SIW7) or the former State Secretary's toy (interviews SIW1, SIS7), on stronger political feet. What is more, this created a platform for structured exchange, also concerning other governmental actors such as the FDFA (interview SIW1). The committee was now composed of key stakeholders and operated on the principle of consent. The establishment of the Swissnex committee can be seen as a response by the new State Secretary and as his attempt to leave a political mark. At the same time, this was an attempt to anchor the instrument more strongly and contribute to its institutionalisation and consolidation.

10.2.3. Consolidating the Network: Closure, Evaluation and New Formats

Following Swissnex's politically initiated expansion wave, a period of consolidation took place in 2015. This is most prominently associated with the closure of Swissnex Singapore. In addition, critical evaluation of the network took place, which left its mark on the administration but ultimately led to a stronger Swissnex network. These two key events challenged Swissnex's ways of working and significantly impacted its (gradual) institutionalisation.

10.2.3.1. Closing the Singapore Location

In September 2015, it was announced that, after 11 years in operation, Swissnex Singapore would close its doors and be transformed into the position of a Science Counsellor at the Swiss embassy in Singapore (Der Bundesrat, 2015). This closure constitutes a milestone event in the gradual development of the network, which until then had been continuously expanding. The reason for closing Swissnex Singapore was explained by the fact that it had fulfilled its initial mission of strengthening the coopera-

tion between the two countries (SERI, 2015a, p. 6). The official narrative explained that Swissnex had been successful since it was no longer needed by stakeholders (interviews SIS2, SNX1, SIS6, SIS7), although this logic could be contested²¹⁹:

*The contradictory thing about Swissnex is that if Swissnex does its job well, then there is actually no longer a need for a Swissnex*²²⁰ (interview SIS2).

This perception is even considered to be an ideal-typical scenario at times, where Swissnex works as a door-opener for domestic actors to launch effective partnerships and then moves on (interview SIW2). This line of argument corresponds with Switzerland's general approach to science diplomacy, which has been characterised as making itself superfluous:

But at the same time, the goal of our science diplomacy is to make ourselves superfluous [...] Once the doors are open for science and both sides actively exchange, their task is accomplished—the effect lasts (State Secretary Dell'Ambrogio cited in Rittmeyer & Forster (2013, p. 67))²²¹.

219 On a challenging note, one might wonder to what extent this line of argument can in fact be applied to the whole network. In the case of Swissnex Boston and San Francisco, it could be argued that both locations are well-established and successful. The fact that these two older Swissnex offices are still in place contradicts the previous argument. The interviews reveal that many Swiss actors have in fact established ties at these locations in the meantime. Accordingly, it might rather be assumed that there are different rationales tied to different locations. In other words, the Swissnexes which are based in the USA seem to possess a political relevance and political dimension since questions could be raised as to whether the links between Switzerland and the USA, and its academic communities, have not also become institutionalised over time to a comparable degree as Singapore, which would make Swissnex superfluous. This is also addressed critically in the data (interview SIW2): rather than remaining in these established locations that work well, it is suggested that there should be a shift of focus towards locations where door-openers are needed. Swissnex Boston and San Francisco have probably institutionalised themselves over time; however, they presumably constitute excellent cases for conveying and reinforcing an image of Switzerland that is (greatly) envied and admired by other countries. Accordingly, these two cases seem to have a representational and a branding function (i.e., a niche for Switzerland to position itself internationally; see also chapter 5.2.4).

220 “das widersprüchliche an Swissnex ist, dass wenn Swissnex seinen Job gut macht, dann braucht es eigentlich ein Swissnex nicht mehr” (interview SIS2).

221 “Aber gleichzeitig besteht das Ziel unserer Wissenschaftsdiplomatie darin, sich überflüssig zu machen [...] Stehen die Türen für die Wissenschaft einmal offen und werden von beiden Seiten rege beschritten, ist ihr Aufgabe erfüllt- die Wirkung hält an“ State Secretary Dell'Ambrogio cited in Rittmeyer and Forster (2013, p. 67).

To provide more detail, it was also revealed that the added value of Swissnex Singapore had diminished since Swiss actors (for instance, ETH Zürich) managed to create their own strong presence and were less dependent on the support of Swissnex to establish cooperation (interviews SIW2, SIS2, SIS6, SIS7). Similarly, budgetary constraints were revealed as being decisive, since the politically triggered expansion of the network did not result in a budgetary increase on the part of SERI (i.e., funding more locations with the same amount of money; on a side note, this was made possible by the significant private funding share). In addition, given budgetary constraints, the room for manoeuvring and reaching out to new countries was limited (interview SIS2, swissinfo.ch, 2015). All this triggered the Singapore debate; furthermore, the closure was also revealed to be a signal of political will, which aimed to demonstrate the idea that Swissnex remains mobile. In addition, the closure was conveyed as a political signal, reflecting a coherent political approach and the ability to implement cut-backs, particularly in relation to other actors in the system, such as the FDFA. Official documents further refer to the closure as a matter of prioritisation of the external network (Schweizer Bundesrat, 2016, p. 3229). This official view is framed slightly differently by other sources, which indicate that SERI was under pressure to respond to market dynamics: given that the Singapore office was quite small (interviews SIS4, SIS7), the options were either closure or strengthening the office (interview SIW1).

10.2.3.2. Evaluation

Another critical moment in the institutionalisation of the network was marked by the evaluation by the Swiss Federal Audit Office (*Eidgenössische Finanzkontrolle, EFK*) in 2015/2016. This performance audit scrutinised the work of the network and drew circles which led into the heart of the administration and caused turbulence (interviews SIS6, SIS7). The performance audit (Swiss Federal Audit Office, 2016) critically examined the network and identified ideas for improvement. These ideas were not necessarily shared by the administration, which in turn criticised that the evaluation had an incomplete (even potentially false) understanding of the Swissnex concept, which was reflected in the evaluative report but was disputable (interviews SIS6, SIS7). In a nutshell, the evaluation was conceived as a highly 'political' issue. The evaluation raised points of criticism such as the accounting method and the way that private funding is identified or

the legal basis for Swissnex, which seemed to be lacking (since it is not referred to in official legal documents but mentioned in the *Botschaft* documents²²²). It called for these aspects to be changed as well as for a better performance indicator system to measure the impact of Swissnex and its better integration into the external network (coordinated by the FDFA) to exploit synergy effects (Swiss Federal Audit Office, 2016).

With regard to the last point, the evaluation also noted that there were blurred responsibilities and a lack of demarcation regarding the work of the different Swiss actors abroad (the latter was also highlighted in the interviews, cf. interview SIW2 and section 9.4.2). Following this evaluation, SERI tackled and responded to these issues. Some of these points even aligned with the strategic vision that SERI had formulated for developing the network, such as introducing better performance indicators (SERI, 2015a). However, the evaluation did not significantly impact the actual work of Swissnex in terms of challenging governance structures or calling for a revision of its main activities²²³. Instead, performance measurements were tackled, signalling the existence of a kind of functional logic that addresses the issue of accountability. For instance, a central accounting for all locations was set-up in Bern (interview SNX3), while an independent evaluation of the network was also commissioned (cf. Oxford Research A/S, 2020).

10.2.3.3. Outlook and New Formats

To underline the consolidation of the network and also as a response to a parliamentary inquiry²²⁴, in 2015, SERI published a road map for the future development of Swissnex: this document outlined the strategic considerations that would guide the (future) network (SERI, 2015a). Three guiding principles were mentioned: 1) to build on and reinforce the strengths of

222 To recall, *Botschaft* documents are official policy documents. As far as it can be retraced, there is still no official legal basis (cf. interview SIS7). Originally, the idea was to do this when the Swiss research and innovation law (*Forschungs- und Innovationsförderungsgesetz*, FIFG) was revised (cf. Swiss Federal Audit Office (2016)). Interview data, however, assumes that the network gained greater political significance following the evaluation also due to the establishment of the Swissnex committee (interview SIS7).

223 This constitutes a major difference to the evaluative exercise that was undertaken in Germany.

224 See the postulate (*Postulat*) by Fathi (2012), member of the National Council.

Swissnex, 2) to keep the external network lean and agile while prioritising and being reactive towards stakeholder demands, 3) to foster synergies with science and technology counsellors where possible. In this spirit, and having reduced the number of Swissnex offices, new agile formats emerged, such as *outposts*. While the concept of outposts has largely disappeared again, around 2014/2015 three outposts were launched in selected countries Swissnex was already operating in. Given the countries' sizes and potential, it made sense to be present in more than one city (interview SIS6). These horizontal layers were installed in countries such as China (Guangzhou), the USA (New York)²²⁵ and Brazil (São Paulo) (Schweizer Bundesrat, 2016, p. 3228; Swissnex, 2016), and were funded entirely by partner contributions (Ayebare Nyakato & Kyora, 2015). In contrast to the Swissnex model, outposts were considered more fluid and volatile, less costly, and more responsive to short-term needs (interview SIS6). Accordingly, outposts were usually set up for a limited period only. Besides the creation of these outposts, there were discussions on exploring other formats, such as mobile Swissnexes, which aligned with the network's anticipated agile character (cf. Swissnex, 2021a). This underlines Swissnex's increased institutionalisation and shows that the idea of Swissnex had begun to spill over to new areas.

10.2.4. Expansion and Reinvention

Since the closure of Swissnex Singapore, the network has been in a consolidation phase and seems to have experimented with temporal formats such as outposts or Swissnex mobile in relation to the international EXPO (House of Switzerland, 2016; Swissnex, 2021a). In addition, Swissnex re-invented itself and changed its slogan to "*connecting tomorrow*" in about 2020. It also created a new logo and its leadership team rotated (cf. Swissnex, 2021a). All of this can be seen as reinvention. What is more, the

225 The data suggests that the New York outpost was opened in about 2014 (cf. Swissnex in Boston and New York (2022)). Today, New York is no longer referred to as an outpost; instead, it is officially listed in line with Boston. As has been mentioned previously, the concept of outposts seems to have disappeared (see chapter 3.3.2). The interview data refers to critical views on keeping the New York outpost, particularly questioning the added value of Swissnex in an area with an already crowded Swiss organisational presence (interview SIW2). This raises the issue of duplication (and possibly demarcation).

Swissnex network has broadened beyond the traditional Swissnex locations. Furthermore, science offices in Seoul and Tokyo²²⁶ have been (newly) listed as being part of the global Swissnex network²²⁷. As far as the established Swissnex locations are concerned, expansion of the network has been announced with the opening of a new location in Osaka (Japan), planned in the first half of 2022. As early as in 2016, there was a political aim to open one or two new offices between 2017 and 2020 (Schweizer Bundesrat, 2016, p. 3228). In that context, Japan was already identified as an attractive location by the ministerial bureaucracy and stakeholders²²⁸.

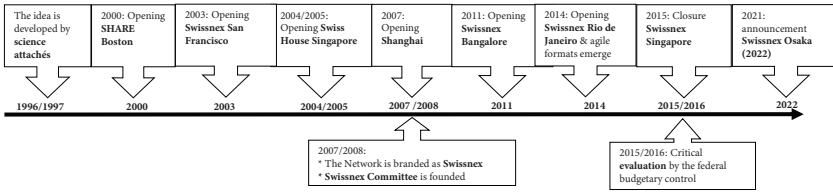
The most recent policy documents refer to additional momentum for expansion in Asia, the Middle East, and Africa in particular (Schweizer Bundesrat, 2020b), although this depends on the interests of key stakeholders. The opening of Swissnex Osaka once more underlines the political will and significance that is tied to this instrument, as well as the need to be present in regions which are considered technology leaders. While there is clear political will on the one hand, it was similarly stressed in the interviews that stakeholders see an interest in Africa or even within Europe, yet the stakeholder data reflects ambivalence here (interview SIW2, SIW3). In a nutshell, despite the growth of the Swissnex network, it seems that the current governance and funding arrangements have remained largely unchanged over time, while this has also been viewed critically (interview SIW2), for one thing because of the difficulty that *“it just means that there are more organisations going after the same source of money”* (interview SNX3), at least in terms of Swiss (public) contractors, while secondly, questions were raised about channelling public money through third parties (such as universities), rather than providing Swissnex with a stronger financial basis (interview SIW2). However, this competition, or “co-opetition” as it was also referred to, is similarly viewed as keeping Swissnex dynamic and is hence to some degree also politically intended (interviews SNX3, SIS6).

226 For more information, see <https://swissnex.org/about-us/our-team> (accessed 01.02.2022).

227 Without going into detail, they seem to have a special role and are distinct from the regular science and technology counsellors.

228 This intention was reaffirmed during the interview process in 2019 (cf. interviews SIS7, SIW3, SIW7).

Figure 12 Milestones in the Development of Swissnex



Source: created by the author.

10.3. Findings and Discussion

This chapter retraced the historical development of the Swissnex instrument in terms of its inception and subsequent evolution (see Table 30). In line with the theoretical premise, this deconstruction provides an insight into the trajectory of Swissnex, its embeddedness in a wider context and its current form. Accordingly, key factors and events were identified which explain Swissnex's current structure in terms of design principles.

The idea of Swissnex developed, firstly, due to particular political momentum that can be explained by larger societal transformations. This laid the groundwork for and created an awareness of the need for change and action since internationalisation efforts were in their infancy (compared to the current situation, there was a minimal institutional presence of key science and education actors abroad, a situation which has changed by now). In addition, aspects of timing and contingency were relevant: a combination of timely factors, such as visionary policy entrepreneurs and a newly appointed State Secretary, who seized and supported these ideas. While the initiative could not be covered by the regular budget, a substantial amount of private funding was made available in order to realise this visionary idea and open SHARE Boston as a unique venture at that time. This development must furthermore be understood in line with the pragmatic bottom-up principle and the politics of understatement that are characteristic of Switzerland in the sense of it granting autonomy and space for ideas to grow²²⁹.

229 This is thus characterised as being a refreshingly unbureaucratic partnership between private donors and state officials that soon developed into a pearl of Swiss diplomacy: sparkling, oscillating, valuable—and fragile: “*erfrischend unbürokratische Partnerschaft privater Geldgeber und staatlicher Amtsträger. [...] zu einer Perle*

Table 30 Key Findings for Swissnex's Institutionalisation

Swissnex - Switzerland	
Genesis	<ul style="list-style-type: none"> * Political momentum, policy entrepreneur driving the idea and timely private funding * Elements of trust * Bottom-up logic driving the installation * Ministerial struggles over competences
Critical Junctures & Evolution	<ul style="list-style-type: none"> * Politically triggered expansion of the network (2007 onwards) * Critical audit exercise (2015/2016) * Increase in politicisation of the network, re-branding and stronger political steering (while keeping autonomy) * Closing of Swissnex Singapore (politically motivated) * Expansion in 2022
National Characteristics & Contingency	<ul style="list-style-type: none"> * Reflecting typical Swiss bottom-up policy style and politics of pragmatism * Contingency and timing: political window of opportunity and timely events

Source: created by the author.

The significant autonomy which Swissnex locations possess has been singled out as a key factor in their success (this is reflected in the mix of public and private funding sources). To expand on this, because Swissnex needs to generate a substantial part of its income, Swissnex's work is guided by an entrepreneurial approach in the sense that it needs to stay ahead of developments and offers services that provide added value to its clients. This principle of successful partial self-funding is therefore seen as an indicator of Swissnex's added value. In other words, if Swissnex can generate its own income, this demonstrates an acceptance of and a need for the instrument within its extended stakeholder community. This is seen as providing a source of legitimacy. Finally, Switzerland is a small country, where people know each other (cf. interviews SIW1, SIS7), and a certain consensus is key to discussions. The interview data indicates that this personal interconnect-edness also creates an atmosphere of trust (as in the case of securing private funding) and this has been significant in the development of Swissnex.

Despite its innovative and autonomous development in its early stages, the subsequent evolution of Swissnex mirrors a development in line with functional considerations. Around 2007, the network seemed to develop more strongly as a result of political steering, aiming to ensure a greater impact of and more visibility for the network. To that end, for instance, the re-branding exercise took place. Furthermore, the critical audit exercise, which was encountered, can be seen as reflective of the functional dimensions that Swissnex is increasingly exposed to. The evaluation challenged Swissnex's (lacking) legal basis and led to friction within the administration. Nevertheless, these struggles were viewed as placing the network on stronger feet, although some of the critical issues have not yet been resolved. In addition, the closure of Swissnex Singapore was viewed as a consolidating measure for the network as a whole.

To sum up, while Swissnex is now supported politically, the project initially emerged largely outside the political agenda and enjoyed quite some autonomy. The development of the network is furthermore a story of contingency as well as timing, which were both central to the development of the idea. This differs significantly from the gradual institutionalisation of the DWIH, although some similarities become evident (these will be discussed in more detail in chapter 12). Retracing Swissnex's institutionalisation shows that the network developed to a large extent due to endogenous factors, i.e., gradually, and naturally from within the system, at least in the first few years. Over time, exogenous factors also impacted Swissnex's development, such as a clear political will to expand and strengthen the network.

The next chapter will expand the analysis of the institutionalisation by investigating actors' rationales behind participating in this instrument. This attempts to a) unveil their sense-making and b) examine the use of the instrument. The combination of these two elements allows us to fully grasp and analyse the gradual institutionalisation of Swissnex. In addition, the chapter will identify the political objectives which are associated with Swissnex.

der Schweizer Diplomatie: funkelnd, oszillierend, wertvoll - und fragil“ (Egger (2013, p. 54)).

11. Analysis of Actor Rationales for Participation (Swissnex)

This chapter complements the reconstruction of Swissnex's development (chapter 10) and examines the instrumentation of Swissnex, i.e., the use of this instrument by key actors. It also generates additional evidence of the (gradual) institutionalisation of Swissnex. The chapter is divided into two main parts; the first part (section 11.1) addresses the (political) objectives and goals that Swissnex has responded to over time. The second part (section 11.2) presents the rationales of key actors, which explain their participation in Swissnex and enable a better understanding of how the instrument is used. In combination, these two analytical stages provide an insight into how Swissnex is interpreted and used by key actors, as well as how it is embedded in its context. In other words, this chapter presents evidence regarding Swissnex's instrumentation, which may ultimately push forward institutionalisation dynamics.

11.1. Political Objectives

The following section analyses the political objectives that Swissnex should respond to, i.e., their political instrumentation. To evaluate Swissnex's political framing, a document analysis of publicly available political documents was conducted (see Table 31 and Appendix 2.2). This analysis adds another layer of insights into Swissnex's (gradual) institutionalisation since it reveals how the instrument has been used over time by key political actors. Before we turn to the results, it is vital to discuss one of Swissnex's key characteristics. Swissnex possesses a significant degree of autonomy and operates within a broader political framework although its distinct tasks and activities may vary between locations and are client and market-driven. This has implications for the data analysis; with regard to the political documents which have been analysed, it is not possible to clearly establish whether the themes considered are distinct (new) political objectives or a political endorsement of Swissnex's work. In other words: Do the reports reflect original political objectives? Or do they reflect the tasks and objectives which Swissnex defined for itself? Either way, it can be assumed that these objectives were politically endorsed if they appear in the documents.

With this in mind, the analysis identifies four main objectives which were revealed in the documents²³⁰: 1) the international branding and positioning of Switzerland, 2) knowledge transfer and innovation, 3) internationalisation efforts and 4) foreign policy goals. As such, they differ slightly from objectives identified in the German case study.

11.1.1. International Branding and Positioning

International branding and international positioning appear to be the key objectives of Swissnex, which have remained stable over time. This is not surprising and was also confirmed in the previous chapter (chapter 10): Swissnex was established with the intention of making a difference in the international landscape and positioning Switzerland as a highly innovative country. More specifically, Switzerland's science capacity and expertise were seen as vehicles to reinforce this international positioning. Thus, Swissnex is seen as an instrument which can facilitate international cooperation and engage in networking activities to create international ties and enhance the visibility of Swiss institutions in particular and Switzerland in general. These goals have remained consistent and indicate Swissnex's core purpose: to position Switzerland internationally as a key actor in education, research and science.

11.1.2. Knowledge Transfer and Innovation

In a similar vein, a further key Swissnex objective is the promotion of Swiss knowledge and innovation. These objectives have repeatedly been connected to Swissnex in a range of different ways through it promoting the valorisation of knowledge (as a key element of innovativeness), facilitating market entry for new businesses, helping start-ups to gain ground or, more generally, providing information. In a similar vein, Swissnex is also seen to have a trend-scouting role (Schweizer Bundesrat, 2020b) to secure a

230 These themes are not 100% watertight and Swissnex's framing is very granular at times. Some of the aspects which emerged from the analysis could, in principle, correspond to multiple themes. In addition, certain aspects were mentioned in one breath and these aspects were not separated, such as considerations which link to foreign policy goals.

competitive advantage²³¹. In particular, the most recent policy document highlights these aspects in detail (Schweizer Bundesrat, 2020b).

11.1.3. Internationalisation Efforts

What is more, Swissnex is also regarded as an instrument that facilitates internationalisation efforts. This reaffirms previous findings which specify that Swissnex developed as a salient response to distinct internationalisation pressures and in light of increased international competition (chapter 10). Swissnex was initially considered to be an instrument that promotes academic mobility and attracts foreign talent to Switzerland (Schweizer Bundesrat, 2002). The attraction of foreign talent reflects an economic dimension which is often tied to knowledge society discourse (cf. Välimaa & Hoffman, 2008). Over time, these aspects have changed in favour of considerations such as strengthening partnerships with strategically relevant partners in regions that are scientific heavyweights. What is more, Swissnex is also viewed as a vital instrument for the Swiss vocational and professional education system and for promoting bilateral cooperation programmes in education and science in key regions such as North America, Singapore or China (Schweizer Bundesrat, 2007). The data provides evidence that the internationalisation aspect was particularly relevant in the early years of Swissnex, while its exact focus and framing has shifted slightly in recent years. This aspect also appears to be relevant again in the most recent documents (Schweizer Bundesrat, 2018, 2020b).

11.1.4. Foreign Policy Goals

From the start, Swissnex was regarded as creating a new kind of diplomacy, which draws on science (see chapter 10): scientific diplomacy. This has left its mark on Swissnex's DNA and this aspect has been referred to more or less prominently in *Botschaft* and international strategy documents in different years (see Table 31). Furthermore, Swissnex has acted as a blueprint for other countries (Schweizer Bundesrat, 2012), has been regarded as contributing to the impact of Switzerland's external network and has

231 This aspect was already mentioned in the interviews which were conducted in 2018/2019; however, it was manifested in political documents only in 2020 in line with the regular *Botschaft* cycles (see Schweizer Bundesrat (2020b)).

also been considered a vehicle for improving Switzerland's international relations and reinforcing its political priorities (this was most explicitly formulated in 2010 and 2018 (cf. Schweizer Bundesrat, 2010, 2018)). What is more, Switzerland has positioned itself in the realm of science diplomacy: scientific excellence is seen as being beneficial for its diplomacy. The 2018 international strategy refers explicitly to key assumptions which characterise current science diplomacy discourse: international cooperation creates trust between nations, builds bridges and enables exchange in the pre-political sphere in relation to non-political topics (Schweizer Bundesrat, 2018). Swissnex is seen as a distinct instrument that facilitates this.

11.1.5. Conclusions

To sum up, the findings of the analysis made it possible to identify four main themes to which Swissnex responded: 1) the international branding and positioning of Switzerland, 2) knowledge transfer and innovation, 3) internationalisation efforts and 4) foreign policy goals. These findings are not surprising and reaffirm the findings regarding Swissnex's development (cf. chapter 10), although in a more nuanced way. It became evident that core themes have remained stable; however, the notions encompassed by these themes are more fluid and certain topics have arisen in some years and become less significant in others. Most notably, the initial goal of and justification for Swissnex—overcoming the brain drain situation which Switzerland had encountered—was no longer explicitly referred to after Swissnex was established (it was last mentioned in 2002, (cf. Schweizer Bundesrat, 2002)). Swissnex is seen as playing a vital role in Swiss international policy, while it also serves as a blueprint for other countries. Swissnex's key targets appear to have remained stable: these include facilitating international exchange between higher education institutions, scientists and Swiss enterprises, and positioning Switzerland internationally as a key actor in education, research and science. Furthermore, new focuses have also emerged (such as the support for start-ups). Arguably, Swissnex has experienced layering and also seems to act as a platform for responding to changing stakeholder goals.

Table 31 Core Themes and Objectives tied to Swissnex²³²

	2004 – 2007	2008 – 2011	2010:2 012	2013 – 2016	2012 – 2015	2017 – 2020	2018	2019	2021 – 2024
Reverse a brain drain									
International Branding & Positioning of Switzerland									
Brand & position Switzerland (internationally)									
Contribute to being internationally competitive by having a collective presence									
Promote and strengthen international cooperation and networking between Swiss actors and international partners									
Strengthen international visibility of Swiss institutions & Swiss know-how									
Knowledge Transfer & Innovation									
Promote the valorisation of knowledge									
Facilitate market entries									
Support Start-ups & promote innovation									
Promote Exports									
Source of information (trend-scouting role)									
Internationalisation									
Promote academic mobility									
Attract academic talent to Switzerland									
Provide administrative and logistical support to its stakeholders									
Consolidate partnerships with scientifically strong regions									
Launch cooperation with strategically relevant countries which possess scientific & technology potential									
Promote bilateral cooperation agreements									
Promote vocational and professional education									
Foreign Policy Goals									
Reinforce impact of Switzerland's external network and political priorities									
Contribute to Swiss international relations (element of diplomacy)									*

Source: created by the author.

Legend

Grey cells = topic is mentioned in the report

Please note:

- * 2010 & 2012 merges two documents: 1) 10.109 Botschaft 2012 and 2) the Swiss International Strategy.
- * 2012-2015: the FDFA's strategy does not refer to Swissnex (and potential objectives).
- * 2018*: This document emphasises distinct notions of science-exchange over non-political topics.
- * 2019: the FDFA's vision of Switzerland 2028 refers only once to Swissnex. However, the importance of science to technological progress as well as for diplomacy is highlighted.

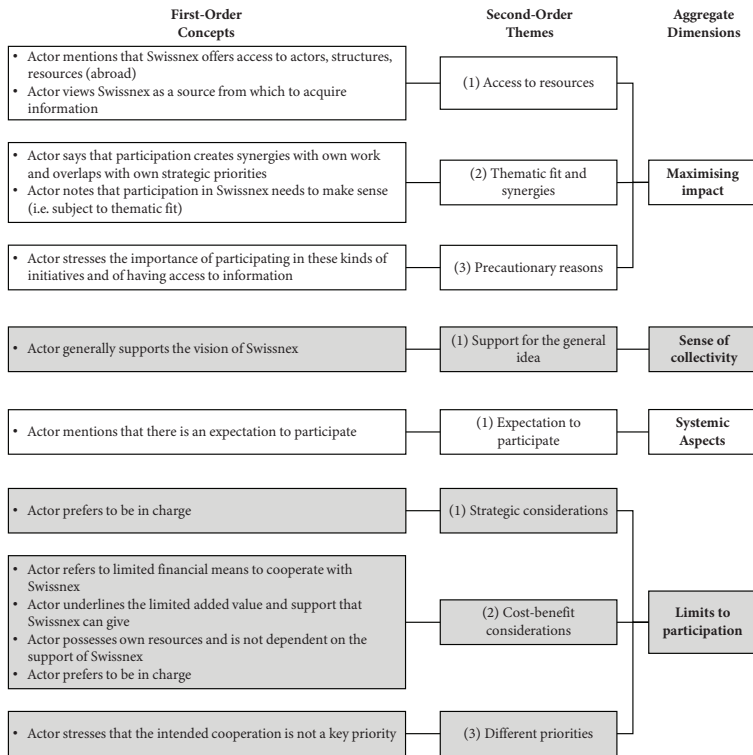
11.2. Key Stakeholder Rationales

The following section presents an aggregated analysis which explains why actors participate in Swissnex and how they use this instrument. The analysis identifies three overarching dimensions, which can be viewed as explanations for actor participation: (1) actors' strategic interests, (2) aspects that link to a sense of collectivity and general support for the instrument and (3) explanations that are of a systemic nature. In addition, the interview data points to factors that limit participation (see the data structure displayed in Figure 13). These elements are discussed in more detail in the following sections.

The results presented in this chapter should be considered in relation to the key principles of Swiss political structures, such as the autonomy of science actors and a pragmatic, bottom-up policy-making style. In addition, it should be noted that Swissnex operates on a service-oriented basis. This implies that stakeholders collaborate on the basis of ad hoc contracts with Swissnex and reimburse Swissnex for its work. This presumably impacts the actors' rationales for using Swissnex. This funding arrangement constitutes a key difference to the German set-up, where the DWIH makes limited amounts of funding available to its supporters for joint action.

-
- 232 Please note: 2010 & 2012 merges two documents: 1) 10.109 Botschaft 2012 and 2) the Swiss International Strategy.
2012–2015: the FDFA's strategy does not refer to Swissnex (and potential objectives).
2018*: This document emphasises distinct notions of science diplomacy: trust, bridge-building, exchange over non-political topics.
2019: the FDFA's vision of Switzerland 2028 refers to Swissnex only once. However, the importance of science to technological progress as well as for diplomacy is highlighted.

Figure 13 Rationales for Actor Participation (Swissnex)



Source: created by the author.

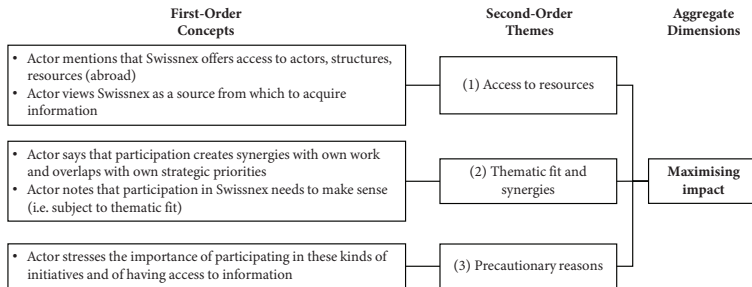
11.3. Strategic Considerations: Maximising Impact

The first set of considerations that explain actor participation are aimed at reinforcing actors' own positions. Swissnex is seen as working as a multiplier for actors and helps to reinforce actors' activities and ultimately maximise their impact (see Figure 14). The data shows that Swissnex is used in such a way that it constitutes a meaningful asset for actors. More specifically, it yields added value because it serves as a door-opener in certain circumstances or facilitates gaining access to specific resources which would otherwise not be at these actors' disposal. This door-opening role is particularly valuable if actors are entering a new field and would encounter difficulties gaining access on their own (interviews SIW2, SIW4,

11. Analysis of Actor Rationales for Participation (Swissnex)

SIW7). More specifically, the analysis identified three sub-themes which characterise the use of Swissnex and reflect the way it is interpreted by key actors. These three aspects are: (1) gaining access to various resources (such as structures, networks, etc.), (2) alignment with their own priorities and topics, and (3) participation for precautionary reasons. In combination, these considerations can be seen as improving the visibility of actors and Switzerland in general, although this is not mentioned explicitly in the data. This may either be because it is considered to be obvious, or it may, in line with the Swiss habitus, reflect the key principle of understatement (which is elaborated on further below). The next section discusses these aspects in detail; however, there is no suggestion of a hierarchy in terms of importance.

Figure 14 Actor Rationales: Maximising Impact



Source: created by the author.

11.3.1. Access to Resources

Using Swissnex is linked with gaining access to resources (see Table 32). In line with Swissnex's core mission, the interview data stresses the value of Swissnex's door-opening function in some situations. More specifically, Swissnex is seen as an instrument which serves as a multiplier for actors' strategic objectives; Swissnex provides access to resources, which supports actors in conducting their key missions. The data provides evidence that actors use Swissnex in those cases where it a) provides access to facilities, b) works in a connecting way or c) is able to support actors in various (administrative) matters. These activities pave the way for the actors to be able to conduct activities abroad and engage in an international environment. What is more, the data reflects that, in addition to acting as a stepping stone

for actors to operate internationally, Swissnex is also seen as a valuable source of information. On the one hand, this relates to situations in which actors require specific knowledge about a certain country, the region or type of infrastructure. On the other hand, Swissnex is viewed as acting as an early-warning system: it may provide actors with valuable (strategic) insights into relevant developments in science and technology. Swissnex is seen as playing a role in terms of trend scouting and horizon scanning. Accordingly, actors view Swissnex's ability to provide significant information as added value. In a similar vein, the interview data demonstrates that participation is also viewed as an opportunity to gain access to relevant actors and structures. In other words, Swissnex is seen as a source of information and as being in a position to provide distinct, country-specific knowledge, which ultimately facilitates actors' own operations.

Table 32 Actor Rationales: Access to Resources

(1) Access to Resources

Actor mentions that Swissnex offers access to actors, structures, resources (abroad)

That is something; they make the contacts for us, and this is a real added value for [actor x]. But to summarize, it really depends on where the Swissnex is and who the people are, what their interests are, because that differs. [...] For places such as India or Brazil [...] it is good if you have someone there who speaks the same language, who knows both local cultures. (SIW2)

“Da ist etwas, sie stellen die Kontakte her und das ist ein echter Mehrwert für [actor x]. Also kommt es wirklich sehr stark darauf an, zusammenfassend, wo ist das Swissnex, was sind die Personen, was haben die für Interessen, weil auch das ist unterschiedlich. [...] Für Plätze wie Indien oder Brasilien, da ist es, da würden diese Elemente wegfallen. Also da, ja da wäre es. Es ist schon gut, wenn man an solchen Orten jemanden hat, der die gleiche Sprache spricht, der die, der beide lokalen Kulturen auch kennt“. (SIW2_2018-04-19: 48 - 48)

“So, we use them more; for example [...] in [location x], we use some of the rooms for our students in innovation“. (SIW3_2018-04-23-08: 12 - 12)

“At this time, it was quite useful because at this time [actor x] was a little bit less known than now, so we had contact with them“. (SIW3)

Because [...] if we, [...] for instance, are planning a trip by [person x] [...] then we would immediately go to the places where Swissnex is and then we

“Weil wenn [...] sagen wir [...] eine Reise von [person x] planen möchten, dann würden wir sofort in den Orten wo Swissnex ist und

(1) Access to Resources

would count on Swissnex to bring us the most relevant people, because the embassy can't do that. (SIW7)

dann würden wir auf Swissnex zählen, dass sie uns die wichtigsten Leute bringen, weil die Botschaft kann das nicht machen“. (SIW7_2019-12-16_spracherkennung: 14 - 14)

Participation is a good opportunity to get in touch with the network, generally. (SIW8)

Actor views Swissnex as a source with which to acquire information

The strength of participating in a Swissnex is knowing; knowing what is happening in a country, just knowing what is happening in Bangalore, what the current topics are, who the specialists are. And there, we, [...] it is difficult to develop this knowledge everywhere in the world, and there you have an entrance door in the country where you, yes, you get a short business card. (SIW4)

“Die Stärke, von einem Swissnex ist gerade ein Wissen; die wissen, was in dem Land passiert, oder gerade so in Bangalore zu wissen, ja was sind gerade da die aktuellen Themen, wer sind da die Spezialisten. Und da, wir [...] ist schwierig dann dieses Know-how überall auf der Welt zu entwickeln und da hat man eine Eingangstür in dem Land, wo man ein bisschen ja, kurz eine Visitenkarte bekommt“. (SIW4_2019-12-13: 30 - 30)

It is just that the network is permanently there. And that is also one of their tasks, to report things to us. I think they did that sometimes; they do it a little less now. (SIW7).

“Es ist einfach, dass das Netzwerk da permanent da ist. Und das ist auch ihre Aufgabe uns Sachen zu melden. Ich glaube das hatten sie manchmal gemacht, sie machen das ein bisschen weniger jetzt“. (SIW7_2019-12-16_spracherkennung: 16 - 16)

“But on the other hand, we use them for other purposes. For example, we gave them some mandate some time [...].We [...] want to make research collaboration with the US and major problems that we have is funding. [...] So, our programme was to look the different ways of research funding in the [country x]. So, we ask the people from Swissnex [x], it was [x], to come here and to give a talk to all our researchers about the funding possibility in the [country x]. And that is an example of a practical, we could have done it ourselves, but we don't have the, it is better to give this mandate to Swissnex because they know much better than us how they find this money. So, they came here for two days and they made a pre-

(1) Access to Resources

sentation of how the funding possibility to our researchers. That was very successful. That is an example how we work with them” [sic]. (SIW3_2018-04-23-08: 16 - 16)

Source: created by the author.

11.3.2. Thematic Fit and Synergies

The analysis of the interview data also reveals thematic fit and the creation of synergies as distinct aspects (see Table 33). The quotations below show that there is general (proactive) support for the work, the idea and largely also the concept of Swissnex. This is illustrated by the fact that actors give annual mandates to Swissnex, which in turn carries out specific activities or provides services for those actors and is reflective of the funding mechanisms of Swissnex (cf. section 9.2, interviews SIW2, SIW3, SIW7). Beyond this ongoing support, stakeholders critically examine cooperation opportunities in terms of thematic fit and monetary aspects. The thematic fit of activities thereby seems to be a highly relevant consideration, particularly for activities that take place outside these mandates. A certain reluctance towards the latter was revealed in the data; though this might be context-related and dependent, for instance, on the availability of their own resources. The data furthermore shows examples that underline the support of common goals: stakeholders approach Swissnex and suggest certain (low-threshold) activities which support the work of Swissnex (i.e., connect actors) and create a mutually beneficial situation (interview SIW2). Also, Swissnex itself approaches actors with specific ideas and suggestions for cooperation. This proactive behaviour reflects the entrepreneurial character of Swissnex and is explained by its need to generate its own income.

Table 33 Thematic Fit and Synergies

(2) Thematic Fit and Synergies

Actor notes that participation in Swissnex needs to make sense	Well, so this mandate, we actually renew it every year. We haven't changed that content-wise since the very beginning. [...] And then it is really like that, that the respective Swissnex approaches us and says we	“Wobei (unv.) also diese, eben dieses Mandat, das erneuern wir eigentlich jedes Jahr. Wir haben das auch nicht geändert inhaltlich seit eigentlich dem Anfang. [...]
---	--	--

(2) Thematic Fit and Synergies

(i.e., subject to thematic fit) have this and that idea. And then we look at it and sometimes we do it and sometimes don't. But we do not have [actor x] internal planning on how we want to cooperate with Swissnex. We don't have that. It is really more driven from this side and, yes, in that sense the decision on which issues, this depends on what they suggest to us. And that is something, if you have known each other for a long time, then they also know what is relevant for [actor x]. So, we basically look at everything and when it makes sense to [actor x] and if we can finance it, then we do it. (SIW2)

Und dann ist es eigentlich so, dass das jeweilige Swissnex auf uns zukommt und sagt, wir hätten diese und diese Idee. Und dann schauen wir es an. Und manchmal machen wir es und manchmal nicht. Aber es gibt nicht bei uns [actor x] eine Planung, wie wollen wir jetzt mit den Swissnex zusammenarbeiten. Das haben wir nicht. Es ist mehr wirklich getrieben von dieser Seite und ja, insofern ist die Entscheidung zu welchen Themen, die ist getrieben dadurch, dass, es kommt darauf an, was sie an uns herantragen. Und das ist dann auch wieder etwas, wo man, wenn man sich kennt über längere Zeit, dann die wissen auch, also mittlerweile an was [actor x] interessiert ist. [...] Also wir schauen uns grundsätzlich alles an. Und wenn es aus Sicht [actor x] Sinn macht, dann, und wir das auch finanzieren können, dann machen wir das“. (SIW2_2018-04-19: 34 - 34)

Actor says that participation creates synergies with own work and overlaps with own strategic priorities We also try and in fact we do that, to link them, so we write an e-mail to Swissnex and say Prof. XY is in [place x] during this and that time, in case of mutual interests, for example for a talk, for an alumni event, etc., you should get in contact. [...] That is also something where we actually give, but that is also good for our people, because it's also a way for our alumni, the [actor x] alumni, to show something of [actor x]. This is also support for professors etc. in this general form. [...] That is somehow our approach and if it aligns with our goals, then we are certainly willing to make our contribution. (SIW2)

“Wir versuchen die immer und wir tun das auch, wir verlinken die immer dann mit dem, also wir schreiben Swissnex eine E-Mail und sagen Prof. XY ist während dieser und dieser Zeit in [place x], wenn es mutual interest gibt, beispielsweise für einen Talk bei Swissnex, für ein Alumni Event usw. dann schließt euch kurz. [...] Das ist auch etwas wo wir geben eigentlich, aber das bringt unseren Leuten auch etwas, denn für uns es auch ein Weg um unsere Alumnis, den [actor x] Alumnis etwas von der [actor x] zu zeigen. Das ist auch ein Support of Professors usw. in dieser allgemeinen Form. [...] Das ist so ein bisschen die Haltung und je nachdem, wenn es dann auch mit unseren Zielen übereinstimmt sind wir selbstverständlich gerne bereit auch unseren Beitrag da zu leisten“. (SIW2_2018-04-19: 60 - 60)

Source: created by the author.

11.3.3. Precautionary Reasons

The interview data also reveals that precautionary measures are another reason why actors engage with Swissnex (see Table 34). Some actors explain their decision to participate in relation to strategic (governance) considerations; they wish to be informed about the latest developments and receive relevant information to be able to (potentially) influence these decisions. In addition, actors report that participating in Swissnex is beneficial because they have the opportunity to give feedback on relevant network-related decisions. This aspect, however, was only referred to in very few cases, yet it underpins the importance for actors of being able to potentially influence Swissnex's governance and operations. Furthermore, the interview data emphasises that obtaining information and being in a strategic position are considered relevant aspects to an actors' (potential) impact.

Table 34 Precautionary Reasons

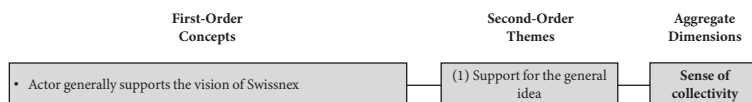
(1) Precautionary Reasons		
Actor stresses the importance of participating in these kinds of initiatives and of having access to information	If there is going to be a new location, or what it should look like in the USA. And there it is essential that we can give general feedback [...] also if it is about closing a Swissnex, or expanding one, it is probably good to know (SIW4)	“Ob es einen neuen Standort, oder wie es in den USA aussehen sollte. Und da ist wichtig auch mal, dass wir eine allgemeine Rückmeldung geben können [...]. Also wenn es darum geht, ein Swissnex zu schließen, zu erweitern, ist wahrscheinlich gut zu wissen“ (SIW4_2019-12-13: 12 - 12)

Source: created by the author.

11.4. Sense of Collectivity

These aspects, which were discussed initially, aim to improve the (strategic) position of actors; furthermore, the analysis also reveals considerations that encompass actors' contributions to the general landscape (see Figure 15).

Figure 15 Actor Rationales: Sense of Collectivity



Source: created by the author.

Apart from the considerations that aim to put actors in a better position, the interview data reveals those that take Switzerland as a frame of reference and seek to benefit the country more generally (see Table 35). Participation in Swissnex is linked to a sense of collectivity that is manifested in general support for the instrument (cf. interview SIW8). The data suggests that actors support the instrument due to the belief that Swissnex is beneficial for the individual actor but also to promote Switzerland's international visibility (interviews SIW2, SIW8). To expand on the second aspect, the interview data shows that actors support Swissnex for the sake of Swissnex, i.e., its concept and because of the idea it encapsulates rather than looking only at its benefits for individual actors. Swissnex is supported because it is viewed as a *shell* that is dependent on external input (interviews SIW2, SIW3). Accordingly, key actors are willing to provide content for that shell.

Table 35 Sense of Collectivity

(1) Sense of Collectivity

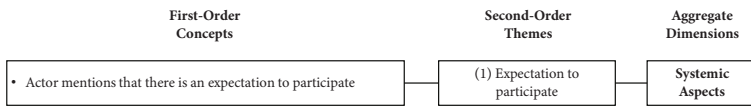
Actor generally supports the idea of Swissnex	<p>It is a very good thing that, in principle, you have these outposts that try to connect Switzerland with the respective region, with a focus on certain topics. [...] But [actor x] would not disappear and is resilient enough to cope with a loss of the Swissnex network. But certainly, for the whole of Switzerland it possesses, I think, depending on the location, in fact, an added value. (SIW2)</p> <p>But perhaps fundamentally it is good that the instrument is continued. [...] the tool is useful and makes sense and we support the fact that there is another phase. (SIW4)</p> <p>The idea was to intensify this, but we do that on a very loose basis. We pay for something because we believe that it is good work. (SIW7)</p>	<p>“Das ist eine gute Sache, dass du im Prinzip diese Outposts hast, die versuchen die Schweiz mit dem jeweiligen Standort zu verbinden mit einem Fokus auf gewissen Themen, also. [...] Aber [actor x] würde nicht verschwinden und ist genug resilient, um einen Verlust des Swissnex-Netzwerkes zu verkraften. Aber klar, es ist für die Gesamt Schweiz ist es, denke ich, eben je nach Standort schon immer noch ein Mehrwert“ (SIW2_2018-04-19: 48 - 48)</p> <p>“Aber vielleicht grundsätzlich, dass wir gesagt haben, es ist gut, dass das Instrument weitergeführt wird. [...] doch das Instrument ist nützlich und sinnvoll und wir unterstützen, dass es noch eine weitere Phase gibt“. (SIW4_2019-12-13: 6 - 6)</p> <p>“Die Idee war es zu intensivieren, aber wir machen das auf eine ziemlich lockere Ebene. Wir bezahlen etwas, weil wir denken, dass es ist eine gute Arbeit“. (SIW7_2019-12-16_spracherkennung: 8 - 8)</p>
--	--	---

Source: created by the author.

11.5. Systemic Aspects to Participation

The analysis reveals that there is a (perceived) expectation to participate in Swissnex (see Figure 16).

Figure 16 Actor Rationales: Systemic Aspects



Source: created by the author.

This is reflected in the quote below and is explained by certain institutional constellations and interdependences. However, the interview data suggests that this expectation is not explicitly expressed (see Table 36). On the contrary, it appears to be an implicit (normative) expectation to comply with. A decision not to participate in Swissnex would presumably lead to questions (interview SIW8). Accordingly, a certain degree of (implicit) compliance is expected, which explains participation in the instrument, although the added value for the actor might be limited.

Table 36 Systemic Aspects

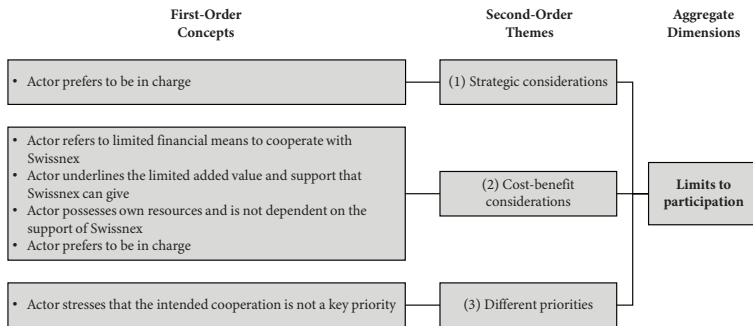
(1) Systemic Aspects		
Actor mentions that there is an expectation to participate	I think that [actor x] has a certain obligation with respect to Swissnex [...] that we, I would say, that we cooperate. (SIW2)	“Ich glaube [actor x], hat eine gewisse Verpflichtung gegenüber des Swissnex [...] dass man, ich sage jetzt mal, dass man zusammenarbeitet“. (SIW2_2018-04-19: 10 - 10)

Source: created by the author.

11.6. Limits to Participation

In the previous sections, considerations which explain actor participation were discussed. Similarly, the interview data identifies reasons that constitute limits to participation (see Figure 17). To some extent these aspects invert the previous findings. Three key aspects have been identified, which will be discussed in the following: (1) strategic considerations, (2) cost-benefit considerations and (3) different priorities.

Figure 17 Actor Rationales: Limits to Participation



Source: created by the author.

11.6.1. Strategic Considerations

Strategic considerations pose limits to participation. This can be further explained by some actors preferring to remain in charge of their (strategic) resources. The interview data shows that there is sometimes a deliberate and strategic decision to not delegate activities to Swissnex but to keep them in the hands of the actor. This is explained by quality considerations, which assume that the actor is better able to conduct and control certain activities and links to strategic resources, and that they do not wish to give up control of these aspects. The quote below illustrates that the actor does not trust Swissnex to carry out a certain activity and instead decided to build up in-house resources and infrastructure. Interconnected to these strategic considerations are the aspects of ownership and visibility. In the case of joint events, the actor’s visibility needs to be maintained and should be more prominent than that of Swissnex (e.g., by using a larger logo); in fact, the actor brings visibility to Swissnex and constitutes the bigger brand:

People come to these events mostly not because of Swissnex, but because of [actor x], because that is the content²³³ (interview SIW2).

This underlines the earlier assertion that Swissnex is a shell that is dependent on the support and contributions of key actors (see Table 37). These considerations are of a strategic nature and impact an actor’s decision about

233 “Die Leute kommen an diese Veranstaltungen häufig nicht wegen Swissnex, sondern wegen der [actor x], weil das der Inhalt ist“ (SIW2).

whether to participate in Swissnex, while also revealing the conditions for participation (e.g., the use of logos).

Table 37 Strategic Considerations

(1) Strategic Considerations		
Actor prefers to be in charge	We decided against this and have instead created certain structures here internally for [topic x]. We are convinced that this, in the long run, will have more added value than if we would simply / a key problem is [actor x] has its DNA, [actor y] has its DNA, Switzerland has its DNA. All very different though partially overlapping. And we do not trust a non [actor x] person, I would say, to sell [actor x]. (SIW2)	“Wir haben uns dagegen entschieden und haben dafür aber hier intern bei uns Strukturen aufgebaut für [topic x]. Weil wir überzeugt sind, dass das längerfristig mehr wert ist, als wenn wir einfach, ein wesentliches Problem ist oder, wenn du, [actor x] hat ihre DNA, [actor y] hat ihre DNA, die Schweiz hat ihre DNA. Sind unterschiedlich, wenn auch zum Teil überlappend. Und wir trauen nicht einer nicht [actor x] Person sage ich mal zu, [actor x] zu verkaufen.“ (SIW2_2018-04-19: 24 - 24)

Source: created by the author.

11.6.2. Cost-Benefit Considerations

Cost-benefit considerations emerged as being significant to actors' decisions about whether to participate in Swissnex (see Table 38). Three aspects are identified in the analysis: financial constraints, a lack of added value and the availability of an actor's own resources. To start with, financial constraints are identified as a clear limiting factor; due to Swissnex's set-up, an actor needs to have financial means at their disposal in order to cooperate with Swissnex. Participation obviously depends on the availability of these resources: does the actor have the respective means to enter into a contract with Swissnex? A second factor that limits participation points to a lack of added value. The interview data shows that, in some cases, Swissnex is not viewed as an asset for certain activities that are part of an actor's core mission. Instead, in these cases, actors must draw on their own channels and resources to fulfil their needs. This non-participation seems to be subject to structural and systemic aspects since the scope of Swissnex's outreach and the service it can provide do not always correspond to actor needs, despite the fact that they both operate in a similar realm. However, this does not level a criticism per se since Swissnex's capacities are limited and its core mission is not to accommodate all actor demands. Third, the

analysis highlights that those actors who have access to their own distinct resources are less dependent on support from Swissnex (again financial means are a factor here). The two quotations below indicate that actors that have access to selected regions are independent and able to operate outside the Swissnex framework. While this might be advantageous from an actor perspective, it can be challenging for Swissnex since it limits the contracts that are signed and ultimately has an impact on its financial set-up. Nevertheless, the fact that some actors do not require support from Swissnex is also viewed as a success factor. To recall, the data highlighted that Swissnex is viewed as having been successful in its mission (i.e., making contacts and being a door-opener) if it is no longer needed and becomes obsolete (section 10.2.3). However, the data suggests that this design principle creates a paradoxical situation: Swissnex needs the actors and their support to fulfil a distinct part of its key mission, while actors may not necessarily need Swissnex (SIW2).

Table 38 Cost-Benefit Considerations

(2) Cost-Benefit Considerations		
Actor refers to limited financial means to cooperate with Swissnex	In an ideal case, they [Swissnex] pay for the flight, etc., but if they can't do so, then we take care of this. That is ok. But in fact, that's ok for such things as a speaker, but when the situation relates to bigger things, then it is different. (SIW2)	„Im Idealfall bezahlen die dann den Flug usw., aber wenn sie das nicht können, dann machen wir es. Das ist ok. Aber eben das ist, das geht bei solchen Dingen, wenn es um einen Speaker geht, wenn es aber um größere Dinge geht, dann ist das schon etwas anderes.“ (SIW2_2018-04-19: 16 - 16)
Actor underlines the limited added value and support that Swissnex can give	We either have a direct relation with [actor x] and then we have our own platforms to talk. And that would be in [places and actor x]. And here, Swissnex cannot fundamentally contribute, because they do not have access to these platforms. (SIW7)	„Entweder haben wir eine direkte Beziehung mit einer [actor x] und dann haben wir unsere Plattformen, um darüber zu sprechen. Und das wäre [places and actors x]. Und hier kann Swissnex nichts Grundsätzliches bringen, weil die haben keinen Zugang zu diesen Plattformen.“ (SIW7_2019-12-16_spracherkennung: 10 - 10)
Actor possesses own resources and is not dependent on the support of Swissnex	I will give an example, on [date] we will have a big public event in [city x], including media and everything related to the topic [x]. And we can in fact do that without, we do that, without local support, well not without local support, but without support from a Swissnex, for example. (SIW2)	„Ich gebe ein Beispiel am [date] werden wir in [city x] wieder eine große Veranstaltung machen öffentlich, inklusive Medien und alles zum Thema [topic x]. Und eben das machen wir ohne, das können wir ohne, das können wir ohne lokalen Support machen, also nicht ohne

(2) Cost-Benefit Considerations

lokalen Support aber ohne Support von einem Swissnex beispielsweise“.
(SIW2_2018-04-19: 14 - 14)

“We have quite a lot of our own network, we also have also some things, in the case of China, we had, now it is no more the case, but in the past, we had our [resources x] in China. So, we didn't need Swissnex China for our own networking in China, in the past. Also, you have to realise that since we are the same with the US for example, we don't need Swissnex for the contact. We have that contact with the universities, foreign university”. (SIW3_2018-04-23-08: 12 - 12)

Source: created by the author.

11.6.3. Different Priorities

A difference in priorities is the third element that emerges in the analysis as impacting and more specifically limiting participation in Swissnex (see Table 39). Since Swissnex needs to generate its own income, it is not uncommon and is, in fact, anticipated that it will approach actors to identify topics and areas for possible cooperation. As is evident from the quotations below, whether (or not) this cooperation indeed takes place depends on a (paying) key actor's strategic interests and considerations. The data suggests that considerations are on the one hand linked to aspects of thematic coverage and strategic, institutional positioning. On the other hand, these different priorities address regional and geographic aspects. In combination, these considerations reveal the limits of participation.

Table 39 Different Priorities

(3) Different Priorities

Actor stresses that the intended cooperation is not a key priority	But we don't do that. We are not doing it because we think for the whole institution; we have, not very long-term, but we have a few plans of what we actually want to do roughly and things of this size need early planning and we need to have a discussion	“Aber das machen wir nicht. Wir machen es deshalb nicht, weil wir denken für die gesamte Institution, wir haben nicht sehr langfristig, aber wir haben so ein bisschen Pläne was wir überhaupt machen ungefähr und Dinge in dieser Größenord-
---	--	---

(3) Different Priorities

about how and by means of which instruments, which exhibitions or the like, we want to position ourselves [actor x]. And then [topic x] is not the right one. That means we have to say no, and that causes frustration on both sides. (SIW2)

nung, die müssen früh in die Planung eingehen und da müssen wir eine Grundsatzdiskussion führen, wie, über welche Instrumente, über welche Ausstellungen oder sowas wir [actor x] positionieren. Und da ist eben [topic x] nicht das richtige. Das heißt wir müssen Nein sagen. Das führt auf beiden Seiten zu Frustration“. (SIW2_2018-04-19: 16 - 16)

“With [country x] we have much less, because [country x] is not, I would say it is not a priority country for us. We only have contact with a few institutions, but so far we haven’t invested too much energy and time in [country x]”. SIW3_2018-04-23-08: 32 - 32)

Source: created by the author.

11.7. Findings and Discussion

This chapter identified the rationales that are tied to Swissnex: ministerial and key stakeholder rationales. Doing so added another layer of insights into the (gradual) institutionalisation of Swissnex and thereby a) helped us to better understand and position key developments and design principles of Swissnex. At the same time, this also b) generated insights into the instrumentation of Swissnex. The analysis of the political objectives reflected that Swissnex is primarily viewed as an instrument which is intended to position and brand Switzerland internationally. Over time, internationalisation concerns and notions of science diplomacy discourse have also been added to Swissnex’s core objectives, although these have been subject to change. Swissnex’s role of promoting knowledge transfer and innovation has, however, remained rather stable. In essence, the analysis showed that Swissnex has experienced layering and seemed to work as a platform from which to transport changing (political) goals.

The analysis of stakeholder rationales was carried out using an aggregated approach to data presentation; this showed the richness of considerations that ultimately account for an actor’s decision to participate in Swissnex. For reasons of anonymity, there was a deliberate decision not to focus on the level of the individual actor. As the sample for the Swiss case

study is considerably smaller than the Germany sample, individual actors were automatically more central. The analysis identified three themes as being relevant to participation (see Table 40). Strategic considerations, i.e., those that aim to maximise the impact of the actor were discussed as being explanatory. In addition, reasons that refer to a sense of collectivity as well as systemic aspects were shown to be linked to actor participation. Furthermore, the analysis addressed those factors that limit participation in Swissnex. Again, these considerations were defined as being mainly individual strategic considerations.

Table 40 Overview: Rationales for Participation

	Swissnex
Maximise (and Reinforce) Own Impact	(1) Access to resources (2) Thematic fit and synergies to own work (3) Precautionary reasons
Sense of Collectivity	(1) Support for the general idea
Systemic Aspects	(1) (Institutional) Expectation to participate
Limits to Participation	(1) Strategic considerations (2) Cost-benefit considerations (3) Different priorities

Source: created by the author.

Accordingly, these findings underline that the logic of action which drives participation is linked primarily to an actor's own interests and agendas. The analysis found that Swissnex is viewed and used as a multiplier for actors' own activities, signalling the hierarchy of interests. Nevertheless, a general willingness to support the instrument was observed. Notably, the Swiss case study also revealed some reactive behaviour from key actors: this was evident from the way that some actors situate themselves in relation to this new instrument and adapt their initial position where this is feasible. Adhering to the design principles of bottom-up management as well as distinct autonomy, the empirical sections demonstrated that a) the oppor-

tunities to influence the development of Swissnex and b) the willingness to do so among the actors seem to be limited (displaying a significant, yet system-inherent difference to the German case study). These findings thereby reaffirm the assertions on the institutionalisation of Swissnex, as discussed in the previous chapter (chapter 10).

To complement the results presented above, it is relevant to consider in more detail the element of the actors' independence from the work of Swissnex. The fact that actors are not dependent on Swissnex to carry out their core missions is not surprising. Instead, it mirrors a functionally divided and organised ecosystem that is able to survive even in the absence of Swissnex. In addition, this links to the self-understanding that is rooted in the Swiss science system in terms of autonomy. A certain level of independence on the part of actors in relation to Swissnex was also identified as a criterion for success. The data reveals that it is a key operation principle of Swissnex and Swiss science diplomacy to become superfluous (although this principle was challenged, see also the previous chapter). For example, Swissnex Singapore was closed for these reasons: collaborations between key actors were consolidated in such a way that the support of Swissnex was no longer needed (section 10.2.3). In a similar vein, the data underlines that the work and added value of Swissnex must be seen in a temporal dimension. While Swissnex is perceived as a door-opener in some countries (interview SIW2), this may change over time, for instance once an actor has set foot in a certain region. The added value of Swissnex is hence diminishing:

“At this time, it was quite useful because at this time [actor x] was a little bit less known than now, so we had contact with them [Swissnex]” (interview SIW3).

In the very beginning [...] to start all that, Swissnex was really helpful. [...] They were very very supportive in the beginning, when we hadn't set foot there, yet²³⁴ (interview SIW2).

On a contextualisation note, it should be made explicit that the individual line of reasoning that an actor takes strongly depends on the actor's points of departure, which is best reflected by their access to and possession of resources. This creates by definition a different point of departure and

234 *“ganz zu Beginn [...] um das Ganze aufzubauen, da war Swissnex sehr hilfreich. [...] Und die waren sehr sehr unterstützend zu Beginn, als wir eben noch nicht Fuß gefasst hatten dort“* (interview SIW2).

influences an actor's positioning and reasons for participating. While the analysis focused mainly on Swissnex, the interview data also referred to cooperation with science and technology counsellors, who are also a part of Switzerland's external network (see chapter 9). Several examples were mentioned where the actor dealt with science and technology counsellors rather than Swissnex (interviews SIW3, SIW7). The criteria for selecting one over the other were linked to the nature of the activities (i.e., whether they required consular guidance) or geographical presence, rather than quality considerations. What is more, interview partners mentioned that, in practice, the demarcations are not relevant:

“And we treat them more or less the same. For us, it is [sic] not two different categories. Sometimes we don't even know the Swissnex. We know it, but I mean we, some of my colleagues don't even realise if that is Swissnex or not” (interview SIW3).

Another aspect that should be highlighted is the differences in institutions' decision-making processes with regard to Swissnex. While in some cases, the decisions on cooperation are taken centrally, in other cases it was shown to be a decentralised process (interviews SIW2, SIW3, SIW4, SIW7). In consequence, this may point to different sense-making and unravels individual preferences rather than institutional ones (while for this study only institutional views were included). Remarkably—and this anticipates the comparative discussion which follows—the reinforcement of actors' international visibility was not explicitly referred to in the interview data as a consideration that drives participation. Compared to the German case, this is a noteworthy finding. The fact that Swissnex is not explicitly seen as a strategic tool might be explained by the fact that it is an obvious objective; however, it might also link to the Swiss habitus and principles of understatement.

In addition, and that will also be discussed in depth in the next chapter, Swissnex possesses a unique structure that differs from its German counterpart such as a lean governance structure, and bottom-up governance. The factors constitute conditions that differ from the German case, while also providing a different basis for actors to (in principle) influence and impact the work of Swissnex. Finally, and that has been repeatedly stressed, the non-use of the instrument by actors is not linked per se to negative connotations. Instead, the opposite may be true, and this constitutes a sign that Swissnex works well since it is on a path to making itself superfluous (for some actors or for some locations). This development has been argued

as being ideal-typical. However, this line of argument can be challenged, particularly with regard to the older and consolidated Swissnex locations, which were presumably institutionalised in such a way that they have become brands and should deliberately keep their flagship function (see section 10.2.3). Furthermore, this underlines the fact that, for actors, the use of and need for Swissnex might change over time.

11.7.1. Interim Analysis of Case Study (II): Instrumentation Effects

Now that the empirical data that forms the basis of the Swissnex case study, being a manifestation of the service-oriented model, has been presented, this section allows us to draw conclusions and provide an interpretation of Swissnex's instrumentation. The data indicates that certain instrumentation effects are encountered, which consolidate each other over time, and that they reinforce the (gradual) institutionalisation of the instrument (see Table 41). In line with the conceptual premise, the trajectory of Swissnex reflects a longevity and inertia over time (Lascoumes & Simard, 2011, p. 14). In light of critical junctures and pressures such as audit exercises and governmental struggles, the instrument remains firmly in place and seems to have even been consolidated. This can primarily be explained by a representation effect. Over time, a direct cognitive effect has been linked to Swissnex, within Switzerland, and beyond. Swissnex seems to have become self-referential. Swissnex is viewed as an instrument that promotes international cooperation and collaboration and aims to secure Switzerland's role in the future. This perception has, over time, become widely shared by (national) key stakeholders.

In addition, there is substantial external awareness of Swissnex, in terms of it being an instrument that is closely monitored and envied by other countries. This recognition can be seen as underlining the instrument's value and seems to suggest that a certain level of visibility is transmitted. Accordingly, it can be confirmed that the instrument is viewed as having an effect on "*those steering public policy and on the competition that drives them*" (Badout, 2011, p. 93). It should, however, be noted that the frame of reference in this case expands beyond Switzerland. This allows us to interpret a) that there is strong explanatory reasoning and value to Swissnex, while b) the instrument also holds a symbolic function. The latter is evident from the dual logic that applies to the success of its locations and their (potential) closure. In combination, these effects seem to have contributed

to the gradual institutionalisation of Swissnex. Furthermore, the analysis of the political motivations that guide the instrument reveals an appropriation effect. Swissnex is used as a platform for reformulations by political actors and is subject to re-framing (over time), as the analysis at the beginning of this chapter showed (see section 11.1).

Table 41 Instrumentation Effects: Swissnex, Switzerland

Swissnex	
Aggregation Effect	* Inertia & longevity of the instrument despite a critical audit
Representation Effect	* Framed as a reliable instrument that promotes international cooperation and is known for its focus on innovation (within Switzerland and beyond)
Appropriation Effect	* Used as a platform for reformulations (and layering) by political actors

Source: created by the author.

12. Comparative Analysis and Discussion

In line with the conceptual architecture, this section comparatively analyses the two selected SICs (*service-oriented* SIC and *representational* SIC). The analysis follows the two-step heuristic framework (section 4.2.3) to answer the overall research question, which is to shed light on the development and the institutionalisation of SICs as distinct instruments of science diplomacy. In that vein, this chapter first discusses the development and (gradual) institutionalisation of these instruments based on the two case studies (section 12.1). The development reveals patterns of similarity and difference that have become visible in the analysis of the instruments' genesis as well as their subsequent evolution. Secondly, following the heuristic framework, this chapter analyses the instrumentation of the SICs by their key stakeholders. This provides a distinctively actor-centred perspective on science diplomacy and points to instrumentation effects that are created and reinforce the (gradual) institutionalisation of the instrument.

These might differ from what had been politically anticipated. To capture this use, the rationales that guide key stakeholders towards participating in SICs were extracted to reflect their sense-making and interpretation (section 12.2). Combined, these two building blocks make it possible for us to conduct a comparative in-depth analysis of the development and institutionalisation of SICs, while revealing explanatory factors. In general terms, this study has found evidence of four aspects that help to explain the development and institutionalisation of the two SICs (in their national contexts). The factors that were extracted across both cases are: a) design principles which were adopted in the SICs' early development and are explained by national system characteristics, b) critical junctures (that led to reorganisation) of the instruments, c) the role of contingent events and timing and d) an appropriation of the instrument by key stakeholders in a predominantly strategic way, though also in terms which reflect distinctive collective logic.

The analysis of this instrument-centred approach enables an empirical understanding of the notion of science diplomacy, while also shedding light on its governance. These findings ultimately enable reflection on the body of knowledge that surrounds science diplomacy and present conclusions

that could enhance and advance the prevailing understanding of this field (section 13.2).

12.1. Institutionalisation Patterns

This section discusses the long-term development (i.e., the careers of the instruments) of the DWIH (Germany) and Swissnex (Switzerland) comparatively in line with the heuristic framework. The analysis of the two cases shows that, while the instruments initially developed differently, they converged over time (see Table 42). In both cases, the genesis is characterised by patterns of difference, such as framework conditions. Furthermore, differences were observed in terms of instrument design, which can be explained by the aspects of timing and contingent events, and the prevailing characteristics of the national systems. To a large degree, the (initial) differences in the development and the shape of the two instruments reflect the national landscape they respond to.

Notably, an alignment of the two instruments becomes apparent over time: both instruments developed according to functional logic and were also subject to critical junctures and increased political steering. Moreover, the analysis shows that initial design principles have remained generally stable. The following section examines the development of the two instruments comparatively by providing a nuanced analysis of the genesis and subsequent evolution that ultimately delineates key elements, which provide insights into the development and current shape of the two SICs.

Table 42 Comparison: Institutionalisation of DWIH and Swissnex

	DWIH (Representational SIC)	Swissnex (Service-Oriented SIC)
Founded	2009 * Within the wider science diplomacy policy package	2000 * Responding to internationalisation and brain drain calls
Genesis	* Top-down logic driving the establishment (promoted by policy entrepreneurs) * The role of key stakeholders: tug of war and struggles over competence in a nested institutional environment * Strategic actors and organisational positioning * Simultaneous opening of SIC locations	* Bottom-up logic driving the establishment * Political momentum, policy entrepreneur driving the idea, and timely private funding * Elements of trust * Ministerial struggles over competences * Incremental (demand-driven) expansion of the network
Critical Junctures & Evolution	* Major reorganisation (governance and funding) and shifts of competences/power within the actor structures due to an audit exercise * Development according to a functional logic and by political will * Critical audit exercise * Politically motivated closure of a location (Cairo & Singapore) * Expansion in 2022 * Stakeholder support	* Politically triggered expansion of the network (2007 onwards) and stronger political steering (while keeping autonomy)
System Characteristics & Contingent Events	* The role of actors reflects the organisation of the German system (strong stakeholders) * Contingency: institutional responsibility at AA	* Reflecting typical Swiss bottom-up policy style and politics of pragmatism * Contingency and timing: a political window of opportunity and timely events

Source: created by the author.

12.1.1. Genesis: Patterns of Difference

The genesis of the DWIH and Swissnex reflects significant patterns of difference, as summarised in *Table 42*. These differences relate to aspects such as the framework conditions that surrounded each instrument's foundation (i.e., the year of their launch and key objectives), but also to the instrument's design process, the (pre-existing) institutional environment as well as distinct national characteristics.

12.1.1.1. Temporality and Different (Initial) Objectives

An apparent difference between the two models relates to the framework conditions that surrounded each instrument's establishment; this links to aspects of temporality and wider pressures. The instruments were created at different moments in time and being presumably a derivative of that, they respond to different (political) objectives. Swissnex developed as a response to early internationalisation attempts in higher education, science and innovation; this took place at the height of globalisation pressures in the late 1990s and early 2000s. At that time, Swissnex occupied a niche in a newly developing policy area and served as a door-opener for national stakeholders to conduct internationalisation activities. In contrast, the DWIH were launched more than 10 years later, in 2009, as a response to science diplomacy calls since internationalisation (in general) was already central to policy-making (cf. BMBF, 2008). While Swissnex can be seen as an early response to emerging internationalisation pressures in Switzerland, the DWIH were installed to respond to different political objectives. This reflects core assumptions that instruments are "*bearers of 'inter-changeable' ideas*" (D. Braun & Capano, 2010, p. 13) and that they reflect a certain *zeitgeist* (cf. Bemelmans-Vidéc, 1998). These differences had a structuring effect on the instrument, at least as regards its initial design, as will be demonstrated in the subsequent sections.

12.1.1.2. Timing: (Delayed) Policy Transfer

In connection with the previous point, the data reveals that timing played a decisive role in the development of the two SICs. In the early days of Swissnex, the model was closely inspected by German policy-makers. However, at the time, it was not considered a suitable (or necessary) instrument for Germany's internationalisation activities. Despite this initial reservation, the data shows that a policy transfer that took place between the two cases at a later stage. In 2008, German policy-makers looked to their direct competitors, including Switzerland, to develop (new) ideas to reinforce Germany's position in a competitive environment and to anticipate future developments. Policy-makers were ultimately inspired by the success of the Swissnex model (this underlines the role of contingency, as defined in section 4.1.3). In light of a growing discourse on science diplomacy, the Swiss model seemed to provide an attractive and suitable solution to a) promoting science diplomacy policy objectives (driven by

policy entrepreneurs) and b) creating a joint international representative body that would increase Germany's visibility abroad.

Notably, the data refers to earlier unsuccessful attempts to achieve the same objective. The political momentum at the time enabled a policy transfer to take place; thus, the main idea of Swissnex and its funding principles were transferred into the respective German context. The funding principles of Swissnex (public-private partnership), however, were eventually discarded as they were considered inappropriate in the German context. In combination with the previous aspect (different pressures), this policy transfer underlines the assumption that policy instruments are often disconnected from political goals (Halpern et al., 2008) and instead are responsive to different contexts and ideas (D. Braun & Capano, 2010, p. 13). In this case, the DWIH responded to science diplomacy, rather than to internationalisation, which was the inspiration for developing Swissnex. Despite this, the Swiss model still seemed a useful tool for addressing these objectives. This policy transfer example underpins the idea that timing was a relevant factor in the development of the DWIH. Swissnex has also benefited from contingent events, which have shaped its development, as will be shown in the next section. The data thus indicates that contingency is a significant factor in shaping the development of the instruments.

12.1.1.3. Design Processes: Bottom-Up vs. Top-Down Logic

Another difference between the two models relates to the dominant forms of logic that characterise their early-stage development; this difference can be explained by national characteristics. In the case of the DWIH, the instrument was designed according to top-down logic, while Swissnex was developed in a bottom-up fashion. Both cases assign a crucial role to policy entrepreneurs, who seized a window of opportunity which successfully led to the establishment of the instruments (also constituting a contingent event). In the German case, the discourse was initiated by policy entrepreneurs and the initial idea for the DWIH quickly developed as one element within a wider policy package initiated from the top down. In addition to the DWIH, a mix of other instruments were also implemented with the aim of reinforcing and conveying a coherent science diplomacy strategy. Hence, the initiation of the DWIH did not generally result from an immediate need on the part of stakeholders; on the contrary, it was rather politically advocated. Similarly, in the Swiss case, a political window of opportunity created an opening for policy entrepreneurs' innovative

ideas; they identified room for action to improve Switzerland's international position, while this window also provided an opportunity to increase Switzerland's visibility and combat brain drain.

The idea ultimately took shape thanks to political support, trust and well-timed private funding (a novelty at that time), and this resulted in the creation of the first scientific consulate. The consulate was given significant autonomy and was set up as a trial; it was given a long time to establish itself as it was co-founded by private means which imposed a 10-year minimum operating period. This development also reveals that elements of contingency were at stake in terms of political momentum, which was related to global mega trends and the well-timed private funding, which itself was facilitated by elements of trust and the personal relationships of key actors. Furthermore, the design process of Swissnex seems to reflect the Swiss understanding of how politics is conducted (pragmatism) and the perception of how science is governed: demand-based, bottom-up and reflecting principles of autonomy (Pasternack et al., 2016).

12.1.1.4. Institutional Environment (Domestic and International)

The data also assigns a key role to pre-existing institutional and organisational arrangements (both domestically and internationally), which are relevant for the development of the two instruments. Upon its launch, Swissnex served as a way for national stakeholders to conduct internationalisation activities in international contexts where Swiss science and innovation stakeholders had a limited presence. The idea of Swissnex constituted a novelty at that time, which enabled the instrument to be developed almost from scratch. In contrast, the DWIH developed in light of an existing and even expanding nested institutional infrastructure abroad, and this had a constraining effect (cf. Howlett, 2009 on limiting factors in the design process, section 4.1.3). Key actors, such as the DAAD, had traditionally operated internationally, while other actors were also in the process of opening their own institutional premises abroad or had just opened them. This pre-existing structure abroad presented a different point of departure in the German case; in fact, this limited what could be realised since organisational interests had to be mediated (cf. Haelg et al., 2020, section 4.1.3). Rather than starting from scratch, as in the Swiss case, the design of the DWIH took place in light of these existing structures and arrangements that evolved institutionally.

In addition, there was a deliberate (political) decision to piggy-back on existing structures in order to reduce the financial burden and secure smooth on-site passage. This reflects that the process was politically driven rather than initiated or demanded by stakeholders. In a similar vein, national institutional arrangements also explain the shape of the SICs. In the case of the DWIH, although its implementation can be characterised as a top-down approach, its design was subject to intense discussions among the key stakeholders and resulted in a tug of war. Against a backdrop of strong autonomy and institutional differentiation among key German stakeholders in the research and science landscape (Edler et al., 2010), the data reveals that processes of institutional positioning (which suggest an aggregation effect), struggles over competences and even mistrust among the key stakeholders all played a role. These aspects became visible, for instance, regarding the question of who should oversee the locations on-site and what degree of autonomy should be attributed to these new structures. These struggles over competences and structures during the DWIH's creation are not uncommon, as scholarly literature suggests (cf. Ahrne & Brunsson, 2005). Furthermore, scholarly literature assumes that the design of SICs is impacted by the composition of its members (*ibid.*). The data observed this as well: the DWIH's design was influenced by institutional mistrust, strong institutional interests and an accidental constellation with the AA (see section 7.2.4). The DWIH were ultimately designed as an additional layer, a separate instrument in an already differentiated system of institutional presences abroad (rather than assigning the DWIH's core tasks to one of these actors in the environment).

In other words, both the existing nested institutional representation of key actors abroad and strategic actors pursuing their own interests in terms of organisational positioning are explanatory factors for the initial design of the DWIH; this points to the significance of national system characteristics. While the German case reflects a strong stakeholder-driven development, in line with these national characteristics, the Swiss case in comparison reveals a lean-actor structure (Pasternack et al., 2016). This is also characteristic for Switzerland (and a comparable degree of actor involvement, as in the German case, would not be in line with Switzerland's self-concept). Accordingly, principles of autonomy and bottom-up governance explain why a comparative situation would not have been encountered in the Swiss case.

12.1.1.5. Ministerial Struggles

The data assigns a key role to aspects of ministerial governance in shaping the SICs; this is most strongly visible in the case of the DWIH. A commonality in the genesis phase relates to struggles over competences between key ministerial actors. Tensions were discerned between the foreign ministry (AA) and the sectoral ministry (BMBF) which related to the governing and steering of the instrument²³⁵. These struggles seem to have been more severe and encompassing in the case of Germany since key stakeholders also considered themselves to be involved in these discussions. The Swiss case also reflects initial reluctance on the side of the FDFA to accept this new model since it was presented as being a substitution (to some degree) for the traditional science and technology attachés and hence a clear loss of competence over traditional foreign affairs topics. Notably, while ministerial struggles were revealed in both cases, the governance set-up differed in terms of who was responsible. The DWIH were placed under the authority of the AA, having been the political agenda setter (appropriation effect). This division of ministerial responsibility marks an early design principle that was not approved by the BMBF. Sources even suggest that the model would have probably looked different if the BMBF had been in the driver's seat. This governance arrangement has remained in place, despite external pressures (i.e., audit exercise) which led to debates regarding a change of governmental responsibility. This reveals inertia in the early design principles against external pressures. As far as Swissnex is concerned, a converse set-up took root. From the start, Swissnex had strong thematic links to the sectoral ministry (SERI) and also remained under their auspices (while receiving various forms of administrative support from the foreign ministry (FDFA)).

12.1.1.6. Incremental vs. Simultaneous Opening of SICs

Another difference relates to the instruments' initial spread and coverage. Initially, the Swiss model developed organically and in a demand-oriented way and was given significant political autonomy. It developed incrementally in line with its success, while also limited financial means were available to fund this initiative. Hence, the first locations were seen as trial

235 To recall, this ministerial struggle has been found in the development and governance of other instruments in that realm, as well (cf. Raev (2020)).

cases, which operated on very limited public funding yet also needed to demonstrate their impact. In contrast, all (initial) five DWIH locations were launched at the same time; this is presumably explained by the fact that Germany jumped on this trend around eight years later, and certainly aimed to demonstrate a certain degree of political clout, while positioning the DWIH as a cornerstone of a new policy that was supported politically (while securing the support of the key stakeholders). This demand-orientation (Swissnex) is still valid today, as the typology exercise showed.

12.1.1.7. Sub-Conclusion

The comparative analysis of the genesis of the two instruments reveals significant differences, while also a few commonalities were found. The role of timing and contingent events can be considered decisive for the development of the two models. The examples of the policy transfer and the way that Swissnex received initial financial support underline this and underpin that the instruments largely developed at favourable moments in time. A major finding that also accounts for the development of the SICs relates to national system characteristics: the instruments developed in response to their respective environments. This was observed, for instance, in relation to the degree of stakeholder involvement, pre-existing institutional arrangements or policy-making styles. The findings underpin that the two SICs which were analysed seem to constitute derivatives of their (institutional) environment. This corresponds to scholarly findings on policy design processes (see section 4.1.3) and the theoretical premise of conceptualising instruments as institutions. It is assumed that instruments contain knowledge of structures, in the sense that they reflect balances of power relations among different actors (Kassim & Le Galès, 2010). To formulate this differently, instruments contain a “*condensed form of knowledge about social control and ways of exercising it*” (Lascoumes & Le Galès, 2007, p. 3). Similarly, it is argued that instruments are a “*social representation of the overall cultural beliefs in a society and instruments become the representation of such a choice*” (D. Braun & Capano, 2010, p. 13, drawing on Ingram and Schneider). The analysis of the instruments’ genesis confirms these assumptions. SICs seem to be magnifiers that reflect and transmit key principles of the relation between the governed and governing, in the sense that they portray these national characteristics.

Furthermore, this became visible by looking at the SICs’ governance structures (i.e., bottom-up governance, actor-driven governance or consor-

tia leadership arrangement), the design process, structures of power and core beliefs. To reformulate this, the current models can, to a large degree, be explained by characteristics that are inherent in the national system and transmitted within it. While this constitutes a seemingly natural factor, this might also be counterproductive because “*formal structures of many organizations [...] dramatically reflect the myths of their institutional environments instead of the demands of their work activities*” (Meyer & Rowan, 1977, p. 341). This became evident through the redundancy of existing institutional structures and questions concerning ministerial authority over SICs.

12.1.2. Evolution of the Instrument and Critical Junctures: Patterns of Alignment

While the founding phase has been identified as crucial in explaining the shape of the two SICs, their subsequent evolution also explains their current shapes. The evolution of the network, in contrast to the genesis, depicts a stronger degree of coherence between the two models (see Table 42) and reveals that the development of both models was impacted by critical junctures that led to changes in the instruments’ way of working. The findings furthermore show that, over time, both instruments have revealed an increase in (formal) accountability and a development according to functional logic.

12.1.2.1. Increased Political Steering

A commonality between the two models that also explains their development is increased political steering and political control over time. This development is notable in the Swiss case, which was initially endowed with significant autonomy and developed largely in response to policy entrepreneurs. The first locations were seen as unique beacons that could operate relatively independently. In 2007, however, this changed and was reflected by the politically triggered enlargement of the Swissnex network. This enlargement had been politically anticipated and led to an increase in steering: this reversed (to some degree) the initial bottom-up principle that was applied to the selection of key locations. The increased network furthermore led to a stronger degree of steering, thereby impacting the prevailing degree of autonomy that had been in place so far. Another

example of this increased political awareness is the streamlined appearance of the network, which was politically encouraged. In 2008, the common *Swissnex* brand was implemented and seen as a sign of consolidating the instrument. In comparison, the German DWIH reflected ab initio their strong integration into the overall science diplomacy strategy. From the start, their way of operating was characterised by political steering (though in line with and limited by actor demands). However, the DWIH also experienced strengthened political steering following a critical juncture, an audit exercise (see next section).

12.1.2.2. Audit Exercises

Over time, both instruments were subject to audit exercises, which constituted critical junctures in their development. In the German case, the evaluation occurred unexpectedly and soon after the DWIH had opened and begun working. The evaluation had a major impact on the DWIH and triggered a process of reorganisation, which significantly targeted the prevailing governance and funding conditions. To expand on this, funding arrangements that were transferred from the Swiss case, i.e., operating in a self-funded way, were viewed as being flawed. Moreover, given that the governance structures differed widely between locations, the evaluation demanded a streamlined appearance, a revised funding structure, a common governance structure and stronger political anchoring to connected policies, such as the internationalisation strategy (issued by the BMBF). Notably, the overall work of the DWIH was not subject to critique.

The Swiss case reveals parallels to what was encountered in the German case. In 2015/2016, an audit exercise took place that also challenged the instrument, for instance by stressing the need to install performance indicators and calling for demarcations to the work of other Swiss stakeholders abroad and for a better linkage to the official external network. The audit was viewed as highly political and interpreted by ministerial stakeholders as an affront to the instrument. Both audits marked a caesura in the (gradual) development of the instruments in terms of questioning their existence and causing political turbulence. Despite this, the audits can be seen as having led to a certain degree of consolidation, since the actual work of the SICs did not seem to have been significantly challenged by the audits. In the aftermath, both instruments can be considered to have been in safer harbours than before the audits. These evaluative exercises signal functional logic and increased accountability, which are tied to the instruments.

Furthermore, in both cases, the audit exercises were viewed as a highly political issue and were also seen as critique of the administration.

12.1.2.3. Renewed Political Focus

While the audits had formulated conditions for the instruments' continued ways of working, they also triggered a renewed process of political steering. This was expressed differently between the two countries and tackled the structural conditions that were in place before. In the case of the DWIH, a direct implication that followed the audit exercise was the closure of one of its locations (although this was not required in the audit). The Cairo location was closed and this was viewed as a signal that demonstrated the political ability to respond to these points of critique. Accordingly, the closure was seen as sacrificing a pawn for the evaluation. In addition, the Cairo location was contested among the key stakeholders from the start. As a result, the network structurally consolidated itself since (presumably) weaker locations i.e., contested ones, were cut off. The data attributes this to being a direct consequence of the audit. Similar renewed political steering was observed in the Swiss case. In light of an expanding network, 2015 marked an end to that phase given that Swissnex Singapore had been closed. Its closure was politically motivated and marked by a dual narrative: it was presented as a success story in that it had made itself superfluous, and it yielded only limited added value to key stakeholders since they had, in the meantime, established their own networks with the help of Swissnex. While this definition of success can be contested, the data stresses that the closure was meant to revive the network by ensuring flexibility and the ability to prioritise within the external network.

In addition, and pointing to ministerial struggles, it was seen as proving the ability to practise a policy of signalling (in the direction of the foreign ministry). In both cases, these events underline that the instruments were subject to increased political steering over time, while functional concerns were also present. A most recent step in the development is marked by the politically triggered expansion, which coincided for the two SICs. Following a period of consolidation in the aftermaths of the audits, an expansion of the network was scheduled for 2021/2022, when both networks opened new locations in San Francisco (DWIH) and Osaka (Swissnex) respectively. This underlines that the instruments are still alive and perceived by decision makers and by stakeholders as being valuable. Rather than relying on past successes, the expansion, after a long time, can be seen as reviving

the idea of SICs, rather than being stuck in a path-dependency situation where a consolidated instrument has little potential for new growth. Hence, the expansion underlines the instruments' agility, their transformative characters and their political relevance.

12.1.2.4. Stakeholder Support

Apart from the political aspects, the data underlines that the instruments were also placed on a stronger footing by the support of their key stakeholders, and this also explains the institutionalisation of the two SICs. This is remarkable in the case of Germany, where initially severe struggles, linked to power dynamics and mistrust, were encountered. Most obviously, these struggles led to the question of competence division and fears of overdominance by certain actors. This was reflected in the instrument from the start; to counterbalance these aspects, the initial leadership of the DWIH was placed in the hands of a consortium of stakeholders. Over time, the struggles seem to have become consolidated (*aggregation effect*) and they lost their intensity, while the initial mistrust was even overcome. The leadership of the DWIH was ultimately placed in the hands of the DAAD, which had previously proven to be a major issue of dissent (*appropriation effect*). This consolidation might also be explained by the fact that key stakeholders were formally included in the different governance bodies following the reorganisation (pointing to better organisational representation than at the beginning).

Accordingly, struggles over power relations were systematically addressed through the installation of new governance bodies, yet only after the audit. In the Swiss case, a move was also made towards the stronger inclusion of key stakeholders for the purpose of legitimising the instrument. The Swissnex committee was installed to ensure widespread acceptance among the key stakeholders while also serving as a sounding board for ministerial actors. In addition, it was viewed as a tool to allow for structural exchange with the FDFA in order to combat tensions.

12.1.2.5. Sub-Conclusion: Comparing the Institutionalisation

The previous sections uncovered coherence in the development of the two instruments over time. Commonalities in their subsequent development are manifested by a) strengthened political steering over time, b) critical

junctures in the evolution of the instruments that had a lasting impact, c) renewed political attention and d) consolidated stakeholder involvement that placed the instruments on a stronger footing. The last aspect, in particular, suggests that collaborations have been institutionalised, if they are understood as *a process by which individuals create a common definition of a social reality* (Mayntz & Scharpf, 1995)²³⁶. The evolution of the instruments hence seems to reflect a process of internalisation relative to their environments. This is furthermore reinforced by instrumentation effects that have triggered institutionalisation processes (see Table 43). In line with the conceptual framework, the data shows that the instrumentation effects are most visible in the longevity of the instruments, (Lascoumes & Simard, 2011, p. 14). Despite severe pressures, such as critical junctures and governmental struggles, the instruments seem to have consolidated themselves. Inertia is also seen in terms of the early design principles; this aligns with the theoretical premise which assumes that *“the effects of these decisions are likely to be enduring”* (Kassim & Le Galès, 2010, p. 6). The case studies revealed that, over time, distinct design principles have become deeply interwoven with the SICs’ DNA, such as funding arrangements and actor-led governance arrangements. Combing the evidence in the previous sections, the data reveals three effects that reinforced the institutionalisation of the instruments and that have partially been aligned with the theory. To pursue this in a more systematic way, in the case of Germany an *aggregation effect* was encountered. The creation of the DWIH brought together heterogeneous actor groups to work on this topic. Despite severe struggles, initial preferences were modified for the sake of the instrument and eventually a common model was adopted (while also resistance was encountered in terms of mistrust: *appropriation effect*). Swissnex seems to have become institutionalised due to a *representation effect* in the sense that it consolidated itself as a unique instrument over time, both nationally and internationally. It serves as a brand for Switzerland and seems to be tied to a certain degree of explanatory logic, while conveying the values of being a distinct and innovative example that fosters international cooperation. Its external reputation can particularly be seen as reinforcing its institutionalisation because Swissnex is seen as an instrument that inspires third countries, and that Switzerland is envied for this. Additionally, the longevity of

236 Mayntz and Scharpf (1995, p. 42), drawing on Berger and Luckmann (1997): *“Institutionalisierung der Prozeß, durch den Individuen eine gemeinsame Definition der sozialen Wirklichkeit aufbauen”*.

Swissnex can be explained by the platform it creates for political reformulations (appropriation effect). Over time, Swissnex has responded to various political objectives, which reflects a process of layering (see section 11.1) (cf. Epping, 2020). Appropriation by key actors, as in the German case study, could not be observed. This is not surprising given that the Swiss case, and Switzerland in general, reveals a different set-up and operates in a service-oriented way. The DWIH, in contrast, reflect various appropriation effects that have reinforced their institutionalisation. The analysis has shown that the DWIH similarly serve as a platform for certain interests, such as political ones. Furthermore, *professional mobilisation* was encountered on the side of the AA, which used the instrument to acquire new competences, expand its portfolio and position itself in a newly emerging field (despite resistance from the other key actors, such as the BMBF). The DWIH are hence viewed as reinforcing an effect on “*those steering public policy and on the competition that drives them*” (Badout, 2011, p. 93). In a similar vein, the DWIH were viewed by certain actors as a chance to reposition themselves and to strategically approach new topics; this could not be observed in the Swiss case (this will be expanded on in the next section). This underlines the finding of Kassim and Le Galès that “[a]s institutions instruments confront actors with structures of opportunity, influencing how they behave and privileging certain actors and interests over others” (2010, p. 4). The data conveys the impression that the instruments create a new arena for various actors to position themselves in. This has been facilitated by certain ideas and norms that are linked to the instrument and reinforce this institutionalisation, as will be shown in the next section.

Table 43 Comparing the Instrumentation

	DWIH	Swissnex
Aggregation Effect	<ul style="list-style-type: none"> * Strong stakeholder involvement and severe struggles among key players in the genesis that ultimately led to the creation of the DWIH * Inertia & longevity of the instrument despite a critical audit 	<ul style="list-style-type: none"> * Inertia & longevity of the instrument despite a critical audit
Representation Effect	<ul style="list-style-type: none"> * Stable (political) framing of DWIH as facilitating foreign policy goals 	<ul style="list-style-type: none"> * Framed as a reliable instrument that promotes international cooperation and is known for its focus on innovation (within Switzerland and beyond)
Appropriation Effect	<p>Affirmation of new competences</p> <ul style="list-style-type: none"> * Instrument serves as a platform for AA to expand their portfolio * Instrument is strategically used by actors to approach new topics <p>Reformulations</p> <ul style="list-style-type: none"> * Shift of power due to the reorganisation (DAAD in charge of the network) <p>Resistance</p> <ul style="list-style-type: none"> * Development of the instrument is constrained by strong actor preferences 	<ul style="list-style-type: none"> * Used as a platform for reformulations (and layering) by political actors

Source: created by the author.

12.2. Actor Structures and Key Stakeholder Rationales

To complement the comparative development of the two instruments, it has been argued in scholarly literature that their use should be analysed, as this will shed light on their institutionalisation as instruments of science diplomacy: in other words, their instrumentation. The case studies have already unpacked the differing rationales for stakeholders participating in their respective SICs, while the analysis of institutionalisation processes has also disclosed how stakeholders look at the instrument and position themselves accordingly. Keeping these findings in mind, this section comparatively discusses and analyses the appropriation of the instrument in line with the conceptual premises of meta-organisation theory, which are deployed selectively (see 4.3). This facilitates the development of a distinctively actor-centred perspective on the rationales of actors for participating in SICs, and hence in science diplomacy. To that end, the different actor structures are discussed briefly, before we turn to the political and stakeholder rationales. The analytical comparison reveals instrumentation effects that underpin the development and institutionalisation of SICs, as has been presented previously. The appropriation of the instruments by key actors is identified as being an additional explanatory element for their development and current shape.

12.2.1. Patterns of Difference: Actor Structures and Involvement

A notable difference that has been identified previously is the varying degree of actor involvement and its impact on the development of SICs. While the German case reflects strong actor-driven governance, the Swiss case mirrors a lean actor structure and that Swissnex operates on a contractual basis with key actors. The data reveals that throughout the institutionalisation of the DWIH, key actors from the science and innovation system and business representatives were intensively engaged in and actively shaped the process. Their role has further been consolidated in the DWIH's nested governance structures over time. The strong actor-driven governance has been explained by system characteristics i.e., strong autonomous institutional actors in the German system. This degree of involvement differs strongly from the Swiss case, which in principle also has a differentiated actor structure in its science and research system²³⁷. However, their engagement in the governance and steering of Swissnex differs significantly. To give an example, stakeholders that are formally involved in the DWIH (for instance the German Council of Science and Humanities, *Wissenschaftsrat (WR)*) are not involved in the governance of Swissnex (*Schweizer Wissenschaftsrat*). This seems to reflect the governance understanding of higher education and science, as well as politics in general (Pasternack et al., 2016). The Swiss model operates in a way that is largely disconnected from these national actor structures, which is also visible in the way that each node is run. While Swissnex has an independent CEO and a supportive team to run each location, the DWIH struggled to agree on a model of leadership; the discussion ranged between opting for a similar structure to Swissnex and installing a model with one key institution being in charge (which is the current model). This trade-off can be explained by the forms of institutional logic that are more strongly present in the German case than the Swiss case. Swissnex instead is viewed as a *shell* that operates on behalf of its clients and for Switzerland as a whole.

237 There are comparable actor structures in both countries, such as research funding organisations (SNF & DFG), rectors' conferences (HRK & swissuniversities), advisory bodies such as the *Wissenschaftsrat* and organisations that facilitate cultural exchange (*Goethe Institutes* and *Pro Helvetia*).

12.2.2. Political Rationales

The analysis of the political objectives which are tied to both SICs reveals a large degree of coherence. This finding is not surprising since policy transfer was observed. In both cases, the specific instrument is seen as a tool for branding and positioning that draws on science and technology as vehicles. In addition, the DWIH responded to economic considerations and was broadly able to be placed in the dynamics of cooperation and competition, while Swissnex responded to similar goals with a stronger focus on innovation and knowledge transfer (Swissnex's spike). While the core objectives have remained relatively stable over time, such as the SICs' role in foreign policy, the analysis showed that the instruments' experienced layering of more nuanced objectives. In other words, some aspects were more relevant in some years than they were in others. This makes it possible to conclude that the instruments serve as a platform for various political goals in the wider field of promoting science, research and technology.

12.2.3. Patterns of Sense-Making: Rationales for Participation

The conceptual premises rely on the assumption that instruments, once they are in place, are subject to interpretation and use by their main actors, and this hence shapes institutionalisation dynamics (Le Galès, 2011, p. 11). In addition, it can be argued that the use of the instrument might differ from what has politically been anticipated and thus constitutes a focal area that reinforces (or even prevents) the institutionalisation of an instrument. The case study findings (chapter 8 and chapter 11) confirm these assumptions and identified distinct narratives and interpretations of the instruments, which will be discussed comparatively here (see a shortened version that focuses on the aggregated dimensions Table 44).

A key finding of the comparison is a strong alignment of rationales for participating in SICs in both case studies. This might, at first glance, be surprising given the SICs' different framework conditions, such as the degree of stakeholder involvement and their set-up (actor-led governance vs. lean governance). Another difference relates to funding: while the DWIH provide limited funding to their supporters to incentivise certain activities to be conducted abroad (under the DWIH umbrella), Swissnex is organised in a contrasting model that depends on its clients to co-finance

it. Nevertheless, the two models are ultimately designed for comparable stakeholder groups: mainly key actors in the national research and science landscape. These stakeholders operate nationally and internationally and are subject to similar environment pressures, such as navigating between the poles of competition and cooperation (J. J. W. Powell, 2018, 2020; Ruffini, 2020a)²³⁸. The data accordingly finds that actors predominantly use the SICs strategically: stakeholders mainly use the instruments in line with their own agendas.

However, the data also reveals that both instruments create a distinct frame of reference (towards aspects of collectivity), while actors also use the instrument in a way that was politically anticipated, such as competence enhancement. This suggests instrumentation effects that developed independently from initial political objectives. In both cases, the empirical findings reveal three overarching dimensions which structure the use of the SICs: 1) maximising (and reinforcing) the actors' own impact, 2) considerations linked to a sense of collectivity and 3) systemic explanations. Furthermore, both cases revealed distinct limits to the participation in SICs. The next section compares their use analytically.

238 Scholarly literature explains this with isomorphic pressures and the fact that these actors (despite being in a different national context) might be part of a nested organisational field (cf. Hüther and Krücken (2016)). In addition, in terms of stakeholders such as higher education institutions, scholarly literature considers them to be strategic actors that, despite different contexts, behave similarly (Krücken and Meier (2006); Dusdal, Zapp, Marques, and Powell (2021)) and states that a strategic positioning takes place (Fumasoli, Barbato, and Turri (2020)).

Table 44 Comparison: Rationales for Participation

	DWIH	Swissnex
Maximise (and Reinforce) Own Impact	(1) Increasing international visibility (2) Access to resources (3) Opportunity for strategic (re-) positioning (4) Thematic fit and synergies to own work (5) Precautionary reasons	(1) Access to resources (2) Thematic fit and synergies to own work (3) Precautionary reasons
Sense of Collectivity	(1) Support for the general idea (2) Maximise the impact of the wider (science) landscape (3) Responsibility	(1) Support for the general idea
Systemic Aspects	(1) Institutional expectations (2) Nested organisational embeddedness (membership in Alliance)	(1) (Institutional) Expectation to participate
Limits to Participation	(1) Concerns about visibility (2) Cost-benefit considerations (3) Different priorities	(1) Strategic considerations (2) Cost-benefit considerations (3) Different priorities

Source: created by the author.

12.2.4. Strategic Considerations

A distinct commonality which has been revealed in both case studies is the use of the instruments by stakeholders to maximise their own impact. Stakeholders use SICs according to their strategic agendas, which suggests that rational considerations are key to explaining participation (assuming rational actors). This overarching dimension emerged as being highly relevant in both cases and is consistent with a key assumption of meta-organisation theory whereby participation in wider structures may be seen as being motivated by a desire to change patterns of interactions with their environment (for a detailed overview, see Table 45). Furthermore, this is underpinned by a look at the second order themes that emerged from the analysis. The SICs are, in both cases, used as a vehicle for and a multiplier of the stakeholders' own needs. This, for instance, relates to getting access to resources which would otherwise be more difficult to access. Both SICs seem to be used as door-openers in certain situations. Furthermore, the data shows that participation is subject to a thematic fit and must align with actors' priorities and create synergies (meta-organisation theory refers to this as the protection of one's own interests and cost-benefit balances). This reflects the stakeholders' key priorities for using SICs in line with their own logic and requirements. This finding across both cases is not

surprising since stakeholders are more likely to participate in and use SICs if there is a perceived value attached to the instrument. In other words: *“belief-systems and institutions are interdependent: individuals will believe policies are effective only when the structure of the governance institution is congruent with that person’s policy-core beliefs”* (Lubell, 2003, p. 309).

Another example of strategic considerations relates to pre-cautionary reasons, which were revealed in both cases. To elaborate this, stakeholders explained their participation in SICs as being in a position that allows them to exert influence and to stay informed, while also being able to prevent undesired developments (cf. Ahrne & Brunsson, 2005). While this use does not primarily reflect a thematic concern, it links to a strategic source of being able to impact and control their environment (in relation to other stakeholders and ministerial authorities). Comparing the two cases, this issue was more prominently mentioned in the German case. This is not surprising and can be explained by differences in how stakeholders use the instrument (representational vs. contractual relations). It is noteworthy that the German case also reflects a more nuanced set of second-order themes. Aspects such as promoting actors’ own visibility abroad, which were key to the German case, could not be extracted from the Swiss case that explicitly. This finding is surprising since one would assume that this aspect would also be relevant for Swiss stakeholders as they also participate in a competitive (science and innovation) environment. An explanation for this might be the politics of understatement which are part of the Swiss habitus, rather than the fact this is not a concern for them²³⁹.

Despite a large overlap in the use of the instrument, the German case is slightly more refined in terms of second order themes than the Swiss case. This might be explained by how the instruments are connected to their key stakeholders: a customer relationship that takes place on an ad hoc basis compared to a representational model where the instrument is a strategic resource and stakeholders need to maintain a watching brief to secure their position. This links to another difference in the use of the instruments: as tools for institutional repositioning. In the German case, the instrument is seen as a vehicle through which to expand competences and approach topics that typically lie outside the actors’ core domain. This finding suggests that the instrument has a potentially lasting impact on actors and their way of operating if strategically relevant topics can be approached. This again underpins the strategic behaviour that is encountered by stakeholders. In

239 However, a certain sampling bias can also not be excluded.

other words, the instrument is deliberately used in such a way that it tackles the “*balance of power*” (Kassim & Le Galès, 2010, p. 5), which, as a consequence, might impact the overall architecture of the system. This finding is remarkable and underlines the theoretical premises that guide this study: it shows how and that the instruments are used by key stakeholders in a transformative way that exceeds initial political objectives. The DWIH are clearly used as a platform for stakeholders’ own goals. Furthermore, this use follows its own logic relative to the interpretation of its users and in fact differs to what policy-makers had anticipated (Le Galès, 2011, pp. 151–152). This finding reasserts that the DWIH (and instruments more generally) create their own context and serve as a platform for interpretation and strategic action.

To conclude on this aspect, the findings show that the instrument is primarily used by stakeholders for strategic considerations that are ultimately aimed at improving and maintaining their position or at least ensuring that the instrument does not threaten them (protection of vested interests). Furthermore, the analysis shows that SICs developed as a platform for uses that had not been politically anticipated, such as a competence development, in other words, a source of repositioning due to the DWIH. The findings therefore underpin the fact that in both cases, the institutionalisation of the instruments is (anchored and) reinforced by an actor structure, which is driven by strategic considerations and finds its own channels for using the instrument. Overall, this strategic dimension of the use of the instruments reaffirms and explains their (structural) development, as portrayed in previous sections.

12.2.5. Sense of Collectivity

Aspects of collectivity are an intertwined yet distinctly separate set of considerations that conceptualise the use of the instrument. Across both cases, it has been revealed that the instruments constitute a source of collective action, which reaffirms the considerations that drive meta-organisation theory (Ahrne & Brunsson, 2005). The use of the instrument seems to trigger a distinct form of sense-making that creates a new context among the actors, nationally as well as internationally. To give an example, the data for the German case reveals that new forms of cooperation between national actors were launched within the framework of the DWIH. This can be seen as a redefinition or reinvention of spaces that takes place and that links

national actors in a stronger way in the light of a common goal. The data furthermore illustrates general support for the instruments that transcends individual rationales (see Table 44). More specifically, stakeholders in both case studies underline their support for the instruments because of their vision and underlying idea: promoting the national science and innovation ecosystem and showcasing the respective countries (as well as more implicit objectives that relate to science diplomacy). What is more, stakeholders fear a loss of visibility to the wider landscape if the SICs were to be suspended. This finding is remarkable given that actors had also indicated that there is no direct need for the instrument for them to conduct their own activities. Accordingly, this seems to underpin and justify the finding that the instrument is not just a technical device; instead, it conveys certain ideas that are also supported by actors, and it ultimately creates its own sense-making (which accounts for the instruments' institutionalisation).

The rationales are again more nuanced in the German case and reveal responsibility for and solidarity with those (weaker) actors that have fewer resources. This has been shown by my drawing on the example of institutional premises abroad. The use and support of the DWIH is justified by collective solidarity and is an added value for the entire ecosystem (actors in fact considered themselves to be part of the wider system). This finding underlines the assumption of meta-organisation theory that these forms of collective action are more relevant for weaker organisations since they have more difficulties organising themselves (Ahrne & Brunsson, 2005, p. 435). However, this collectivity arguably also reinforces actors' own positions (abroad) due to their larger clout (i.e., the opportunity to exert external influence by means of collective action) and this hence reflects a certain symbolic dimension. This indicates that the instrument creates its own context, framework and ideas and that these are more encompassing than strategic considerations alone. In other words, the instruments create certain configurations of (national) actors and possibly interactions that would presumably not have occurred in the absence of the instrument. In addition, this solidarity (sense of collectivity among the actors) was not an explicit objective but instead it developed naturally. This reflects how the instrument is interpreted by key actors that produce their own narratives, thus creating a sense of collectivity (nationally).

In a similar vein, the data shows that, in both cases, stakeholders set aside their core interests, to some degree, in favour of this collective purpose (this confirms considerations which were formulated by scholarly literature, cf. Ahrne & Brunsson, 2005). The data shows, particularly in the

German case, that actors conduct activities that are not their core business for the sake of supporting the DWIH. The same finding was observed in the Swiss case, where mandates are given to Swissnex as a sign of support, rather than being a pressing area for action. To sum up, this underlines that the instrument is supported, not primarily because of the activities that are conducted, but instead because of a) of the idea that is conveyed and b) the perceived value that the instrument might yield for the wider ecosystem due to collective action (though in turn, this is also beneficial for the actors).

12.2.6. Systemic Aspects of Participation

The data furthermore highlights systemic reasons which explain the use of the instruments, more specifically normative considerations, which are explained by the national environment. Across both cases the data points to an expectation of participation²⁴⁰, which is a form of behavioural compliance, even though 'breaches' cannot be sanctioned. Both cases point to this (implicit) expectation of participation in the instruments, while the frame of reference differs. In the German case, this expectation is formulated in light of other ministerial actors and is explained by a nested governance structure. In turn, non-participation would lead to questions (this links to the logic of appropriateness and institutional expectations, according to meta-organisation theory). Apart from these expectations, most key actors are also part of the Alliance of Science Organisations (presumably some form of meta-organisation), which collectively took the decision to participate in the DWIH during their establishment phase. Although it is similarly mentioned that key actors cannot be forced to participate, despite their membership in the Alliance, this collective decision constitutes its own frame of reference and in turn leads to a certain degree of compliance. These considerations are reflective of the nested governance structure in the fragmented German system (see section 5.2.4.1 and section 6.2).

In addition, the Swiss case refers to institutional expectations as being at stake. These also link to institutional constellations and the logic of appropriateness and even disapproval in the case of non-participation. Although,

240 Please see the work by W. R. Scott (2001), who identifies three dimensions of institutions, among which is a normative one. This concept is deployed by Marques (2018) to enrich the notions of the sociological understanding of policy instruments.

in principle, participation in the DWIH is voluntary, as is also assumed by meta-organisation theory for these forms of collective action, the data reflects that the instrument must be contextualised: national characteristics, such as the nested governance structure and organisational constellations present a certain path-dependency (see section 4.1.3) so that non-participation is, in fact, not opportune. This is because this embeddedness in the respective environments reveals certain norms and entails expectations of compliance. These findings underpin the assumptions which have been borrowed from meta-organisation theory: reasons which explain participation refer to the logic of appropriateness being intertwined with an expectation of participation (Ahrne & Brunsson, 2005, p. 435).

12.2.7. Limits to Participation

Lastly, the analysis makes it possible to reveal factors which limit participation in SICs. In line with meta-organisation theory, a key challenge to participation is a case of too much similarity between the meta-organisations and their members (here SICs and their stakeholders) since this raises the question of boundaries (Ahrne & Brunsson, 2005). The case study data found evidence of this concern. In the German case, stakeholders deliberately refrained from using the DWIH (and thus from promoting collective action) to secure their own visibility first. This finding is not surprising since German actors were keen on maintaining their visibility from the start, as the development showed. In fact, this finding reaffirms the constraints that the DWIH encountered throughout their institutionalisation (and which explain their set-up). In a similar vein, the findings of the Swiss case point to strategic considerations that limit participation. Swiss actors stressed the importance of being more strongly visible in cases of joint cooperation with Swissnex: their logo needed to be bigger than the Swissnex logo.

Another limiting issue that was mentioned in the Swiss case is that of keeping strategically relevant topics and resources close, rather than delegating them. This was decided so that the actors remained in control. In this context, the aspect of resource availability emerges as being crucial. Both cases show that stakeholders that have sufficient resources at their disposal are less dependent on the SICs to maximise their impact, which confirms the assumption of meta-organisation that SICs “*become organizations for the weak rather than the strong*” (Ahrne & Brunsson, 2005, p. 435).

Participation might be better explained instead by one of the other themes (such as collectivity, expectation or even precautionary reasons).

This shows that the transfer of activities towards collective action has limits that are decided upon by stakeholders' strategic behaviour. Constraints to collective action in the SICs are hence linked to cost-benefit considerations (Ahrne & Brunsson, 2005). Since in the Swiss case, cooperation entails a financial contribution by participating actors, there must be clearly articulated and perceived benefits to their use. A last point that was mentioned as limiting participation relates to different priorities. Both cases refer to situations where organisational interests take precedence and stakeholders do not use SICs because the area/topic is not relevant for the actors. To sum up, this section revealed constraints on the use of the instruments. The findings reaffirm that stakeholders have strong vested interests and operate to preserve them.

12.2.8. Sub-Conclusion: Comparing Rationales for Participation

The previous sections analysed the sense-making of key stakeholders in relation to the use of the two SICs comparatively. This was a crucial analytical step, which sheds light on the instrumentation and ultimately the institutionalisation of the instruments. The findings reflect a large overlap and consistency in the use of SICs across the two case studies. Despite differences in their *modus operandi*, core missions and goals, and their governance structures, their (non-) use by stakeholders reflects a high degree of coherence: key actors act predominantly strategically. This is not surprising since the two SICs are designed for similar stakeholder groups, namely key actors in the research, science and innovation landscape. These stakeholders are embedded in a national environment which is subject to common pressures that are located between the poles of competition and cooperation (J. J. W. Powell, 2018, 2020; Ruffini, 2020a). Accordingly, similar responses and similar behaviour towards these pressures are not uncommon. In addition, the data pointed to a policy transfer between Germany and Switzerland to tackle similar challenges.

Key assumptions, which were extracted from meta-organisation theory, helped to illuminate and explain the findings, such as voluntary participation in this collective action, struggles among members over the organisational set-up and the relevance of these kinds of instruments depending

on the actors' access to resources. The analysis furthermore shows that interpreting the findings from a meta-organisation perspective is useful in explaining stakeholder participation. The theoretical assumptions hold explanatory power as to why stakeholders create, join and participate in SICs (even though the question of whether SICs are themselves meta-organisations has been left aside). This coherence is also reflected in the subsequent overview, which aligns the case study findings with the theory (see Table 45)²⁴¹, while also certain assumptions could not be confirmed in these two cases and will be discussed briefly.

Firstly, increased cooperation among SICs' stakeholders was not identified as a key political goal but instead was referred to in the data as a by-product. This can be explained by the nature of SICs' activities. SICs largely operate internationally and aim to impact their environment in such a way as to change interactions with international partners by means of collective action. Intensified national cooperation among the SIC stakeholders might, however, facilitate this. Secondly, gaining social status and prestige were not identified as relevant to explaining the use of SICs. However, this was explained by sampling aspects and a certain bias due to the inclusion of actors involved in the governance of the SICs; these are hence presumably stronger actors. The data in fact shows that stakeholder participation is, to a large degree, independent of the SICs' reputation, since their own brand and reputation is more significant than that of the DWIH or Swissnex (cf. interviews DWIH1, GIS5, SIW2). This might potentially change in the future; it is often assumed that the DWIH are already greater than the sum of their individual parts and hence may (increasingly) carry this prestige. However, this must be contextualised and it holds true for those regions where the actor is already operating. The situation might be different when actors are confronted with unknown territory and, in fact, might draw on the SIC brand to facilitate their own activities, as in the case of Swissnex, and serve as a door-opener in some cases. For less well-equipped actors, the advantages of visibility, prestige and social benefits might in fact be higher, and it should be noted that SICs are ultimately also designed for these cases.

241 That data was analysed in an inductive way to remain close to the original interview data. Therefore, compared to the theory, slightly different yet data-inspired categories were developed, which overall reflect a degree of coherence with the theory (see Table 45).

Table 45 Alignment of Findings to Meta-Organisation Considerations

Reasons to Join a Meta-Organisation		DWIH	Swissnex
Inducements	(1) Support for the organisation's purpose	General support for the idea	General support for the idea
	(2) Cooperation opportunities between members	--- (not a key concern)	---
	(3) Change interactions with the environment	Maximise (and reinforce) own impact internationally	Maximise (and reinforce) own impact internationally
	(4) Exert external influence (through collective action)	* Maximise the impact of the whole (science) landscape * General support of the idea	General support for the idea
	(5) Protect own interests	* Push visibility abroad * Access to resources * Opportunities for strategic (re)positioning	* Access to resources * Strategic considerations (limiting)
	(6) Benefit from social status and prestige	---	---
Expected Contribution	(1) Cost-opportunity balance	* Thematic fit & synergies to own work * Concerns about visibility * Cost-benefit considerations	* Thematic fit & synergies to own work * Cost-benefit considerations
	Precautionary Reasons	(1) Participate to not be left out (2) Prevent undesired developments	Precautionary reasons Precautionary reasons
Identity	(1) Logic of appropriateness	* Institutional expectations * Membership	---
	(2) Expectation to participate from environment	---	* Institutional expectation to participate
	(3) Participation equals an entry criterion	---	---
Availability of alternatives		---	---

Source: created by the author.

Thirdly, in a similar vein, SICs have not yet become institutionalised to the extent that they have become an entry criterion or that they serve as accreditation for participating in certain markets (while admittedly, their structures are advantageous for market entry). This might change in the future and is subject to increased institutionalisation of the SIC brand abroad. Both instruments might develop into meta-brands that serve to accredit actors' work and increase credibility, in a similar way to diplomatic representation, for instance. Stakeholders might benefit from the symbolic power of the instruments, although this also raises questions of desirability, which links to visibility, in particular individual versus collective visibility. Finally, the availability of alternatives did not seem to be a consideration among the actors sampled. All the actors stressed that they are capable of

operating on their own—even in the absence of SICs (this is subject to further validation among other actor groups). The data also stresses the aspect of responsibility, which is not mentioned in the theory on meta-organisations. Stakeholders also participate in SICs to give more visibility to other actors that do not have similar resources in place. While this could be considered general support for the SICs' purpose, it constituted a relevant consideration in the German case and even reflects how the instrument is appropriated. To sum up, the considerations of meta-organisation theory, more specifically its assumptions on organisational behaviour, provide a valuable lens for understanding participation in SICs, with some limits.

12.3. Conclusion

This chapter analysed the two case studies (*service-oriented SIC* and *representational SIC*) comparatively. This was done by me first analysing the development of the instruments comparatively and, secondly, by me defining their instrumentation by key actors. The heuristic framework of the sociological understanding of policy instruments as institutions was deployed, as were considerations from meta-organisation theory (leaving the question aside of whether SICs are themselves meta-organisations). While the development initially differed between the two cases, the subsequent evaluation depicts strong coherence between them and the instrumentation by key actors also shows an alignment. If we aggregate these findings even further, it can be argued that a handful of factors were singled out as being relevant for the SICs to develop, whereas the exact expressions in the national contexts differ and provide a contextualised and nuanced understanding. The following conclusions can be drawn from the comparative analysis in this chapter.

Firstly, the analysis of the two SIC models reveals that they embody and reflect national governance arrangements and inherent system beliefs. Their development and institutionalisation can be understood as being strongly shaped by aspects of timing and contingent events (throughout their development), national characteristics (i.e., their environment) that ultimately determine governance structures, and design principles which have largely remained inert over time. Their development is further explained by critical junctures that had an impact on their workings.

Secondly, the development of the two SICs further depicted instrumentation effects which consolidated the two instruments and which account for

their institutionalisation. The data shows evidence of aggregation effects, representation effects and appropriation effects, which in combination, reinforce a process of institutionalisation and account for the longevity of the instrument.

Thirdly, appropriation effects in particular reveal that the two instruments have created their own contexts, which differ from the apparent objectives that are tied to the SICs. Aspects such as being a platform for their own strategic behaviour or competence advancement (hence reaffirming certain power-relations) have been revealed among key actors (also political actors). This platform creates a new legitimacy for the instrument to be in place and again fuels a process of institutionalisation. In a similar vein, the instrument created a new sense of collectivity (nationally and internationally) and a distinct configuration of stakeholders that led to new and different interactions, which points to a distinct instrumentation effect.

To sum up, in line with the empirical findings which have been presented in this study, it is argued that the development and institutionalisation of the service-oriented SIC and the representational SIC are subject to design principles that were adopted early on and are to a large degree explained by national system characteristics. In addition, both models encountered critical junctures that led to reorganisation of the instruments. Furthermore, contingent events and timing also played a role. Finally, the analysis of both models reveals that appropriation of the instruments by key stakeholders is a significant explanatory factor. Key stakeholders in the science and innovation landscape predominantly use the instrument strategically. However, they also create their own contexts and sense-making, and thus fuel institutionalisation dynamics and explain the SICs' inertia, against outside pressures (Lascoumes & Le Galès, 2007), over time. What is more, ministerial actors use the instruments as a platform for conveying changing (political) objectives. The next section draws conclusions about the research which was conducted and applies these key findings to the scholarship on science diplomacy in order to conceptually advance and reflect on this notion.

13. Conclusion and Reflection

This chapter presents the overall conclusions on this research project. This thesis aimed to explain and understand the development and the institutionalisation of Science and Innovation Centres (SICs) as distinct tools of science diplomacy. A need was identified in scholarly literature due to the increasing momentum of science diplomacy as a governmental strategy and the weak empirical basis, which is reinforced by a discourse that is driven by normative perspectives. Accordingly, insights into (the governance of) science diplomacy are largely lacking. This study took account of these shortcomings and was positioned in such a way that it follows a distinct analytical and empirical path. Rather than approaching the notion of science diplomacy in general terms, the study adopts an (inductive) instrument-centred perspective, which makes it possible to translate specific findings to the wider discourse. The instrument that was selected are SICs. They are a unique and underexplored institutional response in the governmental toolbox, which is, however, increasingly being adopted by highly innovative countries. More specifically, an in-depth comparison of two SICs, the German DWIH and the Swiss Swissnex, was conducted in a long-term and nuanced way, which is unprecedented in present scholarship (see chapters 7 and 10) and contributes to scholarly literature on institutionalisation processes of (organisational) instruments.

The key question of this study was answered by deploying a two-step heuristic framework based on the theoretical considerations of Lascoumes & Le Galès (2007). This framework structured the empirical analysis since it specified the analytical path and attempted to trace the trajectory of the instruments, i.e., their careers over time in their national contexts. Specific aspects which deserved attention were the contextual factors, the actors involved, the discourse which accompanied the instruments' design and launch as well as critical junctures in the instruments' subsequent development (Lascoumes & Le Galès, 2007). Secondly, the framework seeks to focus on the use and interpretation of the instrument by key actors to generate an insight which accounts for their development (and institutionalisation). It is argued that the use of the instrument by key actors might create distinct (instrumentation) effects, which push institutionalisation dynamics. To provide a guide as to how and why actors might use the

13. Conclusion and Reflection

instrument, the theoretical considerations of meta-organisation were selectively deployed (Ahrne & Brunsson, 2005, 2008), leaving the question aside of whether SICs are themselves meta-organisations. More specifically, these considerations conceptualise why actors agree to participate in collective action in the first place (it can be argued that a key goal of SICs is to promote a certain degree of collective action). This furthermore made it possible to develop a distinctly actor-centred perspective on science diplomacy.

This instrument-centred approach has been identified as a meaningful strategy to empirically contribute to the normatively coloured discourse of science diplomacy and to illuminate its governance. This study generated distinct insights into the longitudinal development of SICs and positioned them in their national contexts. To that end, it drew on qualitative data (interviews and documents) to answer the main research question and built a rich and comprehensive data set, which informed the analysis. This work generated original insights through the comparative analysis of Germany's DWIH and Switzerland's Swissnex.

In the following, the key findings of this thesis are put forward (section 13.1) and positioned with respect to the academic literature which informed my research (section 13.2). More specifically, the findings are translated to the science diplomacy discourse (section 13.3), while conceptual advancements to scholarly literature are proposed. This work is furthermore critically evaluated in terms of its limitations (section 13.4) before distinct avenues for further research are presented, (section 13.5) which help to advance the body of knowledge that surrounds a) science diplomacy and b) SICs.

13.1. Key Findings

The key findings can be best arranged by discussing them in light of the four sub-questions which were formulated (see sections 1.1 and 5.1). The first three sub-questions are discussed in the following sections. Sub-question four is answered in the next section (section 13.3) since it focuses on the conceptual implications of these specific findings for the general scholarship of science diplomacy.

13.1.1. Characterisation of SICs (Sub-Question 1)²⁴²

This study provided a characterisation of SICs, which so far had constituted a gap in scholarly literature (chapter 3). Based on a comparative exercise, this study finds evidence of a (growing) isomorphic trend among highly innovative countries to establish SICs. A SIC has been defined as a *distinct unit or satellite institute which has been established in another country by a government and which operates at the nexus of higher education, research, innovation and diplomacy* (Epping, 2020). SICs have further been characterised as *operating within a network structure* (ibid.). The findings show that the exact national representations of SICs differ, but they reflect coherence in being a governmental response which aims to improve a country's international position in a competitive science and technology environment. What is more, SICs are designed in a way that facilitates their national branding and helps to secure their access to distinct resources. More specifically, this study showed that SICs are situated in the larger dynamics of cooperation and competition. They were established in locations which can be considered centres of excellence, key technology hubs or emerging markets (although this varies for each national SIC).

This thesis evaluated SICs according to distinct key characteristics, which ultimately led to the development of a typology. This typology distinguished between three different types of SICs, *the representational model*, which has an irreducible bureaucratic core and a way of operating that is largely determined by key stakeholders, b) *the service-oriented model*, which offers services and caters to the needs of stakeholders on an ad hoc contractual basis, while also responding to market developments to provide the latest insights, and c) *the policy-led model*, which is closely tied to political goals and primarily responds to these (political) needs. Policy-led models are an integral part of a country's diplomatic representative body and presumably operate within this (bureaucratic) framework. Each of these types has been characterised in an ideal-typical way to underline its distinctness. This typology structures the SIC landscape in terms of its organisational set-up and method of operation, and serves as an entry point to further research in the sense of validating these three SIC types. It further marks a conceptual advancement and a distinct contribution to understanding the rise of SICs. In this study, the representational model (DWIH) and the service-oriented model (Swissnex) were selected for clos-

242 Sub-question 1: What are SICs and how can they be characterised?

er analysis. Studying a representational model and a service-oriented model enabled a high level of innovation in the findings due to the network-based structures of these SIC types and their stronger detachment from political goals in comparison to the policy-led model. What is more, both SICs have established distinct organisational units, which largely operate outside the diplomatic umbrella (thus, they are less hierarchically organised) and are hybrid concepts in terms of their actors, themes and set-up. Therefore, studying these two cases revealed a higher degree of institutional innovation, which ultimately generated novel insights into the governance of science diplomacy and enabled unique patterns of interactions and distinct actor constellations to be identified. What is more, given their network character, the opportunities for appropriation by key actors were seen to be higher, which enabled us to develop a distinctly actor-centred perspective on science diplomacy (see section 5.2.4).

13.1.2. Longitudinal Analysis of Two SICs (Sub- Question 2)²⁴³

Both SIC instruments, Swissnex and the DIWH, were analysed in a nuanced and longitudinal way to reconstruct their development, i.e., “*their careers*” (Lascoumes & Le Galès, 2007) over time and in their national contexts. This approach constitutes an advancement to SIC scholarship and contributes to the body of knowledge on the institutionalisation dynamics of organisational instruments. Particular attention was paid to the instruments’ establishment phase and their subsequent development (chapters 7 and 10). This thesis showed in a nuanced way how these two SIC instruments were established over time and identified potential effects which may have reinforced institutionalisation dynamics. The following aspects were singled out as being explanatory for the development of SICs and ultimately as explaining the current model (for a more detailed analysis, see chapter 12):

- (1) This thesis found evidence that SICs developed in light of distinct pressures and given favourable conditions.
- (2) The analysis of the two SIC models reveals that both models are inextricably connected to their national environments and are impacted by system characteristics. In other words, they embody and reflect wider

243 Sub-question 2: Why did SICs emerge and how have they developed since their genesis? How can the current model be explained?

national governance arrangements and inherent system beliefs in such a way that they explain SICs' design principles and the way that SICs were set-up.

- (3) Their development and institutionalisation can be understood as being strongly shaped by contingent events.
- (4) Their shape is, to a large extent, explained by their national environment and the distinct design principles which immediately derive from this (such as the degree of actor involvement in the governance of SICs or funding principles) and remained stable over time.
- (5) The SICs' development is further explained by critical junctures which had an impact on their functioning and led to reorganisation of the instruments.
- (6) The development of the two SICs over time must be understood according to distinct actor constellations which gave rise to instrumentation effects. These instrumentation effects had a consolidating effect and seemed to reinforce institutionalisation dynamics. The data reflects aggregation effects, representation effects and appropriation effects, which, in combination, reinforce a process of institutionalisation and seem to explain the longevity of the instruments, despite critical junctures such as audit exercises.
- (7) The analysis revealed appropriation by key actors in such a way that the two instruments have created their own context which differs from the apparent (political) objectives that were tied to the SICs.

13.1.3. Actor-Centred Perspective: Stakeholder Rationales (Sub-Question 3)²⁴⁴

The analysis of the trajectory made it possible to reveal key actors in the SICs and their involvement in the instruments (see chapters 8 and 11). The analysis reflects clear differences concerning stakeholder involvement, which was most visible by looking at governance aspects: actor-led governance (DWIH) compared to a lean-actor structure (Swissnex). An explanation for this key difference was found in prevailing national system characteristics, which are deeply rooted in the two systems. These varied degrees of involvement were also seen as explaining how the respective

244 Sub-question 3: Which actor groups are involved in SICs and what explains their participation?

13. Conclusion and Reflection

model developed. Furthermore, the rationales that guide actors to participate in SICs were unearthed and pointed in both cases to rational considerations. Irrespective of their national context, key actors were primarily concerned with using the instrument in such a way that it would maximise their individual impact. This thesis found evidence that the SICs were used as a platform for their own strategic behaviour or competence advancements (this was also seen as reaffirming certain power relations among key stakeholders). What is more, this study has found evidence that SICs are used in a way which exceeds primarily individual considerations by key stakeholders. More specifically, the instrument seems to create a new context and a sense of collectivity (nationally and on-site) among actors. In other words, the findings show that SICs are valued because they facilitate a stronger appearance of the national research and innovation ecosystem abroad and work as a stepping stone for those actors that do not have a presence abroad. What is more, the findings have shown that actors deliberately support the SICs because of these considerations, in addition to the potential impact for other actors in the national system and because of the idea they encapsulate. This reflects a certain sense-making exercise, which led to distinct stakeholder configurations and new interaction patterns: stakeholders collaborated on-site to support the SIC (although they would not do so otherwise). Accordingly, a key finding of this study is the sense of collectivity which developed among key actors in the national research and education ecosystem in the light of SICs. The next sections will discuss the contribution of this thesis and its findings to scholarly literature.

13.2. Contributions to Scholarship

This thesis was set-up as an inductive and exploratory research project to account for the novelty of the phenomenon. As such it did not primarily aim to test theory. This study drew on and was informed by several theoretical considerations, such as institutional theory. In that vein, this work did not provide an original theoretical contribution to a distinct body of scholarship; instead, it aimed to develop conceptual insights to understand SICs as distinct instruments in the governmental toolbox in order to empirically and conceptually anchor science diplomacy. In addition, it can be argued that it also contributed to scholarly literature on the institutionalisation processes of (organisational) instruments. This thesis has hence prepared

the scene for subsequent studies. In the following section, the findings of this study are discussed with regard to the scholarship it is positioned in.

Policy Instruments Literature

This study has been situated as a policy instruments study and used distinct insights into instruments and policy design (Bali et al., 2019; Capano & Lippi, 2017; Howlett & Mukherjee, 2017) in a way that has informed this thesis and provided a framework for understanding SICs as a distinct (governmental) response. This work was able to confirm some of the key propositions of that body of scholarly literature, most prominently that the launch of SICs has been seen as a (governmental) solution with which to tackle (societal) problems (Salamon, 2000). It also confirmed that the instruments' design processes were constrained and influenced by prior choices and situational logic (Howlett, 2014a). While conventional scholarly literature assigns a functional understanding to policy instruments, this thesis applied the theoretical assumptions of the sociological approach to policy instruments. It contributed to this (novel) stream of scholarly literature and responded to calls to apply these considerations in an empirical sense (Lascoumes & Le Galès, 2004, 2007). Thus, key propositions of this framework were confirmed. In contrast to previous studies, this one, however, focused on one aspect of the framework in detail: the use of the instrument by distinct actors. This was done to establish an actor-centred perspective on science diplomacy and develop an understanding of the instrumentation of SICs to ultimately understand institutionalisation. This selective analysis constitutes a novelty to scholarship since it focuses to a lesser degree on the instruments' choices as part of instrumentation. Instead, it shifted its focus to appropriation and the way that the instrument (as an institution) is interpreted and used by actors. Accordingly, this thesis examined a distinct part of that framework in depth and advanced the theoretical framework by Lascoumes and Le Galès (2007) (which is pointed to in other contributions, as well (Ravinet, 2011)). What is more, this thesis contributed to scholarly literature on institutionalisation processes of (organisational) instruments.

Cooperation and Competition

What is more, this thesis contributes to scholarly understanding of governmental responses to navigating between the logic of competition and cooperation, which characterise the research and science and innovation landscape (Edler & Fagerberg, 2017; J. J. W. Powell, 2020). While scholarly

13. Conclusion and Reflection

literature sees distinct approaches to tackling this, such as excellence initiatives (Cremonini et al., 2018) or internationalisation policies (de Wit & Altbach, 2021; Huisman & van der Wende, 2005; van der Wende, 2001), these responses are largely designed in such a way that they work in the national context. In other words, these approaches aim to equip national actors with resources to secure their competitive advantage internationally. This work, in contrast, focuses on the understanding of an instrument which operates beyond this national context and aims to develop an impact abroad, which feeds back into the national system. This can be seen as a shift of focus and an inversion of the ways previous instruments worked. This also identified distinct governance structures, i.e., seeing the foreign ministry in the driver's seat and key stakeholders from the science and innovation landscape. So far, scholarly literature has been divided according to these two perspectives: those instruments which aim to generate an impact within the system (mostly sectoral ministry-funded) and those instruments which aim to create an impact abroad, which feeds back and advances the national system (which reflects the foreign affairs ministry's way of thinking). This study can be seen as bridging these two perspectives.

To add to the previous section, SICs in particular were situated alongside the spectrum of competition vs. cooperation (J. J. W. Powell et al., 2017; J. J. W. Powell, 2020; Ruffini, 2020a). This was observed at a national level and at the level of actors. SICs in both countries were viewed from the start as a response to being internationally competitive since their core goals were to showcase and promote the two countries internationally as top destinations for science, research and innovation. This was deemed relevant considering their scarce natural resources. Moreover, the German case reflected that the AA deliberately analysed how competitors position themselves in light of these pressures and aimed to adopt comparable responses. This overarching objective is reflected in the set-up, core goals and geographical spread of both SICs (such as navigating between emerging economies and key tech hubs). Furthermore, the analysis of actors' use of the SICs in question shows that forms of competitive logic are at stake. Stakeholders used the SICs to secure their position nationally and internationally. On the other side of the coin, the focus on cooperation has been a complementary element. This is most notable when looking at the German case and the placement of SICs in the third pillar of foreign policy, which generally emphasises cooperation. Furthermore, SICs have been viewed in both cases as instruments which make it possible to build bridges and encourage international research cooperation. Accordingly, cooperation is viewed as a central

element which guides SICs. This is also reflected in their design, which aims to promote exchange with the national and international academic communities. Accordingly, this study emphasises and reaffirms that the two logics of competition and cooperation, which characterise the international science and research system, are manifested in SICs too (Ruffini, 2020a).

International (Research) Collaborations

In addition, this study also contributes to an understanding of the conditions under which international collaborations might take place. More specially, light is shed on the question of how international research collaborations might be organisationally facilitated and what logic drives institutional actors to engage in international collaborations (Dusdal & Powell, 2021). Accordingly, the actor-driven rationales for participating in SICs which were identified in this thesis might offer meaningful insights which help us to understand (international) collaborations in the research and innovation ecosystem in general terms. Please note that this study does not shed light on the individual considerations of academics; instead, it pays attention to organisational structures, such as intermediary organisations, research councils and higher education institutions. The next section outlines the specific contributions to scholarship of science diplomacy.

13.3. Reflections on Science Diplomacy (Sub-Question 4)

In response to empirically and conceptually weak science diplomacy scholarship, this thesis provides empirical insights to advance science diplomacy scholarship and moves beyond the normative expectations which often characterise current discussions (Ruffini, 2020b). This study, accordingly, responds to the distinct critique that has been raised previously: the lack of empirical evidence (see section 2.6). In addition, it drew on neighbouring academic fields and concepts to create insights. Thereby, this study aims to overcome the frequent claims of new forms of diplomacy that opt for an “*explanation by naming*” approach (Sending et al., 2011, p. 534). The study’s instrument-centred approach allows for its key findings to be transferred to the wider discourse and illuminate the governance of science diplomacy (actors, rationales and instruments). It further generated a distinctly

13. Conclusion and Reflection

actor-centred perspective²⁴⁵. These findings have the potential to structure the ongoing science diplomacy debate in more rigorously grounded and policy-relevant terms. Whilst some findings are distinctly original, others reaffirm those of previous studies.

13.3.1. A New Focus on Science Diplomacy Instruments

The science diplomacy toolbox is richer than is commonly conceived in scholarly literature and includes SICs.

This study enriches the understanding of the governmental toolbox of science diplomacy. So far, scholarship has largely paid attention to the same kinds of instruments, such as CERN or SESAME (Rüffin & Schreiterer, 2017a; Rungius, 2020). These instruments are viewed as best-case scenarios and ideal-typical cases of science diplomacy. However, this study shifts the focus away from these multinational research organisations and towards national instruments, which are in the academic focus to a lesser degree (an exception is the work by Sabzalieva et al., 2021). More specifically, SICs were selected because of their hybrid nature and since they are increasingly being adopted by innovative countries. What is more, SICs have largely been neglected in scholarly literature (exceptions to this are Berg, 2010; Epping, 2020; Rüffin, 2018). This thesis accordingly makes a distinct and original contribution to the body of literature since it is set up as a longitudinal and bi-national comparative analysis. What is more, the specific instrument-centred approach constitutes a distinct entry point for scholarship, which allows for insights into science diplomacy that are based on empirical observations: SICs serve as magnifiers for understanding science diplomacy in terms of its governance, national embeddedness, etc. Accordingly, the analysis of SICs here overcomes normatively coloured explanatory patterns, which dominate the discourse. What is more, it singles out alternative instruments in the governmental toolbox which are worthwhile studying since they enrich the body of knowledge of instruments that aim to promote science diplomacy.

245 Sub-question 4: How can the study of SICs be used to further understand and advance the concept of science diplomacy?

A typology to classify SICs

The instrument-centred approach of this study facilitates an attempt to systematise and typologise (science diplomacy) instruments, which are increasingly being adopted as instruments in highly innovative countries. Based on a comparative exercise, a three-model typology of SICs has been developed which classifies them. The typology shows that SICs share similarities, yet they are distinct and can only be fully understood in their national contexts. While this typology is certainly subject to verification, it marks an attempt to structure the empirical SIC landscape. So far, there have been few attempts to classify science diplomacy instruments in scholarly literature, although there are distinct tools for doing this (see section 4.1.2). This typology creation can be seen as an advancement to the prevailing scholarship and it underpins the finding that science diplomacy approaches differ between countries (Flink & Schreiterer, 2010): there is no one-size-fits-all definition and approach to science diplomacy.

13.3.2. Science Diplomacy is National

Science diplomacy primarily responds to (changing) national needs

This study shows that science diplomacy is strongly anchored in its national context and can only be fully understood by unravelling the underlying structures of the (institutional) environment, system beliefs and objectives. The shape of SICs, and hence the shape of science diplomacy, is deeply rooted in the national context and mediated, for instance, by organisational capacities, institutional positioning or funding and governance principles. This thesis has shown that behind the smokescreen of normative assumptions about science diplomacy, there are distinct political objectives and goals attached to SICs as instruments which have changed slightly over time (suggesting layering of objectives). From the start, the two SICs in this study were used as instruments to facilitate national objectives such as promoting internationalisation and combatting brain drain (Swissnex), while also serving as a one-stop-shop opportunity abroad (DWIH). In both cases, the instruments are seen to promote international visibility and reflect a deliberate branding exercise. This underlines a symbolic dimension which is tied to SICs in terms of generating an external impact.

Accordingly, SICs are viewed as a distinct tool of public diplomacy (Melissen, 2005) intended to promote a national image abroad. In contrast

to the normative conceptualisations that guide the science diplomacy discourse (see chapter 2), the findings of this study show that the decisions to adopt a particular instrument are driven primarily by national interests (rather than transcending boundaries). This largely corresponds to previous findings (cf. the rationales of science diplomacy as mentioned by Flink and Schreiterer (2010) but also cf. Ruffini, 2020b; Rungius & Flink, 2020). What is more, this underlines the aspect of intentionality of science diplomacy activities (cf. Van Langenhove, 2016). Rather than being a side-product, this study has shown that science diplomacy is intentional and ultimately driven by political ambitions; it is primarily concerned with national interests (rather than tackling common global challenges), although arguably cross-border activities are also relevant (cf. Gluckmann et al., 2017). The German case study, in particular, nevertheless showed tendencies towards more universal values, such as promoting academic freedom. In terms of creating boundaries, science diplomacy can be defined as purposive governmental action, which is manifested in instruments or policies, rather than being a coincidental by-product (though side effects might be observed). Aligning this to the Royal Society and AAAS (2010) definition, this comes closest to being an expression of *diplomacy for science*. A noteworthy finding points to the role of influence (cf. T. C. Wang, 2013). While the normatively driven discourse assumes this to be a key concern in the promotion of international science cooperation, this was observed to a lesser degree in this study, while this might arguably be an implicit goal since SICs are part of the wider policy frame.

Challenging normative claims: science diplomacy and its instruments are context-specific and develop in line with national characteristics

This thesis demonstrates that science diplomacy is strongly embedded in and linked to its national context. More specifically, national system characteristics and interests are seen as providing the framework conditions for science diplomacy to take shape. In fact, they constitute limits to what can be realised and also provide opportunities. While this aspect is neglected in the advocacy literature, this finding is of utmost importance since it adds a realistic perspective to the normative discourse. To underpin this, although the national interest of science diplomacy activities is not a new finding in scholarship (Flink & Schreiterer, 2010; Ruffini, 2020a), the way that this translates into the choices and set-up of instruments constitutes a new finding. This study has found that responses to science diplomacy (such as instruments and policies) are impacted by distinct national charac-

teristics, which may place a limit on what is politically anticipated. This work was able to show that framework conditions, such as the institutional environment or distinct actor constellations, were constraining factors in terms of the instrument's design and capabilities, and even its core themes were subject to negotiation processes. This led to outcomes that were based on a lowest common denominator. Furthermore, the findings show that contingency aspects are at stake and science diplomacy responses might successfully be adopted under certain circumstances (in light of momentum), while at other times, these ideas cannot generate a similar impact (which is most evident from the failed policy transfer of the DWIH). Accordingly, the findings in this thesis add a realistic policy-making (and policy design) focus to the normatively coloured debate on science diplomacy, which traditionally assumes win-win situations and deliberate policy-making. This contradicts the often "*romanticized*" narrative of science diplomacy (Rungius & Flink, 2020) by bringing in a realistic dimension.

13.3.3. Science Diplomacy Actors

Ministerial actors are in charge

This thesis further shows that the national context reveals insights into the actor structures of science diplomacy. Scholarly literature identified governmental actors, such as foreign ministries and ministries of education and research (Flink, 2009), as key stakeholders. This study was able to confirm that these two actors play a crucial role in terms of SICs. Furthermore, it was also able to identify struggles over competence between these two actors, which has also been observed elsewhere (Raev, 2020; Ruffin, 2018). Thereby, it was revealed that the degree of involvement in SICs (and hence science diplomacy) varies in the two cases studied. In the Swiss case, the ministry for education and research (SERI) was identified as being the key ministerial actor, while in the case of Germany, the AA is credited as playing a crucial role. However, both cases pointed to cooperation with other governmental actors. These differences are explained by initial design principles which were institutionalised over time.

Key stakeholders in the science and innovation landscape operate as agents of science diplomacy and can actively shape and influence it

Apart from these key governmental actors, the data reveals a diversified actor structure which is involved in the steering of science diplomacy

13. Conclusion and Reflection

activities. This is in line with the findings of Legrand and Stone (2018), who observe a fragmented science diplomacy actor structure, and more generally with Salamon (2000), who argues for network governance structures of non-state actors. The DWIH, for instance, assign a key role to actors in the national science and innovation landscape in terms of a) shaping the design of the instrument and b) being involved in its governance and steering. To illustrate this, relevant stakeholders were actors in the science and research system (Alliance of Science Organisations) in addition to stakeholders from the business and innovation sectors. What is more, this thesis has shown that key actors may operate as agents of wider (political) objectives, while they also have gate-keeping roles which might limit the instrument. SICs might work according to the lowest common denominator and certain activities are subject to actors' approval. The crucial role of stakeholders, which has been identified in this study, has not been adequately captured in scholarly literature and ultimately constitutes a clear limitation (The Royal Society & AAAS, 2010). SICs place key stakeholders in a position to operate as agents, to deploy the instrument and to generate an impact to carry forward national objectives.

Therefore, this thesis argues for an analysis of the national context to identify those actors who have a governing or steering role and who possess the competences and resources to determine science diplomacy structures, and are hence actors in science diplomacy. This might generate a more refined understanding of science diplomacy actors than is commonly conceived in scholarly literature. In essence, this study argues that those actors who have the discretion and power to determine and influence science diplomacy activities in the sense of governing and steering should be identified as primary actors (and distinguished from those who use the instruments but do not have a governing role; these are presumably secondary actors). On a different note, it is subject to discussion and additional research whether these primary actors would, in fact, consider themselves to be actors in science diplomacy or not.

13.3.4. Science Diplomacy Is Used by (Key) Stakeholders as a Platform to Convey Their Goals

SICs create arenas that actors use according to their own agendas and in line with their own needs. This might lead to goal conflicts.

This study has shown that science diplomacy instruments reflect and are shaped by key stakeholder needs. While SICs are vehicles with which to convey these (political) objectives, the success and impact of this instrument depends on its use by actors in the end. However, these operate according to their own logic and reflect reasoning that is largely driven by individual (strategic) considerations. In other words, this study has shown that despite this new value-loaded science diplomacy instrument, stakeholders seem to continue doing what they would do anyhow, irrespective of whether SICs are seen to be an instrument of science diplomacy. Classical notions that are tied to the science diplomacy discourse, such as bridge building or facilitating mutual understanding (representing the science diplomacy discourse, see chapter 2) were hardly mentioned as explanatory elements for participation and seem to be more of a political concern (with the limits shown in section 8.1). Instead, actors mainly operated according to their own benefit, which reflected their own sense-making of SICs (actors even distanced themselves from responding to political objectives). This finding suggests that certain conflicts over goals might have been encountered (possibly impacting on the instrument's performance). The data thus underlines that the rationales for participation in the instrument rarely adhere to the political (science diplomacy) aspirations which are tied to the instrument (see chapter 2).

13.3.5. Science Diplomacy Creates a Sense of Collectivity (in Research Ecosystems)

Science diplomacy creates distinct effects

The actor-centred perspective which was adopted in this study reveals a distinct use of SICs in the sense of them being transformative and having a structuring role. This study was able to show that SICs, as instruments of science diplomacy, reflect distinct instrumentation by their key actors, which creates a new frame of reference. Most notably, the findings identify a sense of collectivity that emerged among stakeholders who considered

13. Conclusion and Reflection

themselves to be part of this joint (science diplomacy) endeavour. In other words, SICs create distinct actor configurations and collective action that would otherwise presumably not have been encountered. New platforms of exchange and interaction patterns emerged as a result of this instrument. Therefore, this study sees evidence that instruments of science diplomacy, though originally designed to create an impact on the external (international) environment, also have an impact on national actor structures and create (or reinforce) a distinct sense of collectivity among them. One could speculate whether this sense of collectivity among national actors facilitates the SICs in operating abroad and potentially fosters national branding exercises.

This effect has not been politically formulated, yet the findings show science diplomacy has a positive impact on national science and innovation ecosystems in the sense that it creates a sense of collectivity. Yet as far as the international environment is concerned, the data shows that bringing together different actors under the SIC umbrella constructs new international spaces that promote the national research eco-system. In other words, it can be argued that science diplomacy redefines space and relationships by linking actors both nationally and internationally. This attests to the structuring and transformative role of science diplomacy and thereby confirms one of its normative assumptions: science diplomacy has the potential to impact and reinforce relations with international partners. Hence, the findings can also be seen as providing insights into the aspects that explain international collaboration: expectations of collaborating, a sense of solidarity among key actors and collaboration primarily in line with (rational) strategic considerations.

To sum up, the findings of this study make it possible to define science diplomacy as intentional governmental action rather than as a side project. More specifically, science diplomacy relates to cooperation between political actors and science and innovation actors in a common framework and towards a common goal. However, science diplomacy clearly needs to be understood in its distinct national context.

13.4. Reflections and Limitations

Finally, critical reflection is engaged in during this research exercise. This study generated insights into how distinct instruments of science diplomacy emerged and how they gradually became institutionalised and formalised

over time. Four aspects should be reflected on in more detail. Firstly, limitations apply in terms of the data sources which inform this thesis, most specifically interviews. These considerations were already addressed in detail in a previous section (section 5.5) but are noteworthy in a concluding sense. Interviews were selected as one of the two key data sources that inform this study. Given that the German case was poorly documented, interviews were used as compensation to trace the DWIH's development over time and to reveal actors' perspectives. The data processing (and analysis) signalled that a skewed and selective memory among interview partners might have been at stake because the different interview sources revealed ambiguities. For instance, these related to the timing of certain events and the stakeholders that were involved. This was also observed in the Swiss case, where the data was ambiguous at times, and a tendency was observed for various actors to want their part of the pie and get the glory. These ambiguities were clearly identified in the case study presentations, and triangulation was attempted by relying on documents. Overall, however, the impact of these ambiguities was not so severe and did not significantly limit the findings of this study or impact the quality of the data. Moreover, the use of SICs by key actors was extracted by my mainly drawing on their self-reported use. This can be seen as a shortcoming since there might be a discrepancy between the SICs' anticipated use and their actual use by stakeholders (this could, however, not be monitored; to contextualise these findings the annual reports of key actors were inspected with regard to the use of SICs). Furthermore, particularly in the German case, this proved to be a sensitive issue, and a certain degree of reluctance on the side of interview partners was observed. Accordingly, strict measures that ensure anonymity were taken, such as presenting the use of SICs by actors in an aggregated way.

Secondly, the data collection process, more specifically the interviews were impacted by sampling factors. The sample for this study was, for instance, impacted by the non-availability of certain stakeholders or by gatekeeping expressed through the denial of access to certain interview partners, which presumably limited critical perspectives on SICs. As regards the actual sample, key actors were sampled who were involved in the SICs' governance structures. It became clear that these actors seem to be comparatively strong and well-equipped. To balance these findings and generate more nuanced instrumentation of SICs, a more diversified sample would have been necessary (although this was not the research focus). An even more diverse sample in terms of stronger and weaker actors

(resource-wise) would also shed light on the added value of the instrument for weaker actors. This was elaborated in more detail (in section 12.2.8) and propositions were made for specific appropriation aspects which may be encountered by weaker actors, such as SICs being a door-opener, gains in visibility, prestige or social benefits.

Thirdly, the aspect of generalisability should also be discussed. These findings inform the wider science diplomacy discourse and scholarship on SICs. This study can be held accountable for the insights which it generated by analysing two national SICs models, while the findings need to be critically evaluated for the third model which was identified in this study: the policy-led model. Given the different set-up of the policy-led model (see section 3.4.3), findings regarding appropriation by key stakeholders are unlikely to hold true in the same terms for the policy-led model. While policy-led models also involve stakeholder interactions, they differ in terms of their degree and intensity compared to the other two models (see chapter 3). Also, appropriation effects, such as the development of a collective identity (see section 12.2) are not likely to be encountered for the policy-led model. In terms of understanding the institutionalisation of the policy-led model, the present findings might, however, be transferable to the third model, too. Aspects such as national characteristics seem to be relevant considerations which could explain the development of the policy-led model. In addition, the policy-led is characterised by a dual ministerial responsibility (at least in the case of the UK's SIN, while the information on the other two countries is incomplete), which was identified as a decisive element in this study (chapter 3). Accordingly, the findings of this study are only transferable and generalisable to the understanding of policy-led models to a limited degree. This thesis argues for an in-depth analysis of this model (see section 13.5 for avenues for further research on policy-led models).

Fourthly, besides being a distinct and valuable instrument, it is essential to point out that SICs are just one instrument in the wider governmental toolbox which aims to promote international collaboration and address national competitiveness at the global level (BMBF, 2020b; Schweizer Bundesrat, 2020b). Previous sections identified other instruments (see sections 6.4 and 9.4.2) (tool-mixes) in this realm which have similar purposes; it is assumed that these instruments work in concert. However, it should be highlighted that SICs operate with comparatively little public funding, despite having the potential to create distinct effects.

13.5. Avenues for Further Research

This study proposes an agenda for further research and suggests five distinct avenues that will be outlined in the following section. These aim to advance the research on SICs and science diplomacy.

Analysis of a Policy-Led Model

This study developed a typology to structure the SIC landscape. Of the three models which were identified, this thesis analysed two. To further advance the body of knowledge on SICs, the typology is subject to validation and (potentially modification). More specifically, a promising avenue for further research is the analysis of the third model that has been identified, yet not analysed in this study: policy-led SICs. This analysis would be useful to understand general patterns of SICs and science diplomacy governance structures. In addition, this analysis would help to contrast and position the findings regarding the policy-led model in relation to the findings of this study. The Science and Innovation Network (UK) as well as the Holland Innovation Network and the Flemish network have all previously been identified as ideal types of policy-led models (see section 3.4.3), although more specific information is required for the latter two.

To gain an empirical understanding of their ways of working, it would be useful to trace their development and institutionalisation in a way similar to that done in this study (drawing on interviews and documents). Three distinct strategies could be followed: Firstly, it could be revealing to comparatively analyse the Dutch and the Flemish models since both the Netherlands and Belgium are comparable in size and are neighbouring countries. What is more, the Flemish model has been newly set up, and one could assume that this model has been strongly influenced by already existing SICs. Secondly, a comparative analysis of the UK model with one of the other two countries could also be revealing to gain a deeper insight into how these SICs are governed and whether country size makes a difference. Thirdly, the most promising strategy would be a comparison of a policy-led model and another service-oriented model (such as the Danish case or Nordic Innovation House (see section 3.4.1)). This would reveal insights into a policy-led model and verify this study's typology exercise. In other words, it would enrich the body of knowledge on SICs in general and the two models in particular (*service-oriented* and *policy-led SICs*), keeping in mind that appropriation by key actors is presumably found to a lesser degree in policy-led models (compared to the findings of this study).

13. Conclusion and Reflection

All three comparative studies, as outlined above, would benefit from in-depth expert interviews with ministerial key actors and on-site observations for data collection. This has been demonstrated to be a useful strategy for examining the appropriation of the newly created spaces by key actors. To conclude, the previously outlined strategies would presumably make it possible to generate distinct insights into the policy-led model and would contribute to a greater understanding of these SICs.

Expanding and Diversifying SICs' Stakeholders

Moreover, in line with the actor-centred perspective on science diplomacy and underlining the instrumentation effects that were observed, it would be beneficial to expand and diversify the number of stakeholders. In the case of Germany, it has been suggested that this should be extended to those actors that are not involved in the governing structures and should also include those that have fewer resources of their own. One would expect that these actors' instrumentation of SICs might differ and reveal considerations such as SICs being used as a stepping stone or providing legitimacy and a brand for operating abroad.

On-Site Perspectives on SICs

In addition, the findings of this study would benefit from being aligned with an on-site perspective on SICs. Given that this thesis has largely focused on the national arrangements and characteristics that explain the development of the instruments, it has not delved into the richness of activities and the often unique constellations that arise on-site due to this instrument. Accordingly, an in-depth analysis of on-site locations would complement the understanding of the SICs since it might also put some of the findings that were observed here into perspective. Furthermore, this could generate new insights, for instance, into how stakeholders collaborate on-site and whether that differs from collaborations (struggles) in their national contexts. It further enriches the distinct actor-centred perspective on science diplomacy by also including those actors that engage on-site with the SICs, or in the case of Germany, are supporters of the instrument, not to mention the political perspective that could be contrasted (pointing to the aspect of effectiveness). This would shed light on how national science diplomacy responses operate abroad.

Measuring the Effectiveness of SICs

The question of the impact and the effectiveness of SICs has not been explicitly answered in this study. However, these constitute relevant questions which help to position SICs as an instrument in the wider governmental toolbox and to evaluate their added value compared to other (funding) instruments. Assessing the effectiveness of SICs is not an easy task given the complexity of this instrument and the different objectives to which it responds. Based on the findings of this study, it can be argued that measuring effectiveness requires a context-specific and an actor-specific focus. One might, of course, turn to quantitative numbers and key performance indicators, such as measuring the number of events or third-party funding. However, it is more revealing to analyse effectiveness in a qualitative way in order to understand it in terms of the collaborations which may emerge, the networks which may have been strengthened and the impact that these instruments may have had on the wider national ecosystem (such as the sense of collectivity), as well as on individual actors (such as opportunities for repositioning or new collaborations which emerge). Measuring this added value could be achieved even more by drawing on counterfactual elements which address a hypothetical situation, for instance closing SICs. This was also a strategy in this study (see section 5.4.2). This approach makes it possible to identify the perceived importance of SICs, while also providing further insights into actors' sense-making and the added value of SICs. The data pointed to several joint activities between actors and SICs that were considered to have made an impact. Qualitative follow-up interviews could presumably shed light on this perceived impact. What is more, the data identified the work of SICs in terms of creating distinct new channels for cooperation and communication, which also constitute a qualitative element for analysing and understanding effectiveness. To sum up, based on the findings of this study, there should be an awareness that the effectiveness of SICs in policy terms and their effectiveness from an actor-perspective might diverge. Hence, an approach is needed which is sensitive to the national context and distinct actor appropriation to effectively measure the impact of SICs in a qualitative way and to go beyond image building and beyond purely quantitative considerations.

Reflecting Upon Science Diplomacy in Light of Recent Geopolitical Events

A final avenue for research on the use of SICs and science diplomacy derives from recent geopolitical events. Without going into too much detail,

13. Conclusion and Reflection

this normative view of science diplomacy has been strongly shaken up and disrupted by the Ukraine–Russia conflict (since February 2022). While science diplomacy has been praised as a bridge builder and a channel of communication that remains open even in times of conflict, these events have shown the limits of the concept and marked an unprecedented case of science diplomacy being put on hold. This implies a need for conceptual modification of the notion. For instance, at CERN²⁴⁶, a prestigious science diplomacy instrument, Russia’s observer status has been suspended. In a similar vein, organisations such as the German DAAD have stopped individual funding arrangements with Russia (i.e., funding the mobility of German researchers to Russia in line with sanctions that aim to isolate Russia economically) or have refrained from communicating with government officials (cf. J. Mukherjee, 2022). Mobility from Russia should, however, be maintained to keep these channels of communication open. This demonstrates that there are in fact limits to science diplomacy in certain situations, which had not previously been considered to that extent. The conflict also shows the limits of soft power when it is confronted with hard power (cf. Schütte, 2022). In addition, prestigious research organisations, such as the German DFG, have been confronted with a situation where their authorisation to operate in Russia has been withdrawn, although this is subject to further analysis. Thus, the implications for the DWIH’s ability to operate in Russia are still unclear²⁴⁷. Arguably, these cases seem to constitute a critical juncture for the study of science diplomacy and are a stress test for its (normative) considerations. Ultimately, current definitions and assumptions need to be reconsidered.

13.6. Conclusion

This thesis explained the development and institutionalisation of *Science and Innovation Centres* (SICs). SICs were identified as unique and under-explored instruments in the science diplomacy toolbox; they are increas-

246 For more information on how these developments have affected CERN, please see: <https://home.cern/news/news/cern/cern-council-responds-russian-invasion-ukraine> (accessed 14.03.2022).

247 Personal communication indicated that the DWIH have taken on an observer role for the time being rather than actively organising events or engaging with local actors. However, the DWIH are seen as a valuable instrument, a stepping stone which might quickly take up its work again if the time comes (personal communication, 12.05.2022).

ingly being adopted by highly innovative countries in order to promote international cooperation and respond to international competition. While SICs are just one instrument in the governmental toolbox for promoting international collaboration and enhancing international visibility, they are distinct due to their holistic set-up and their role as a nucleus for the wider research and innovation system they represent. Moreover, SICs appear to have the potential to create a distinct impact despite their limited financial resources. The findings of this study have reaffirmed that there is no one-size-fits-all approach to science diplomacy. Furthermore, to answer the main research question put forward by this thesis, this study has shown that the German and Swiss SICs were developed as responses to wider societal trends, although these trends differed between the two cases. Their specific developments have been characterised by aspects such as timing, contingency and critical junctures. Furthermore, SICs were identified as being inextricably connected to their national contexts and they reflect distinct system characteristics, such as governance arrangements or the degree of actor involvement. These aspects were also seen as explaining the exact shape that SICs take. In addition, this study has found evidence of appropriation of SICs by key actors, and this has contributed to their institutionalisation. Key actors primarily use SICs in line with their organisational interests. In the case of the DWIH, this impacted and even limited the DWIH's (potential) design and ways of operating. However, the analysis of SICs' appropriation also revealed a distinct sense of collectivity, which developed among actors in the national research and innovation ecosystem due to the instrument. Accordingly, the development and institutionalisation of SICs can be explained by the national context, aspects of timing, contingent events and critical junctures, as well as distinct actor appropriation.

In combination, the findings of this thesis reaffirm that science diplomacy is clearly driven by national agendas; furthermore, its governance (actors, rationales and instruments) can only be fully understood by analysing its national context. Moreover, this study positioned science diplomacy as a distinct governmental response to the dynamics of cooperation and competition. These considerations were also found to be key aspects that guide SICs. With regard to the normative assumptions that seem to drive science diplomacy discourse, this study has found evidence that SICs have the potential to create an impact in ways such as creating new channels of communication and by linking actors. However, it is questionable to what extent SICs are instruments that shape diplomacy or, in fact, improve international relations. SICs are certainly a suitable instrument for

13. Conclusion and Reflection

a country's international positioning and the creation of an image (which aligns with ideas of soft power). However, in terms of their connections to diplomacy, SICs can be described as operating under the umbrella of, or alongside, diplomatic representations abroad, rather than actually shaping them. In other words, the normative idea that science diplomacy, or more specifically a SIC, is a vehicle through which to strengthen international relations and create an impact should be viewed cautiously and should not be overemphasised. While a certain impact cannot be excluded, the evidence is unclear and there is no distinct and immediately observable effect (however, a counterfactual situation cannot be examined either). Rather than overemphasising SICs' potential impact on international relations, there should be a focus on their role as a nucleus and their contributions to highlighting national research and innovation systems in a holistic way, as well as the effects and potential this creates for individual actors and the collective ecosystem.

Appendix

1. Data Sources: Case Study (I)—The DWIH, Germany

1.1. Overview: Interviews and Personal Communication

- * Audio-recorded and fully transcribed
- ** Interview protocols based on interview notes

State officials involved with the DWIH (current and former):

1.	GIS1* (face-to-face interview)	07.08.2017
2.	GIS2* (face-to-face interview)	09.02.2018
3.	GIS3** (face-to-face interview)	19.12.2017
4.	GIS4** (face-to-face interview)	20.02.2018
5.	GIS5* (face-to-face interview)	14.01.2020
6.	GIS6** (face-to-face interview)	10.02.2020

Representatives of selected key science and research organisations involved with the DWIH (current and former):

1.	GIW1** (phone interview)	12.06.2017
2.	GIW2* (face-to-face interview)	26.07.2017
3.	GIW3* (phone interview)	26.07.2017
4.	GIW4* (face-to-face interview)	10.08.2017
5.	GIW5* (face-to-face interview)	09.01.2018
6.	GIW6* (phone interview)	27.03.2018
7.	GIW7* (face-to-face interview)	03.05.2018
8.	GIW8* (face-to-face interview)	04.05.2018
9.	GIW9* (face-to-face interview)	11.02.2020
10.	GIW10* (face-to-face interview)	10.02.2020
11.	GIW11* (face-to-face interview)	10.01.2020
12.	GIW12* (face-to-face interview)	13.01.2020
13.	GIW13* (face-to-face interview)	12.02.2020
14.	GIW 14* (phone interview)	04.02.2020

Appendix

15. GIW15* (face-to-face interview) 21.02.2020

Representatives of the DWIH (current and former):

1. DWIH1* (face-to-face interview) 04.07.2019
2. DWIH2* (face-to-face interview) 04.07.2019
3. DWIH3* (face-to-face interview) 05.07.2019
4. DWIH4** (phone interview) 01.02.2021

In addition, several background talks and instances of personal communication took place which are not listed in detail. They nevertheless informed this thesis.

1.2. Overview: Documents (used in Section 8.1)

	Published by Auswärtiges Amt	Published by BMBF
2009	a) Speeches by minister Steinmeier and State Secretary Ammon at the launch of the AWP (2009) (Ammon, P., 2009; Steinmeier, 2009) b) Bericht der Bundesregierung zur Auswärtigen Kulturpolitik 2008/2009 ²⁴⁸ (Deutscher Bundestag, 2010)	
2010	a) Auswärtige Kultur- und Bildungspolitik in Zeiten der Globalisierung (2011) (Auswärtiges Amt, 2011) b) Bericht der Bundesregierung zur Auswärtigen Kultur- und Bildungspolitik 2009/2010 (Deutscher Bundestag, 2011)	
2011	Bericht der Bundesregierung zur Auswärtigen Kultur- und Bildungspolitik 2010/2011 (Deutscher Bundestag, 2012)	
2012	16. Bericht der Bundesregierung zur Auswärtigen Kultur- und Bildungspolitik 2011/2012 (Auswärtiges Amt, 2013)	
2013	17. Bericht der Bundesregierung Auswärtige Kultur- und Bildungspolitik (Auswärtiges Amt, 2014)	
2014	18. Bericht der Bundesregierung Auswärtige Kultur- und Bildungspolitik 2013/2014 (Auswärtiges Amt, 2015)	Aktionsplan des Bundesministeriums für Bildung und Forschung 2014 (BMBF, 2014)
2015	19. Bericht der Bundesregierung zur Auswärtigen Kultur- und Bildungspolitik (Auswärtiges Amt, 2016)	
2016	20. Bericht der Bundesregierung zur Auswärtigen Kultur- und Bildungspolitik (Deutscher Bundestag, 2017)	a) Internationalisierung von Bildung, Wissenschaft und Forschung. Strategie der Bundesregierung (BMBF, 2017a) b) Bericht der Bundesregierung zur internationalen Kooperation in Bildung,

248 The governmental *Auswärtige Kultur- und Bildungspolitik* reports are published annually and cover the previous year. The first report that was included in the analysis is the 2008/2009 report, which was published in 2010.

2017	21. Bericht der Bundesregierung zur Auswärtigen Kultur- und Bildungspolitik für das Jahr 2017 (Auswärtiges Amt, 2019a)	
2018	22. Bericht der Bundesregierung zur Auswärtigen Kultur- und Bildungspolitik für das Jahr 2018 (Auswärtiges Amt, 2019b)	Bericht der Bundesregierung zur internationalen Kooperation in Bildung, Wissenschaft und Forschung 2017–2018 (BMBF, 2019)
2019	23. Bericht der Bundesregierung zur Auswärtigen Kultur- und Bildungspolitik für das Jahr 2019 (Auswärtiges Amt, 2020b)	
2020	a) 24. Bericht der Bundesregierung zur Auswärtigen Kultur- und Bildungspolitik für das Jahr 2020 (Auswärtiges Amt, 2021) b) Science Diplomacy Strategie (Auswärtiges Amt, 2020c)	Bericht der Bundesregierung zur internationalen Kooperation in Bildung, Wissenschaft und Forschung 2019–2020 (BMBF, 2021)

2. Data Sources: Case Study (II)—Swissnex, Switzerland

2.1. Overview: Interviews and Personal Communication

- * Audio-recorded and fully transcribed
** Interview protocols based on interview notes

State officials involved with Swissnex (current and former):

1.	SIS1* (face-to-face interview)	23.08.2017
2.	SIS2* (phone interview)	24.10.2017
3.	SIS4* (face-to-face interview)	17.04.2018
4.	SIS5* (face-to-face interview)	19.04.2018
5.	SIS6* (face-to-face interview)	16.12.2019
6.	SIS7* (face-to-face interview)	12.12.2019

Representatives of science and research organisations involved with Swissnex (current and former):

1.	SIW1** (phone interview)	20.03.2018
2.	SIW2* (face-to-face interview)	19.04.2018
3.	SIW3* (phone interview)	23.04.2018
4.	SIW4* (face-to-face interview)	13.12.2020
5.	SIW7* (face-to-face interview)	16.12.2020

Representatives of Swissnex (current and former):

1.	SNX1* (face-to-face interview)	15.11.2017
2.	SNX2* (face-to-face interview)	11.12.2020
3.	SNX3* (phone interview)	05.12.2019

Other Actors

1.	SIW8** (phone interview)	07.01.2020
----	--------------------------	------------

In addition, several background talks and instances of personal communication took place which are not listed in detail. They nevertheless informed this thesis.

2.2. Overview: Documents (used in Section 11.1)

	Published by Federal Council	Published by FDFA
2004	Botschaft ²⁴⁹ über die Förderung von Bildung, Forschung und Technologie in den Jahren 2004–2007	
2008	Botschaft über die Förderung von Bildung, Forschung und Innovation in den Jahren 2008–2011	
2010	a) Botschaft zur Förderung von Bildung, Forschung und Innovation im Jahr 2012 b) Internationale Strategie der Schweiz im Bereich Bildung, Forschung und Innovation 2010	
2012	Botschaft zur Förderung von Bildung, Forschung und Innovation in den Jahren 2013-2016	Aussenpolitische Strategie 2012–2015
2017	Botschaft zur Förderung von Bildung, Forschung und Innovation in den Jahren 2017-2020	
2018	Internationale Strategie der Schweiz im Bereich Bildung, Forschung und Innovation 2018	
2019		Die Schweiz in der Welt 2028 – Bericht der Arbeitsgruppe «Aussenpolitische Vision Schweiz 2028»
2020	Botschaft zur Förderung von Bildung, Forschung und Innovation in den Jahren 2021–2024	

249 *Botschaft* documents are official policy documents.

References

- AAAS Center for Science Diplomacy (2009). *Science and Diplomacy: A Conceptual Framework*.
- Adamson, M., & Lalli, R. (2021). Global perspectives on science diplomacy: Exploring the diplomacy-knowledge nexus in contemporary histories of science. *Centaurus*, 63(1), 1–16. <https://doi.org/10.1111/1600-0498.12369>
- Adler-Nissen, R. (2014). Symbolic power in European diplomacy: The struggle between national foreign services and the EU's External Action Service. *Review of International Studies*, 40(4), 657–681. <https://doi.org/10.1017/S0260210513000326>
- AG Science Diplomacy (2019). *Science Diplomacy 2020 – Eckpunkte einer neuen Strategie: AKBP-Strategieprozess*. Berlin.
- Ahrne, G., & Brunsson, N. (2005). Organizations and meta-organizations. *Scandinavian Journal of Management*, 21(4), 429–449. <https://doi.org/10.1016/j.scaman.2005.09.005>
- Ahrne, G., & Brunsson, N. (2008). *Meta-organizations*. Cheltenham: Edward Elgar.
- Ahrne, G., Brunsson, N., & Seidl, D. (2016). Resurrecting organization by going beyond organizations. *European Management Journal*, 34(2), 93–101. <https://doi.org/10.1016/j.emj.2016.02.003>
- Alberts, B. (2010). Policy-Making Needs Science. *Science*, 330(6009), 1287. <https://doi.org/10.1126/science.1200613>
- Allison, G. T. (1968). *Conceptual Models and the Cuban Missile Crisis: Rational Policy, Organization Process, and Bureaucratic Politics* (P-3919). California.
- Almeida Domingues, A., & Ribeiro Neto, P. H. (2017). Science Diplomacy as a tool of international politics: the power of "soft power". *Brazilian Journal of International Relations*, 6(3), 607–629.
- Altbach, P. G. (2001). Academic freedom: International realities and challenges. *Higher Education*, 41, 205–219.
- Altbach, P. G., Reisberg, L., & Rumbley, L. E. (2009). *Trends in Global Higher Education: Tracking an Academic Revolution: A Report Prepared for the UNESCO 2009 World Conference on Higher Education*. Paris.
- Ammon, P. (2009, January 20). *Rede von Staatssekretär Peter Ammon zur Auftaktkonferenz der Initiative Außenwissenschaft 2009* [Press release]. Berlin. Retrieved from <http://www.auswaertiges-amt.de/DE/Infoservice/Presse/Reden/2009/090120-StSammon-AWP.html>
- Anheier, H. K. (2017). *Die Auswärtige Kultur- und Bildungspolitik Deutschlands im internationalen Vergleich: Zwischenbericht*. Berlin: Hertie School of Governance.
- Aukes, E., Ordonez-Matamoros, G., & Kuhlmann, S. (2019). *Meta-Governance for Science Diplomacy – towards a European framework* (StEps Working Paper Series No. 2019/01). Enschede.

References

- Auswärtiges Amt (Ed.) (2009a). *Wissenswelten verbinden. Deutsche Außenpolitik für mehr Bildung, Wissenschaft und Forschung: Konferenzdokumentation. Edition Diplomatie*. Berlin.
- Auswärtiges Amt (2009b, January 14). *Wissenswelten verbinden. - Auftaktkonferenz zur Initiative Außenwissenschaftspolitik* [Press release]. Berlin. Retrieved from <https://www.auswaertiges-amt.de/de/newsroom/090114-awp/212790>
- Auswärtiges Amt (2011). *Auswärtige Kultur- und Bildungspolitik in Zeiten der Globalisierung: Partner gewinnen, Werte vermitteln, Interessen vertreten*. Berlin.
- Auswärtiges Amt (2012, October 26). *Außenstaatssekretärin Haber eröffnet Deutsches Wissenschafts- und Innovationshaus in Neu Delhi* [Press release]. Retrieved from http://www.auswaertiges-amt.de/DE/Infoservice/Presse/Meldungen/2012/121026-StSH_DWIIH.html
- Auswärtiges Amt (2013). *16. Bericht der Bundesregierung zur Auswärtigen Kultur- und Bildungspolitik 2011/2012*. Berlin.
- Auswärtiges Amt (2014, February 14). *17. Bericht der Bundesregierung Auswärtige Kultur- und Bildungspolitik*. Berlin. Retrieved from Auswärtiges Amt website: <https://www.bundesrat.de/bv.html?id=0059-14>
- Auswärtiges Amt (2015). *18. Bericht der Bundesregierung Auswärtige Kultur- und Bildungspolitik 2013 / 2014: Grenzen überbrücken – Werte teilen – Wissen schaffen – die Auswärtige Kultur- und Bildungspolitik in globaler Verantwortung*. Berlin.
- Auswärtiges Amt (2016). *19. Bericht der Bundesregierung zur Auswärtigen Kultur- und Bildungspolitik: Kultur, Bildung, Wissenschaft und Kommunikation in globaler Verantwortung*. Berlin.
- Auswärtiges Amt (2017). *20. Bericht der Bundesregierung zur Auswärtigen Kultur- und Bildungspolitik 2016: Menschen bewegen: Dialogräume schaffen Brücken bauen Perspektiven entwickeln*. Berlin.
- Auswärtiges Amt (2019a). *21. Bericht der Bundesregierung zur Auswärtigen Kultur- und Bildungspolitik für das Jahr 2017: Zugang zu Kultur und Bildung: Kulturelle Freiräume schaffen und gestalten*. Berlin. Retrieved from Auswärtiges Amt website: <https://www.auswaertiges-amt.de/blueprint/servlet/blob/2177718/893ae0d7033056d7f6ce7e51a61d42e0/akbp-bericht-2017-data.pdf>
- Auswärtiges Amt (2019b). *22. Bericht der Bundesregierung zur Auswärtigen Kultur- und Bildungspolitik für das Jahr 2018: Europa stärken. Freiräume schützen. Innovationen fördern*. Berlin.
- Auswärtiges Amt (2019c). *Grundprinzipien deutscher Außenpolitik*. Retrieved from https://www.auswaertiges-amt.de/de/aussenpolitik/themen/grundprinzipien/216474#content_5
- Auswärtiges Amt (2020a). *Wissenschaftsdiplomatie*. Retrieved from <https://www.auswaertiges-amt.de/de/aussenpolitik/themen/kulturdialog/-/212804>
- Auswärtiges Amt (2020b, October 9). *23. Bericht der Bundesregierung zur Auswärtigen Kultur- und Bildungspolitik für das Jahr 2019*. Berlin.
- Auswärtiges Amt (December 2020c). *Science Diplomacy*. Berlin.
- Auswärtiges Amt (2021). *24. Bericht der Bundesregierung zur Auswärtigen Kultur- und Bildungspolitik für das Jahr 2020*. Berlin.

- Axworthy, L. (2013). The Political Actors: President, Prime Minister, and Minister of Foreign Affairs. In A. F. Cooper, J. Heine, & R. Thakur (eds.), *The Oxford Handbook of Modern Diplomacy* (pp. 92–105). Oxford: Oxford University Press.
- Ayebare Nyakato, R., & Kyora, S. (2015). A roadmap for the swissnex network. Retrieved from <https://www.startupticker.ch/en/news/december-2015/a-roadmap-for-the-swissnex-network>
- Babbie, E. (2004). *The Practice of Social Research* (10th edn.). Belmont: Thomson Wadsworth.
- Bach, T., & Jann, W. (2010). Animals in the Administrative Zoo: Organizational Change and Agency autonomy in Germany. *International Review of Administrative Sciences*, 76(3), 443–468. <https://doi.org/10.1177/0020852310372448>
- Bache, I. (2010). Partnership as an EU Policy Instrument: A Political History. *West European Politics*, 33(1), 58–74. <https://doi.org/10.1080/01402380903354080>
- Badout, P.-Y. (2011). Uncertain Instruments: The Computerization of Public Administration and Changes in Public Policy (1966–1975). *Revue Française De Science Politique (English Edition)*, 61(1), 69–93.
- Bali, A. S., Capano, G., & Ramesh, M. (2019). Anticipating and designing for policy effectiveness. *Policy and Society*, 38(1), 1–13. <https://doi.org/10.1080/14494035.2019.1579502>
- Ball, P. (2021). Science Is Political, and We Must Deal with It. *The Journal of Physical Chemistry Letters*, 12(27), 6336–6340. <https://doi.org/10.1021/acs.jpcllett.1c02017>
- Balzacq, T., Charillon, F., & Ramel, F. (eds.) (2019). *The Sciences Po series in international relations and political economy. Global diplomacy: An introduction to Theory and Practice*. Basingstoke: Palgrave Macmillan.
- Bemelmans-Videc, M. L. (1998). Introduction. Policy Instrument Choice and Evaluation. In M. L. Bemelmans-Videc, R. C. Rist, & E. Vedung (eds.), *Comparative policy analysis series. Carrots, Sticks & Sermons: Policy Instruments and their Evaluation* (pp. 1–18). New Brunswick, NJ: Transaction Publishers.
- Bemelmans-Videc, M. L., Rist, R. C., & Vedung, E. (eds.) (1998). *Comparative policy analysis series. Carrots, Sticks & Sermons: Policy Instruments and their Evaluation*. New Brunswick, NJ: Transaction Publishers.
- Bendor, J., & Hammond, T. H. (1992). Rethinking Allison's Models. *The American Political Science Review*, 86(2), 301–322. <https://doi.org/10.2307/1964222>
- Berg, L.-P. (2010). Science Diplomacy Networks. In FDFA (ed.), *Swiss Science Diplomacy* (Politorbis – Zeitschrift zur Aussenpolitik No. 49, pp. 69–74). Bern: FDFA.
- Berkman, P. A., Lang, Michael, A., Walton, D. W., & Young, Oran, R. (eds.) (2011). *Science Diplomacy: Antarctica, and the governance of international spaces*. Washington D.C.: Smithsonian Institution Scholarly Press.
- Bertelsen, R. G. (2018). The Arctic as a Laboratory of Global Governance: The Case of Knowledge-Based Cooperation and Science Diplomacy. In M. Finger & L. Heinen (eds.), *The Globalarctic Handbook* (1st edn., pp. 251–267). Cham, Switzerland: Springer. https://doi.org/10.1007/978-3-319-91995-9_15

References

- Bevir, M. (2006). How Narratives Explain. In D. Yanow & P. Schwartz-Shea (eds.), *Interpretation and method: Empirical research methods and the interpretive turn* (pp. 163–168). Armonk, NY u. a.: M. E. Sharpe.
- BMBF (2008). *Deutschlands Rolle in der globalen Wissensgesellschaft stärken: Strategie der Bundesregierung zur Internationalisierung von Wissenschaft und Forschung*. Bonn.
- BMBF (2014). *Internationale Kooperation: Aktionsplan des Bundesministeriums für Bildung und Forschung*. Berlin. Retrieved from BMBF website: https://www.bmbf.de/pub/Aktionsplan_Internationale_Kooperation.pdf
- BMBF (2017a). *Internationalisierung von Bildung, Wissenschaft und Forschung: Strategie der Bundesregierung*. Bonn.
- BMBF (Juni 2017b). *Bericht der Bundesregierung zur internationalen Kooperation in Bildung, Wissenschaft und Forschung 2014–2016*. Bonn.
- BMBF (2018). *Bundesbericht Forschung und Innovation 2018: Forschungs- und innovationspolitische Ziele und Maßnahmen*. Berlin.
- BMBF (2019). *Bericht der Bundesregierung zur internationalen Kooperation in Bildung, Wissenschaft und Forschung 2017–2018*. Bonn.
- BMBF (2020a). BMBF-Preis für Bildungs- und Wissenschaftsdiplomatie für laufende und abgeschlossene wissenschaftliche Projekte. Retrieved from <https://www.nks-lebenwissenschaften.de/de/3188.php>
- BMBF (2020b). *Bundesbericht Forschung und Innovation 2020: Forschungs- und innovationspolitische Ziele und Maßnahmen*. Berlin.
- BMBF (2021). *Bericht der Bundesregierung zur internationalen Kooperation in Bildung, Wissenschaft und Forschung 2019–2020: Politische Kurzfassung*. Bonn.
- Bogner, A., & Menz, W. (2001). „Deutungswissen“ und Interaktion: Zu Methodologie und Methodik des theoriegenerierenden Experteninterviews. *Soziale Welt*, 52, 477–500.
- Boon, W., & Edler, J. (2018). Demand, challenges, and innovation. Making sense of new trends in innovation policy. *Science and Public Policy*, 45(4), 435–447. <https://doi.org/10.1093/scipol/scy014>
- Borchardt, A., & Göthlich, S. E. (2009). Erkenntnisgewinnung durch Fallstudien. In S. Albers, D. Klapper, U. Konradt, A. Walter, & J. Wolf (eds.), *Methodik der empirischen Forschung* (3rd edn., 33–48). Wiesbaden: Gabler.
- Borgwardt, A. (ed.) (2009). *Wissenschaftsaußenpolitik: Deutschland als Knotenpunkt im weltweiten Wissensnetzwerk; Konferenzbericht der Veranstaltung vom 13. November 2008 Friedrich-Ebert-Stiftung* (1. Aufl.). Berlin: Friedrich-Ebert-Stiftung.
- Borrás, S., & Edquist, C. (2013). The Choice of Innovation Policy Instruments. *Technological Forecasting and Social Change*, 80(8), 1513–1522. <https://doi.org/10.1016/j.techfore.2013.03.002>
- Bowen, G. A. (2009). Document Analysis as a Qualitative Research Method. *Qualitative Research Journal*, 9(2), 27–40. <https://doi.org/10.3316/QRJ0902027>
- Brand Finance (2020). *Global Soft Power Index 2020: The world's most comprehensive research study on perceptions of soft power*.

- Braun, D. (1993). Politische Steuerungsfähigkeit in intermediären Systemen am Beispiel der Forschungsförderung. *Politische Vierteljahresschrift*, 34(2), 249–271.
- Braun, D., & Capano, G. (2010). *Introductory Paper: The missing link – Policy Ideas and Policy Instruments* (European Consortium for Political Research Workshop). Münster.
- Braun, V., & Clarke, V. (2006). Using thematic analysis in psychology. *Qualitative Research in Psychology*, 3(2), 77–101. <https://doi.org/10.1191/1478088706qp063oa>
- Bressers, H. T. A., & O'Toole, L. J. (1998). The Selection of Policy Instruments: a Network-based Perspective. *Journal of Public Policy*, 18(3), 213–239. <https://doi.org/10.1017/S0143814X98000117>
- Brunsson, N., & Sahlin-Andersson, K. (2000). Constructing Organizations: The Example of Public Sector Reform. *Organization Studies*, 21(4), 721–746. <https://doi.org/10.1177/0170840600214003>
- Bundesministerium der Finanzen (2020). *Finanzbericht 2021: Stand und voraussichtliche Entwicklung der Finanzwirtschaft im gesamtwirtschaftlichen Zusammenhang*. Berlin.
- Der Bundesrat (2015, September 30). *swissnex Singapore schliesst die Türen, Bildungs- und Wissenschaftsbüro an Botschaft neu eröffnet* [Press release]. Bern. Retrieved from <https://www.admin.ch/gov/de/start/dokumentation/medienmitteilungen.msg-id-58932.html>
- Bundesrechnungshof (2013). Auswärtiges Amt: Wissenschafts- und Innovationshäuser des Auswärtigen Amtes tragen sich weiterhin nicht selbst. In Bundesrechnungshof (ed.), *Bemerkungen 2013 zur Haushalts- und Wirtschaftsführung des Bundes*. Bonn.
- Burkhalter, D. (2010, October 28). *Celebration of the 10-year anniversary of swissnex Boston – «Toward to the next decade of connecting the dots»: Cambridge (USA), 28.10.2010 – Allocution du Conseiller fédéral Didier Burkhalter – Seule la version orale fait foi*. [Press release]. Bern. Retrieved from <https://www.admin.ch/gov/fr/accueil/documentation/communiqués.msg-id-36122.html>
- Capano, G. (2018). Policy design spaces in reforming governance in higher education: the dynamics in Italy and the Netherlands. *Higher Education*, 75(4), 675–694. <https://doi.org/10.1007/s10734-017-0158-5>
- Capano, G. (2019). Reconceptualizing layering – From mode of institutional change to mode of institutional design: Types and outputs. *Public Administration*, 13, 1–15. <https://doi.org/10.1111/padm.12583>
- Capano, G., & Howlett, M. (2020). The Knowns and Unknowns of Policy Instrument Analysis: Policy Tools and the Current Research Agenda on Policy Mixes. *SAGE Open*, 10(1), 1–13. <https://doi.org/10.1177/2158244019900568>
- Capano, G., & Lippi, A. (2017). How policy instruments are chosen: patterns of decision makers' choices. *Policy Sciences*, 50(2), 269–293. <https://doi.org/10.1007/s11077-016-9267-8>
- Capano, G., Pritoni, A., & Vicentini, G. (2019). Do policy instruments matter? Governments' choice of policy mix and higher education performance in Western Europe. *Journal of Public Policy*, 1–27. <https://doi.org/10.1017/S0143814X19000047>

References

- Capoccia, G., & Keleman, D. R. (2007). The Study of Critical Junctures: Theory, Narrative, and Counterfactuals in Historical Institutionalism. *World Politics*, 59(3), 341–369.
- Caporaso, J. A. (2007). The promises and pitfalls of an endogenous theory of institutional change: A comment. *West European Politics*, 30(2), 392–404. <https://doi.org/10.1080/01402380701239921>
- Carlsson, B. (2006). Internationalization of innovation systems: A survey of the literature. *Research Policy*, 35(1), 56–67. <https://doi.org/10.1016/j.respol.2005.08.003>
- Carosso, G. A., Ferreira, L. M. R., & Mostajo-Radji, M. A. (2019). Scientists as non-state actors of public diplomacy. *Nature Human Behaviour*, 3(11), 1129–1130. <https://doi.org/10.1038/s41562-019-0716-1>
- Cassis, I. (2019, March 19). "The corals of Aqaba and the Red Sea, where science and diplomacy come together". Rede von Bundesrat Ignazio Cassis anlässlich der internationalen Konferenz zum Thema „Dialog zwischen Wissenschaft und Diplomatie“ [Press release]. Bern. Retrieved from <https://www.eda.admin.ch/eda/de/home/suche/suchresultat.html/content/eda/de/meta/speeches/2019/3/19/74380.html>
- Chong, A. (2007). *The Foreign Policy Potential of "Small State Soft Power" Information Strategies*. Singapore: National University of Singapore.
- Chou, M.-H., & Ulnicane, I. (2015). Introduction: New Horizons in the Europe of Knowledge. *Journal of Contemporary European Research*, 11(1), 4–15.
- Coleman, J. S. (2010). *Grundlagen der Sozialtheorie: Band 1: Handlungen und Handlungssysteme* (3rd edn.). Scientia Nova. München: Oldenbourg.
- Comtesse, X. (2000, January 26). Opinions. Un grand marché mondial de l'éducation se met en place. *Le Temps*. Retrieved from <https://www.letemps.ch/opinions/opinions-un-grand-marche-mondial-leducation-se-met-place>
- Comtesse, X. (2021). "swissnex was a breakthrough idea". In *Revealing the Dots: Eleven interviews with some of the most influential figures in swissnex's 20-year history* (pp. 6–9). Boston: Swissnex Boston.
- Constantinou, C. M., Kerr, P., & Sharp, P. (eds.) (2016). *The SAGE Handbook of Diplomacy*. Los Angeles, London, New Delhi: SAGE Publications Ltd.
- Constantinou, C. M., & Sharp, P. (2016). Theoretical Perspectives in Diplomacy. In C. M. Constantinou, P. Kerr, & P. Sharp (eds.), *The SAGE Handbook of Diplomacy* (pp. 13–27). Los Angeles, London, New Delhi: SAGE Publications Ltd.
- Cooper, A. F. (2013). The Changing Nature of Diplomacy. In A. F. Cooper, J. Heine, & R. Thakur (eds.), *The Oxford Handbook of Modern Diplomacy* (pp. 35–53). Oxford: Oxford University Press.
- Cooper, A. F., Heine, J., & Thakur, R. (2013). Introduction: The Challenges of 21st-Century Diplomacy. In A. F. Cooper, J. Heine, & R. Thakur (eds.), *The Oxford Handbook of Modern Diplomacy* (pp. 1–31). Oxford: Oxford University Press.
- Copeland, D. (2011). *Science Diplomacy: What's It All About?* (Policy Brief No. 13). Ottawa.
- Copeland, D. (2015). *Science and diplomacy after Canada's lost decade: Counting the costs, looking beyond*.

- Cramer, K. C., & Hallonsten, O. (2020). *Big science and research infrastructures in Europe*. Cheltenham, UK, Northampton, MA: Edward Elgar Publishing.
- Crawford, E., Shinn, T., & Sörlin, S. (1993). The Nationalization and Denationalization of the Sciences: An Introductory Essay. In E. Crawford, T. Shinn, & S. Sörlin (eds.), *Sociology of the Sciences A Yearbook: Vol. 16. Denationalizing Science* (Vol. 16, pp. 1–42). Dordrecht: Springer Netherlands. https://doi.org/10.1007/978-94-017-1221-7_1
- Cremonini, L., Horlings, E., & Hessels, L. K. (2018). Different recipes for the same dish: Comparing policies for scientific excellence across different countries. *Science and Public Policy*, 45(2), 232–245. <https://doi.org/10.1093/scipol/scx062>
- DAAD (2017, September 4). *Gemeinsam und vernetzt international agieren* [Press release]. Bonn. Retrieved from <http://www.juraforum.de/wissenschaft/gemeinsam-und-ernetzt-international-agieren-602753>
- DAAD (Juli 2018). *Deutsche Wissenschafts- und Innovationshäuser: Jahresbericht 2017*. Bonn. Retrieved from DAAD website: https://www.dwih-netzwerk.de/files/2018/08/DWIH-Jahresbericht-2017_D-E_komprimiert.pdf
- DAAD (2020, September 18). *Neues Deutsches Wissenschafts- und Innovationshaus in San Francisco* [Press release]. Bonn. Retrieved from <https://www.daad.de/de/der-daad/kommunikation-publikationen/presse/pressemitteilungen/dwih-netzwerkerweiterung/>
- DAAD (2022). *Wissenschaft, Wirtschaft und Gesellschaft: Hand in Hand für mehr Innovation* (DUZ Magazin für Wissenschaft und Gesellschaft). Berlin.
- Darby, S. (2015). The Emperor's New Clothes — A Failure of Diplomacy in the Oil and Mining Sectors. In L. S. Davis & R. G. Patman (eds.), *Science Diplomacy: New Day Or False Dawn?*. Singapore: World Scientific Publishing Co. Pte. Ltd.
- Davis, L. S., & Patman, R. G. (eds.) (2015). *Science Diplomacy: New Day Or False Dawn?* Singapore: World Scientific Publishing Co. Pte. Ltd.
- De Wit, H., & Altbach, P. G. (2021). Internationalization in higher education: global trends and recommendations for its future. *Policy Reviews in Higher Education*, 5(1), 28–46. <https://doi.org/10.1080/23322969.2020.1820898>
- De Wit, H., Hunter, F., Howard, L., & Egron-Polak, E. (2015). *Internationalisation of Higher Education: Study*. Brussels.
- Deutscher Bundestag (2010, March 4). *Bericht der Bundesregierung zur Auswärtigen Kulturpolitik 2008/2009* (No. 17/970). Berlin.
- Deutscher Bundestag (2011, January 13). *Bericht der Bundesregierung zur Auswärtigen Kultur- und Bildungspolitik 2009/2010* (No. 17/4413). Berlin.
- Deutscher Bundestag (2012, January 11). *Unterrichtung durch die Bundesregierung: Bericht der Bundesregierung zur Auswärtigen Kultur- und Bildungspolitik 2010/2011*. Retrieved from Bundesanzeiger Verlagsgesellschaft mbH website: <http://dip21.bundestag.de/dip21/btd/17/083/1708326.pdf>
- Deutscher Bundestag (2013, June 25). *Antrag: Deutschland in der globalen Wissensgesellschaft klar positionieren – Internationalisierung von Wissenschaft und Forschung weiter vorantreiben* (No. Drucksache 17/14111). Berlin.

References

- Deutscher Bundestag (2017, March 16). 20. Bericht der Bundesregierung Auswärtige Kultur- und Bildungspolitik: Unterrichtung durch die Bundesregierung (Drucksache 18/11550).
- Deutscher Kulturrat e.V. (2018). *Die dritte Säule: Beiträge zur Auswärtigen Kultur- und Bildungspolitik* (Politik & Kultur No. 16). Berlin.
- Deutsches Wissenschafts- und Innovationshaus Moskau (2013). *Deutsches Wissenschafts- und Innovationshaus (DWIH) Moskau 2010–2012*. Moskau.
- Directorate-General of Global Affairs, Development and Partnerships (2013). *Science Diplomacy for France: Report 2013*.
- Dohjoka, N., Campbell, C. A., & Hill, B. (2017, March 17). *Science Diplomacy in Arab Countries: The Need for a Paradigm Shift* (Science & Diplomacy).
- Dolowitz, D. P., & Marsh, D. (2000). Learning from Abroad: The Role of Policy Transfer in Contemporary Policy-Making. *Governance: An International Journal of Policy and Administration*, 13(1), 5–23. <https://doi.org/10.1111/0952-1895.00121>
- Dresing, T., & Pehl, T. (eds.) (2017). *Praxisbuch Interview, Transkription & Analyse: Anleitungen und Regelsysteme für qualitativ Forschende* (7th edn.). Marburg: Eigenverlag.
- Drori, G. S., Meyer, J. W., Ramirez, F. O., & Schofer, E. (2002). *Science in the Modern World Polity: Institutionalization and globalization*. Stanford, California: Stanford University Press.
- Dufour, N. (2000a, April 14). La Suisse expérimente une nouvelle politique face à ses cerveaux expatriés. *Le Temps*. Retrieved from <https://www.letemps.ch/suisse/suisse-experimente-une-nouvelle-politique-face-cerveaux-expatries>
- Dufour, N. (2000b, October 12). A Nouvelle Economie, nouvelle diplomatie? Esquisse de réponse avec la Swiss House de Boston. *Le Temps*. Retrieved from <https://www.letemps.ch/suisse/nouvelle-economie-nouvelle-diplomatie-esquisse-reponse-swiss-house-boston>
- Dufour, N. (2000c, October 14). Quand une banque privée soutient la diplomatie suisse. *Le Temps*. Retrieved from <https://www.letemps.ch/suisse/une-banque-privée-soutient-diplomatie-suisse>
- Dusdal, J., & Powell, J. J. W. (2021). Benefits, Motivations, and Challenges of International Collaborative Research: A Sociology of Science Case Study. *Science and Public Policy*, 1–11. <https://doi.org/10.1093/scipol/scab010>
- Dusdal, J., Zapp, M., Marques, M., & Powell, J. J. (2021). Higher Education Organizations as Strategic Actors in Networks: Institutional and Relational Perspectives Meet Social Network Analysis. In J. Huisman & M. Tight (eds.), *Theory and Method in Higher Education Research* (7th edn., pp. 55–73). Bingley: Emerald Publishing Limited. <https://doi.org/10.1108/S2056-375220210000007004>
- DWIH-Netzwerk (2019). Objectives. Retrieved from <https://www.dwih-netzwerk.de/en/who-we-are/objectives/>
- DWIH-Netzwerk (2021). Organisation. Retrieved from <https://www.dwih-netzwerk.de/de/ueber-uns/organisation/>
- Edler, J., & Fagerberg, J. (2017). Innovation policy: what, why, and how. *Oxford Review of Economic Policy*, 33(1), 2–23. <https://doi.org/10.1093/oxrep/grx001>

- Edler, J., Kuhlmann, S., & Stegmaier, P. (2010). Fragmentierung und Koordination – Governance der Wissenschafts- und Innovationspolitik in Deutschland. In M. Seckelmann, S. Lange, & T. Horstmann (eds.), *Die Gemeinschaftsaufgaben von Bund und Ländern in der Wissenschafts- und Bildungspolitik: Analysen und Erfahrungen* (pp. 169–194). Baden-Baden: Nomos Verlag.
- Eggenberger, C. (1986). Die Stiftung " Pro Helvetia" als Vermittlerin schweizerischer Kunst im Ausland. *Zeitschrift Für Schweizerische Archäologie Und Kunstgeschichte*, 43(4), 417–428.
- Egger, P. (2013). Vorwort. In *Wissenschaftsdiplomatie: Die Schweiz vernetzt sich neu* (Dossier: «Wissenschaftsdiplomatie» Ausgabe 1003, p. 54).
- Elken, M. (2015). Developing policy instruments for education in the EU: the European Qualifications Framework for lifelong learning. *International Journal of Lifelong Education*, 34(6), 710–726. <https://doi.org/10.1080/02601370.2015.1103795>
- Embassy of Finland, Washington D.C. (2016, July 14). *Nordic Cooperation in Silicon Valley* [Press release]. Retrieved from https://finlandabroad.fi/web/usa/current-affairs/-/asset_publisher/h5w4iTUJhNne/content/nordic-cooperation-in-silicon-valley/384951
- Epping, E. (2018). *Science and Innovation Centers – bringing a new dimension to the internationalization of higher education, research and innovation* (CHEPS Blog). Enschede.
- Epping, E. (2020). Lifting the smokescreen of science diplomacy: comparing the political instrumentation of science and innovation centres. *Humanities and Social Sciences Communications*, 7(1), 1–13. <https://doi.org/10.1057/s41599-020-00599-4>
- Erler, G. (2008, November 13). *Rede Staatsminister Gernot Erler bei der Konferenz der FES „Wissenschaftsaußenpolitik – Deutschland als Knotenpunkt im weltweiten Wissenschaftsnetz“* [Press release]. Berlin.
- European Commission (2004). Die Schweiz richtet Wissenschaftsaußenposten in den USA und in Asien ein. Retrieved from <https://cordis.europa.eu/news/rcn/22940/de>
- Fähnrich, B. (2013). *Science Diplomacy: Strategische Kommunikation in der Auswärtigen Wissenschaftspolitik. Organisationskommunikation*. Wiesbaden: Springer VS.
- Fähnrich, B. (2015). Science diplomacy: Investigating the perspective of scholars on politics-science collaboration in international affairs. *Public Understanding of Science*, 1–16. <https://doi.org/10.1177/0963662515616552>
- Fathi, D. (2012, June 5). *Eine Roadmap zur Verdoppelung des Netzwerkes Swissex: 12.3431 Postulat*. Curia Vista – Die Geschäftsdatenbank.
- F DFA (2019). *Die Schweiz in der Welt 2028: Bericht der Arbeitsgruppe «Aussenpolitische Vision Schweiz 2028»*. Bern.
- F DFA (2021). Bundesrat ernennt Sonderbeauftragten für Science Diplomacy. Retrieved from <https://www.eda.admin.ch/eda/de/home/das-eda/aktuell/newsuebersicht/2021/02/science-diplomacy.html>
- Fedoroff, N. V. (2009). Science Diplomacy in the 21st century. *Cell*, 136(1), 9–11. <https://doi.org/10.1016/j.cell.2008.12.030>

- Ferreira, G. G. C., & Oliveira, A. J. N. S. de (2020). From Science Diplomacy to Education Diplomacy: The Brazilian Case. *Conjuntura Austral*, 11(54), 90–104. <https://doi.org/10.22456/2178-8839.100750>
- Fetscherin, M., & Marmier, P. (2010). Switzerland's nation branding initiative to foster science and technology, higher education and innovation: A case study. *Place Branding and Public Diplomacy*, 6(1), 58–67. <https://doi.org/10.1057/pb.2010.6>
- Fischer, T., & Möckli, D. (2016). The Limits of Compensation: Swiss Neutrality Policy in the Cold War. *Journal of Cold War Studies*, 18(4), 12–35. https://doi.org/10.1162/JCWS_a_00678
- Fleury, A., & Zala, S. (eds.) (2012). *Wissenschaft und Aussenpolitik: Beiträge zur Tagung anlässlich des 50. Jubiläums der Schaffung des ersten Postens eines schweizerischen Wissenschaftsattachés. Quaderni di Dodis: Vol. 1*. Bern: Diplomatiche Dokumente der Schweiz: Diplomatiche Dokumente der Schweiz. Retrieved from <http://www.alexandria.admin.ch/bv001490427.pdf>
- Flick, U. (2011). *Triangulation: Eine Einführung* (3rd edn.). *Qualitative Sozialforschung*. Wiesbaden: VS Verlag für Sozialwissenschaften; Springer Fachmedien.
- Flick, U. (2018a). Doing Qualitative Data Collection – Charting the Routes. In U. Flick (ed.), *The SAGE Handbook of Qualitative Data Collection* (34–50). Los Angeles, London, New Delhi: SAGE Publications Ltd.
- Flick, U. (Ed.) (2018b). *The SAGE handbook of qualitative data collection*. Los Angeles: Sage.
- Flink, T. (2009). Aussenwissenschaftspolitik – ein neues Handlungsfeld? *Forschung, Politik - Strategie - Management*, 3+4, 69–78.
- Flink, T. (2020a). The Sensationalist Discourse of Science Diplomacy: A Critical Reflection. *The Hague Journal of Diplomacy*, 15(3), 359–370. <https://doi.org/10.1163/1871191X-BJA10032>
- Flink, T. (2020b). Wissenschaftsdiplomatie in der Europäischen Union: Praktiken und Perspektiven. *Forschung, Politik - Strategie - Management*, 1+2(2019), 5–11.
- Flink, T., & Rüffin, N. V. (2019). The current state of the art of science diplomacy. In W. Cranzler, S. Kuhlmann, & D. Simon (eds.), *Handbook on Science and Public Policy* (pp. 104–121). Cheltenham: Edward Elgar Publishing.
- Flink, T., & Schreiterer, U. (2010). Science diplomacy at the intersection of S&T policies and foreign affairs: toward a typology of national approaches. *Science and Public Policy*, 37(9), 665–677. <https://doi.org/10.3152/030234210X12778118264530>;
- Forbes, W. H. (1957). The Role of Science Attachés. *Bulletin of the Atomic Scientists*, 13(8), 274–276. <https://doi.org/10.1080/00963402.1957.11457578>
- Fromm, N., & Raev, A. (2018). Contesting Contextual Forces of National Politics—Explaining German Transnational Education from a Policy Design Perspective. *European Policy Analysis*, 4(2), 275–293. <https://doi.org/10.1002/epa2.1042>
- Fumasoli, T., Barbato, G., & Turri, M. (2020). The determinants of university strategic positioning: a reappraisal of the organisation. *Higher Education*, 80(2), 305–334. <https://doi.org/10.1007/s10734-019-00481-6>

- Fumasoli, T., & Lepori, B. (2011). Patterns of strategies in Swiss higher education institutions. *Higher Education*, 61(2), 157–178. <https://doi.org/10.1007/s10734-010-9330-x>
- Gabriel, J. (2003). The Price of Political Uniqueness: Swiss Foreign Policy in a Changing World Pages. In J. Gabriel & T. Fischer (eds.), *Swiss Foreign Policy 1945–2002* (pp. 1–22). New York: Palgrave Macmillan.
- Gauweiler, P. (2018). Auswärtige Kulturpolitik. Die dritte Säule der Außenpolitik. In O. Zimmermann & T. Geißler (eds.), *Die dritte Säule: Beiträge zur Auswärtigen Kultur- und Bildungspolitik* (Politik & Kultur No. 16, pp. 101–103). Berlin,
- Gerring, J. (2004). What Is a Case Study and What Is It Good for? *The American Political Science Review*, 98(2), 341–354.
- Gilboa, E. (2008). Searching for a Theory of Public Diplomacy. *The ANNALS of the American Academy of Political and Social Science*, 616(1), 55–77. <https://doi.org/10.1177/0002716207312142>
- Gioia, D. A., Corley, K. G., & Hamilton, A. L. (2013). Seeking Qualitative Rigor in Inductive Research. *Organizational Research Methods*, 16(1), 15–31. <https://doi.org/10.1177/1094428112452151>
- Gläser, J., & Laudel, G. (2013). Life With and Without Coding: Two Methods for Early-Stage Data Analysis in Qualitative Research Aiming at Causal Explanations. *Forum: Qualitative Social Research*, 14(2). <https://doi.org/10.17169/FQS-14.2.1886>
- Gläser, J., & Velarde, K. S. (2018). Changing Funding Arrangements and the Production of Scientific Knowledge: Introduction to the Special Issue. *Minerva*, 56(1), 1–10. <https://doi.org/10.1007/s11024-018-9344-6>
- Gluckmann, P. D., Turekian, V. C., Grimes, R. W., & Kishi, T. (2017). *Science Diplomacy: A Pragmatic Perspective from the Inside* (Science & Diplomacy No. 6 (4)).
- Goetschel, L., Bernath, M., & Schwarz, D. (2005). *Swiss Foreign Policy: Foundations and Possibilities*. New York: Routledge.
- Goodman, L. A. (2011). Comment: On Respondent-Driven Sampling and Snowball Sampling in Hard-to-Reach Populations and Snowball Sampling Not in Hard-to-Reach Populations. *Sociological Methodology*, 41(1), 347–353. <https://doi.org/10.1111/j.1467-9531.2011.01242.x>
- Goodsite, M. E., Bertelsen, R. G., Pertoldi-Bianchi, S. C., Ren, J., van der Watt, L.-M., & Johannsson, H. (2016). The role of science diplomacy: a historical development and international legal framework of arctic research stations under conditions of climate change, post-cold war geopolitics and globalization/power transition. *Journal of Environmental Studies and Sciences*, 6(4), 645–661. <https://doi.org/10.1007/s13412-015-0329-6>
- Gottlieb, T. (2019a). *Innovation Centre Denmark – São Paulo: Research, Funding and Collaboration Opportunities – with Denmark*.
- Gottlieb, T. (April 2019b). *Innovation Centre Denmark*. Retrieved from <https://www.fau-bai.org.br/conf/presentation2019/Centres%20for%20research%20and%20innovation%20as%20platforms%20for%20sustainable%20cooperation%20between%20Europe%20and%20Brazil.pdf>

- Götz, T. (2009). Vorwort: Wissenswelten verbinden. Deutsche Außenpolitik für mehr Bildung, Wissenschaft und Forschung. In Auswärtiges Amt (Chair), *Wissenswelten verbinden. Auftaktkonferenz zur Initiative Außenwissenschaftspolitik*, Berlin.
- Government of Spain (2016). *Report on Science, Technology And Innovation Diplomacy*.
- Graf, L. (2013). *The Hybridization of Vocational Training and Higher Education in Austria, Germany, and Switzerland*. Opladen [u.a.]: Budrich UniPress Ltd. <https://doi.org/10.3224/86388043>
- Gregory, B. (2008). Public Diplomacy: Sunrise of an Academic Field. *The ANNALS of the American Academy of Political and Social Science*, 616(1), 274–290. <https://doi.org/10.1177/0002716207311723>
- Griessen, T., & Braun, D. (2008). The political coordination of knowledge and innovation policies in Switzerland. *Science and Public Policy*, 35(4), 277–288. <https://doi.org/10.3152/030234208X310338>;
- Gunn, A. (2017). Policy entrepreneurs and policy formulation. In M. Howlett & I. Mukherjee (eds.), *Handbooks of research on public policy. Handbook of Policy Formulation* (pp. 265–282). Cheltenham: Edward Elgar Publishing.
- Gupta, K. (2012). Comparative Public Policy: Using the Comparative Method to Advance Our Understanding of the Policy Process. *The Policy Studies Journal*, 40(S1), 11–26. <https://doi.org/10.1111/j.1541-0072.2012.00443.x>
- Haber, E. (2012, October 27). *Staatssekretärin Haber zur Eröffnung des Deutschen Wissenschafts- und Innovations-hauses in New Delhi*. DWIH, Neu Delhi. Retrieved from <http://www.auswaertiges-amt.de/DE/Infoservice/Presse/Reden/2012/121028-Haber-DWIH-Delhi.html>
- Habicht, M. (1953). The Special Position of Switzerland in International Affairs. *International Affairs (Royal Institute of International Affairs 1944–)*, 29(4), 457–463. <https://doi.org/10.2307/2606004>
- Haelg, L., Sewerin, S., & Schmidt, T. S. (2020). The role of actors in the policy design process: introducing design coalitions to explain policy output. *Policy Sciences*, 53(2), 309–347. <https://doi.org/10.1007/s11077-019-09365-z>
- Hajjar, D. P. (2016, June 27). Want to ease tensions in the Middle East? Science diplomacy can help. *Brookings*. Retrieved from <https://www.brookings.edu/blog/markaz/2016/06/27/want-to-ease-tensions-in-the-middle-east-science-diplomacy-can-help/>
- Hall, P. A., & Taylor, R. C. (1996). *Political Science and the Three New Institutionalisms* (MPIFG Discussion Paper No. 6). Cologne.
- Halpern, C. (2008). EU-policy Instruments: To What Extent are they EU-specific? Comparison and transfer of European environmental policy instruments. In *Efficient and Democratic Governance in the European Union* (Connex Report Series, pp. 109–118). Mannheim,
- Halpern, C. (2010). Governing Despite its Instruments? Instrumentation in EU Environmental Policy. *West European Politics*, 33(1), 39–57. <https://doi.org/10.1080/01402380903354064>
- Halpern, C., Jacquot, S., & Le Galès, P. (2008). *A Mainstreaming: Analysis of a Policy Instrument* (New Gov Policy Brief).

- Harmsen, R., & Powell, J. J. W. (2019). Higher Education Systems and Institutions, Luxembourg. In J. C. Shin & P. Teixeira (eds.), *Encyclopedia of International Higher Education Systems and Institutions* (pp. 1–5). Dordrecht: Springer Netherlands; Imprint: Springer.
- Harmsen, R., & Tupper, A. (2017). The Governance of Post-Secondary Education Systems in British Columbia and Ontario: Path dependence and Provincial Policy. *Canadian Public Administration*, 60(3).
- Harnisch, S. (2013). German Foreign Policy: Gulliver's Travails in the 21st Century. In R. K. Beasley, J. Kaarbo, J. S. Lantis, & Snarr, Michel, T. (eds.), *Foreign Policy in Comparative Perspective: Domestic and International Influences on State Behavior* (pp. 71–93). Sage Publications.
- Harnischfeger, H. (2007). Auswärtige Kulturpolitik. In S. Schmidt, G. Hellmann, & R. Wolf (eds.), *Handbuch zur deutschen Aussenpolitik* (1st edn., pp. 713–723). Wiesbaden: VS Verlag für Sozialwissenschaften. https://doi.org/10.1007/978-3-531-90250-0_56
- Hassan, M., ter Meulen, V., McGrath, P. F., & Fears, R. (2015). Academies of Science as Key Instruments of Science Diplomacy. *Science & Diplomacy*. (4. No. 1 (March)).
- Hassel, A. (2015). Public Policy. In J. Wright (ed.), *International Encyclopedia of the Social & Behavioral Sciences* (pp. 569–575). Elsevier. <https://doi.org/10.1016/B978-0-08-097086-8.75029-X>
- Heidenheimer, A. J. (1997). *Disparate ladders: Why school and university policies differ in Germany, Japan and Switzerland*. Abingdon, Oxon: Routledge.
- Heidenheimer, A. J., Hecló, H., & Teich Adams, C. (2005). The politics of social choice. In H. J. Wiarda (ed.), *Critical concepts in political science. Comparative politics: Volume VI Comparative Public Policy* (Vol. 6, 13–36). London: Routledge.
- Helfferich, C. (2011). *Die Qualität qualitativer Daten: Manual für die Durchführung qualitativer Interviews* (4th edn.). Wiesbaden: VS Verlag für Sozialwissenschaften / Springer Fachmedien Wiesbaden GmbH Wiesbaden. <https://doi.org/10.1007/978-3-531-92076-4>
- Hellström, T., & Jacob, M. (2017). Policy instrument affordances: a framework for analysis. *Policy Studies*, 38(6), 604–621. <https://doi.org/10.1080/01442872.2017.1386442>
- Héritier, A. (2012). Policy Effectiveness and Transparency in European Policy-Making. In E. Jones, A. Menon, & Weatherill (eds.), *The Oxford Handbook of the European Union* (pp. 676–689). Oxford: Oxford University Press. <https://doi.org/10.1093/oxfordhb/9780199546282.013.0047>
- Hertig, H.-P. (2015). *UNESCO science report: towards 2030*.
- Hesse, J. J. (2010). Die Internationalisierung der Wissenschaftspolitik: Nationale Wissenschaftssysteme im Vergleich. *Journal for Comparative Government and European Policy*, 8(1), 89–128.
- Hofmänner, A. (2018). *New International Science and Technology Policies: Key Issues and Questions in Switzerland: An exploratory study conducted on behalf of the Swiss Science Council SSC* (No. ISBN 978-3-906113-54-8). Bern.

References

- Hood, C. (1983). *The Tools of Government: Public Policy and Politics* (1st edn.). London: Macmillan.
- Hood, C. (2007). Intellectual Obsolescence and Intellectual Makeovers: Reflections on the Tools of Government after Two Decades. *Governance: An International Journal of Policy, Administration, and Institutions*, 20(1), 127–144.
- Hood, C., & Margetts, H. (2007). *The Tools of Government in the Digital Age*. Basingstoke: Palgrave Macmillan.
- Hoornbeek, J. A., & Peters, B. G. (2017). Understanding policy problems: a refinement of past work. *Policy and Society*, 36(3), 365–384. <https://doi.org/10.1080/14494035.2017.1361631>
- Hornbostel, S. (2001). Third party funding of German universities. An indicator of research activity? *Scientometrics*, 50(3), 523–537. <https://doi.org/10.1023/A:1010566916697>
- Hotz-Hart, B. (2012). Innovation Switzerland: A Particular Kind of Excellence. In J. Bauer, A. Lang, & V. Schneider (eds.), *Innovation Policy and Governance in High-Tech Industries: The Complexity of Coordination* (1st edn., pp. 127–154). Berlin, Heidelberg: Springer. <https://doi.org/10.5167/UZH-50783>
- House of Switzerland (2016). Swiss Pavilion EXPO 2017: call for projects. Retrieved from <https://houseofswitzerland.org/de/headlines/swiss-pavilion-expo-2017-call-projects>
- Howlett, M. (1991). Policy Instruments, Policy Styles, and Policy Implementation: National Approaches to Theories of Instrument Choice. *Policy Studies Journal*, 19(2), 1–21. <https://doi.org/10.1111/j.1541-0072.1991.tb01878.x>
- Howlett, M. (2000). Managing the "hollow state": procedural policy instruments and modern governance. *Canadian Public Administration/Administration Publique Du Canada*, 43(4), 412–431. <https://doi.org/10.1111/j.1754-7121.2000.tb01152.x>
- Howlett, M. (2004). Beyond Good and Evil in Policy Implementation: Instrument Mixes, Implementation Styles, and Second Generation Theories of Policy Instrument Choice. *Policy and Society*, 23(2), 1–17. [https://doi.org/10.1016/S1449-4035\(04\)70030-2](https://doi.org/10.1016/S1449-4035(04)70030-2)
- Howlett, M. (2005). What is a policy instrument? Tools, mixes, and implementation styles. In F. P. Eliadis, M. M. Hill, & M. Howlett (eds.), *Designing Government: From Instruments to Governance* (1st edn., 31–50). Montreal: McGill-Queen's University Press.
- Howlett, M. (2009). Governance modes, policy regimes and operational plans: A multi-level nested model of policy instrument choice and policy design. *Policy Sciences*, 42(1), 73–89. <https://doi.org/10.1007/s11077-009-9079-1>
- Howlett, M. (2014a). From the 'old' to the 'new' policy design: design thinking beyond markets and collaborative governance. *Policy Sciences*, 47(3), 187–207. <https://doi.org/10.1007/s11077-014-9199-0>
- Howlett, M. (2014b). Policy Design: What, Who, How and Why? In C. Halpern, P. Lascoumes, & P. Le Galès (eds.), *L'instrumentation de l'action publique: Controverses, résistances, effets* (pp. 281–315). Paris: Presses de la Fondation nationale des sciences politiques.

- Howlett, M. (2018). The criteria for effective policy design: character and context in policy instrument choice. *Journal of Asian Public Policy*, 11(3), 245–266. <https://doi.org/10.1080/17516234.2017.1412284>
- Howlett, M., & Mukherjee, I. (2014). Policy Design and Non-Design: Towards a Spectrum of Policy Formulation Types. *Politics and Governance*, 2(2), 57–71. <https://doi.org/10.17645/pag.v2i2.149>
- Howlett, M., & Mukherjee, I. (2017). Policy design: From tools to patches. *Canadian Public Administration*, 60(1), 140–144. <https://doi.org/10.1111/capa.12209>
- Howlett, M., Mukherjee, I., & Woo, J. J. (2015). From tools to toolkits in policy design studies: the new design orientation towards policy formulation research. *Policy & Politics*, 43(2), 291–311. <https://doi.org/10.1332/147084414X13992869118596>
- Howlett, M., & Ramesh, M. (1993). Patterns of Policy Instrument Choice: Policy Styles, Policy Learning and the Privatization Experience. *Review of Policy Research*, 12(1–2), 3–24. <https://doi.org/10.1111/j.1541-1338.1993.tb00505.x>
- Howlett, M., & Ramesh, M. (2003). *Studying Public Policy: Policy Cycles and Policy Subsystems* (2nd edn.). Don Mills, Ontario: Oxford Univ. Press.
- Huisman, J., & van der Wende, M. (eds.) (2005). *ACA papers on international cooperation in education. On cooperation and Competition II: Institutional responses to Internationalisation, Europeanisation and Globalisation*. Bonn: Lemmens.
- Hüther, O., & Krücken, G. (2016). Nested Organizational Fields: Isomorphism and Differentiation among European Universities. In E. Popp Berman & C. Paradeise (eds.), *Research in the Sociology of Organizations: Vol. 46. The University Under Pressure* (Vol. 46, pp. 53–83). Bingley: Emerald Publishing Limited. <https://doi.org/10.1108/S0733-558X20160000046003>
- Jäger, T., Höse, A., & Oppermann, K. (eds.) (2011). *Deutsche Außenpolitik: Sicherheit, Wohlfahrt, Institutionen und Normen* (2nd edn.). Wiesbaden: VS Verlag für Sozialwissenschaften. <https://doi.org/10.1007/978-3-531-93024-4>
- Jenson, J., & Nagels, N. (2018). Social Policy Instruments in Motion. Conditional Cash Transfers from Mexico to Peru. *Social Policy & Administration*, 52(1), 323–342. <https://doi.org/10.1111/spol.12275>
- Jones, C. M. (2010). Bureaucratic Politics and Organizational Process Models. In Oxford Research Encyclopedias (ed.). <https://doi.org/10.1093/acrefore/9780190846626.013.2>
- Jones, P. L. (2015). *Track two diplomacy in theory and practice*. Stanford, CA: Stanford University Press.
- Jost, H. U. (2012). Wissenschaft auf Aussenposten. Eine Einführung zur Geschichte der Wissenschaftsattachés. In A. Fleury & S. Zala (eds.), *Quaderni di Dodis: Vol. 1, Wissenschaft und Aussenpolitik: Beiträge zur Tagung anlässlich des 50. Jubiläums der Schaffung des ersten Postens eines schweizerischen Wissenschaftsattachés* (pp. 15–20). Bern: Diplomatische Dokumente der Schweiz.
- Kaltofen, C., & Acuto, M. (2018). Science Diplomacy: Introduction to a Boundary Problem. *Global Policy*, 9 (53), 8–13.
- Kaltofen, C., Acuto, M., & Blackstock, J. (eds.) (2018). Science Diplomacy [Special issue]. *Global Policy*, 9(53). Oxford: John Wiley & Sons Ltd.: John Wiley & Sons Ltd.

References

- Kaplan, K. (2011). International opportunities: The science of diplomacy. *Nature*, 470(7334), 425–427. <https://doi.org/10.1038/nj7334-425a>
- Kassim, H., & Le Galès, P. (2010). Exploring Governance in a Multi-Level Polity: A Policy Instruments Approach. *West European Politics*, 33(1), 1–21. <https://doi.org/10.1080/01402380903354031>
- Keenan, M., Cutler, P., Marks, J., Meylan, R., Smith, C., & Koivisto, E. (2012). Orienting international science cooperation to meet global 'grand challenges'. *Science and Public Policy*, 39(2), 166–177. <https://doi.org/10.1093/scipol/scs019>
- Keerawella, G. (2016). Symbiosis between science and diplomacy in changing paradigm in international affairs. Retrieved from http://www.island.lk/index.php?page_cat=article-details&page=article-details&code_title=154034
- Kleiber, C. (2000). Going Global and Acting Locally. In X. L. Comtesse & C. von Arb (eds.), *Swiss House for Advanced Research and Education* (pp. 4–5). Boston: SHARE Boston.
- Kleiber, C. (2021). “We wanted to invent a new diplomacy”: Former Swiss State Secretary Charles Kleiber reflects on 20 years of swissnex, and imagines a future Switzerland that tackles global challenges head-on. In *Revealing the Dots: Eleven interviews with some of the most influential figures in swissnex's 20-year history* (4–5). Boston: Swissnex Boston.
- Kluge, S. (2000). Empirisch begründete Typenbildung in der qualitativen Sozialforschung. *Forum: Qualitative Social Research*, 1(1).
- Kosmützky, A. (2016). The Precision and Rigor of International Comparative Studies in Higher Education. In J. Huisman & M. Tight (eds.), *Theory and Method in Higher Education Research. Theory and Method in Higher Education Research* (2nd edn., Vol. 2, pp. 199–221). Bingley: Emerald Publishing Limited. <https://doi.org/10.1108/S2056-375220210000007004>
- Kosmützky, A. (2019). Comparative Research, Higher Education. In J. C. Shin & P. Teixeira (eds.), *Encyclopedia of International Higher Education Systems and Institutions* (pp. 1–8). Dordrecht: Springer Netherlands; Imprint: Springer. https://doi.org/10.1007/978-94-017-9553-1_175-1
- Kothari, C. R. (2004). *Research methodology: Methods & techniques* (2nd rev. edn.). New Delhi: New Age International (P) Ltd. Publishers.
- Kowner, A. (1993). Kulturförderung in der Schweiz. In R. Strachwitz & S. Toepler (eds.), *Kulturförderung: Mehr als Sponsoring* (pp. 111–119). Wiesbaden: Gabler Verlag. https://doi.org/10.1007/978-3-322-85836-8_11
- Kristensen, G. K., & Ravn, M. N. (2015). The voices heard and the voices silenced: recruitment processes in qualitative interview studies. *Qualitative Research*, 15(6), 722–737. <https://doi.org/10.1177/1468794114567496>
- Krücken, G., & Meier, F. (2006). Turning the University into an Organizational Actor. In G. S. Drori, J. W. Meyer, & H. Hwang (eds.), *Globalization and Organization: World Society and Organizational Change* (pp. 241–257). Oxford: Oxford University Press.

- Kuckartz, U. (2006). Zwischen Singularität und Allgemeingültigkeit: Typenbildung als qualitative Strategie der Verallgemeinerung. In K.-S. Rehberg (ed.), *Soziale Ungleichheit, kulturelle Unterschiede: Verhandlungen des 32. Kongresses der Deutschen Gesellschaft für Soziologie in München*. Frankfurt am Main: Campus Verlag.
- Kuhlmann, S. (2008). Forschungs- und Innovationssysteme im internationalen Wettbewerb. In G. Schütte (ed.), *Wettlauf ums Wissen: Außenwirtschaftspolitik im Zeitalter der Wissensrevolution* (1st edn., pp. 52–58). Berlin: Berlin Univ. Press.
- Kuhlmann, S., & Rip, A. (2018). Next-Generation Innovation Policy and Grand Challenges. *Science and Public Policy*, 45(4), 448–454. <https://doi.org/10.1093/scipol/scy011>
- Kwiek, M. (2021). The Globalization of Science: The Increasing Power of Individual Scientists. In P. Mattei, X. Dumay, E. Mangez, & J. Behrend (eds.), *The Oxford Handbook of Education and Globalization* (pp. 1–35). Oxford: Oxford University Press.
- Laclau, E., & Mouffe, C. (2014). *Hegemony and socialist strategy: Towards a radical democratic politics* (2nd edn.). *Radical thinkers*. London, New York: Verso.
- Lascoumes, P., & Le Galès, P. (2004). *Gouverner par les instruments* (1st edn.). *Sciences Po Gouvernance*. Paris: Presses de Sciences Po.
- Lascoumes, P., & Le Galès, P. (2007). Introduction: Understanding Public Policy through Its Instruments—From the Nature of Instruments to the Sociology of Public Policy Instrumentation. *Governance: An International Journal of Policy, Administration, and Institutions*, 20(1), 1–21.
- Lascoumes, P., & Simard, L. (2011). Public Policy Seen Through the Prism of its Instruments: Introduction. *Revue Française De Science Politique (English Edition)*, 61(1), 1–17. <https://doi.org/10.3917/rfspe.611.0001>
- Le Galès, P. (2011). Policy Instruments and Governance. In M. Bevir (ed.), *The SAGE Handbook of Governance* (pp. 142–159). London: SAGE Publications Ltd.
- Le Galès, P. (2016). Performance measurement as a policy instrument. *Policy Studies*, 37(6), 508–520. <https://doi.org/10.1080/01442872.2016.1213803>
- Leese, M. (2018). Between a Carrot and a Stick: Science Diplomacy and Access to EU Research Funding. *Global Policy*, 9(2), 48–52. <https://doi.org/10.1111/1758-5899.12546>
- Legrand, T., & Stone, D. (2018). Science diplomacy and transnational governance impact. *British Politics*, 13(3), 392–408. <https://doi.org/10.1057/s41293-018-0082-z>
- Leijten, J. (2017). Exploring the future of innovation diplomacy. *European Journal of Futures Research*, 5(1). <https://doi.org/10.1007/s40309-017-0122-8>
- Lepori, B. (2008). Research in non-university higher education institutions. The case of the Swiss Universities of Applied Sciences. *Higher Education*, 56(1), 45–58. <https://doi.org/10.1007/s10734-007-9088-y>
- Lepori, B., & Fumasoli, T. (2010). Reshaping the Swiss Higher Education System: Governance Reforms and Fields Reconfigurations. *Swiss Political Science Review*, 16(4), 811–814.
- Lepori, B., Huisman, J., & Seeber, M. (2014). Convergence and differentiation processes in Swiss higher education: an empirical analysis. *Studies in Higher Education*, 39(2), 197–218. <https://doi.org/10.1080/03075079.2011.647765>

References

- Lepori, B., Seeber, M., & Bonaccorsi, A. (2015). Competition for talent. Country and organizational-level effects in the internationalization of European higher education institutions. *Research Policy*, 44(3), 789–802. <https://doi.org/10.1016/j.respol.2014.11.004>
- Lequesne, C. (2020). Ministries of Foreign Affairs: A Crucial Institution Revisited. *The Hague Journal of Diplomacy*, 15(1–2), 1–12. <https://doi.org/10.1163/1871191X-BJA10003>
- Linder, S. H., & Peters, B. G. (1989). Instruments of Government: Perceptions and Contexts. *Journal of Public Policy*, 9(1), 35–58.
- Loftness, R. L. (1955). Why Science Attaches? *The Scientific Monthly*, 80(2), 124–127.
- Lombard, T. (2021). "The idea was to build bridges between science and business". In *Revealing the Dots: Eleven interviews with some of the most influential figures in swissnex's 20-year history* (pp. 16–18). Boston: Swissnex Boston.
- Lombard, T., & Odier, P. (2000). Building a Bridge. In X. L. Comtesse & C. von Arb (eds.), *Swiss House for Advanced Research and Education* (pp. 6–7). Boston: SHARE Boston.
- Lombard Odier (2011). *Collaboration and Partnerships: the 'swissnex' Case*. Geneva.
- Long, T. (2017). It's not the size, it's the relationship: from 'small states' to asymmetry. *International Politics*, 54(2), 144–160. <https://doi.org/10.1057/s41311-017-0028-x>
- Lord, K. M., & Turekian, V. C. (2007). Science and Society. Time for a New Era of Science Diplomacy. *Science*, 315(5813), 769–770. <https://doi.org/10.1126/science.1139880>
- Lord, K. M., & Turekian, V. C. (2009, May 5). The Science of Diplomacy. *Brookings*. Retrieved from <https://www.brookings.edu/articles/the-science-of-diplomacy/>
- Lubell, M. (2003). Collaborative Institutions, Belief-Systems, and Perceived Policy Effectiveness. *Political Research Quarterly*, 56(3), 309–323. <https://doi.org/10.1177/106591290305600306>
- Maassen, S., & Weingart, P. (eds.) (2005a). *Sociology of the sciences: v. 24. Democratization of expertise? Exploring novel forms of scientific advice in political decision-making*. Dordrecht, London: Springer. Retrieved from <http://www.springer.com/gb/BLDSS>
- Maassen, S., & Weingart, P. (2005b). What's New in Scientific Advice to Politics? Exploring Novel Forms of Scientific Advice in Political Decision-Making. In S. Maassen & P. Weingart (eds.), *Sociology of the sciences: v. 24. Democratization of expertise? Exploring novel forms of scientific advice in political decision-making* (pp. 1–19). Dordrecht, London: Springer.
- Maaß, K.-J. (2011). Aktuelle Herausforderungen der Auswärtigen Kulturpolitik. In T. Jäger, A. Höse, & K. Oppermann (eds.), *Deutsche Außenpolitik: Sicherheit, Wohlfahrt, Institutionen und Normen* (2nd edn., pp. 584–602). Wiesbaden: VS Verlag für Sozialwissenschaften.
- Maaß, K.-J. (2013). *Werbung, Werte, Wettbewerb – wohin steuert die Auswärtige Kulturpolitik?* Stuttgart.
- Maaß, K.-J. (2015). Das deutsche Modell – Die Mittlerorganisationen. In K.-J. Maaß (ed.), *Kultur und Außenpolitik: Handbuch für Wissenschaft und Praxis* (3rd edn., pp. 263–277). Baden-Baden: Nomos.

- Mahoney, J., & Thelen, K. (eds.) (2009). *Explaining Institutional Change: Ambiguity, Agency, and Power*. Cambridge: Cambridge University Press. <https://doi.org/10.1017/CBO9780511806414.003>
- Mai, M. (2016). *Regieren in der modernen Gesellschaft: Governance aus der Sicht der Ministerialbürokratie*. Opladen [u.a.]: Verlag Barbara Budrich. <https://doi.org/10.3224/84740518>
- Mansell, R. (2018). Science diplomacy and internet governance. In M. Marzouki & A. Calderaro (eds.), *Global Internet Governance as a Diplomacy Issue*. Lanham: Rowman and Littlefield, Lanham.
- Marmier, P. (2021). “We were seeding relationships that very often grew into successful partnerships”. In *Revealing the Dots: Eleven interviews with some of the most influential figures in swissnex’s 20-year history* (pp. 28–31). Boston: Swissnex Boston.
- Marmier, P., & Fetscherin, M. (2010). Case E: A Public–Private Partnership to Foster Science, Higher Education and Innovation – The Case of Switzerland with swissnex Boston. In F. Go & R. Govers (eds.), *International Place Branding Yearbook 2010: Place Branding in the New Age of Innovation* (pp. 97–109). Palgrave Macmillan London.
- Marques, M. (2018). *Research Governance through public funding instruments: institutional change of educational research in the European Union and England 1984–2014* (Dissertation). University of Luxembourg.
- Marsh, D., & McConnell, A. (Eds.) (2008). *Towards a Framework for Examining Policy Success*.
- Max Dohner (2019, April 28). Hans Peter Hertig – Er bündelt dort, wo die Wege sich gabeln. *St.Galler Tagblatt AG*. Retrieved from <https://www.tagblatt.ch/kultur/buch-buehne-kunst/er-bundelt-dort-wo-die-wege-sich-gabeln-ld.1359501>
- Mayntz, R. (1996). *Politik und Wissenschaft – ein Spannungsverhältnis*. Retrieved from Spektrum der Wissenschaft Verlagsgesellschaft mbH website: <https://www.spektrum.de/magazin/politik-und-wissenschaft-ein-spannungsverhaeltnis/823031>
- Mayntz, R., & Scharpf, F. W. (1995). Der Ansatz des akteurszentrierten Institutionalismus. In R. Mayntz & F. W. Scharpf (eds.), *Gesellschaftliche Selbstregelung und politische Steuerung* (pp. 39–72). Frankfurt/New York: Campus Verlag.
- Melchor, L. (2020). What Is a Science Diplomat? *The Hague Journal of Diplomacy*, 15(3), 409–423. <https://doi.org/10.1163/1871191X-BJA10026>
- Melissen, J. (2005). The New Public Diplomacy: Between Theory and Practice. In J. Melissen (ed.), *Studies in diplomacy. The New Public Diplomacy: Soft Power in International Relations* (pp. 3–27). Houndmills Basingstoke Hampshire, New York: Palgrave Macmillan.
- Menon, A., & Sedelmeier, U. (2010). Instruments and Intentionality: Civilian Crisis Management and Enlargement Conditionality in EU Security Policy. *West European Politics*, 33(1), 75–92. <https://doi.org/10.1080/01402380903354106>
- Merton, R. K. (1974). *The Sociology of Science: Theoretical and Empirical Investigations*. Chicago and London: University of Chicago Press.

References

- Mey, G., & Mruck, K. (2007). Qualitative Interviews. In G. Naderer & E. Balzer (eds.), *Qualitative Marktforschung in Theorie und Praxis: Grundlagen, Methoden und Anwendungen* (pp. 247–278). Wiesbaden: Betriebswirtschaftlicher Verlag Dr. Th. Gabler / GWV Fachverlage GmbH, Wiesbaden. https://doi.org/10.1007/978-3-8349-9262-8_13
- Meyer, J. W., Boli, J., Thomas, G. M., & Ramirez, F. O. (1997). World Society and the Nation-State. *American Journal of Sociology*, 103(1), 144–181. <https://doi.org/10.1086/231174>
- Meyer, J. W., & Rowan, B. (1977). Institutionalized Organizations: Formal Structure as Myth and Ceremony. *American Journal of Sociology*, 83(2), 340–363.
- Milkoreit, M. (2015). Science and Climate Change Diplomacy: Cognitive Limits and the Need to Reinvent Science Communication. In L. S. Davis & R. G. Patman (eds.), *Science Diplomacy: New Day Or False Dawn?* (pp. 109–131). Singapore: World Scientific Publishing Co. Pte. Ltd.
- Ministry of Foreign Affairs Denmark (2021). Innovation Centre Denmark Tel Aviv: Advisory Board. Retrieved from <https://israel.um.dk/en/innovation-centre/advisory-board-ii>
- European Commission (01.06.15). *The EU approach to science diplomacy* [Press release]. Washington. Retrieved from https://ec.europa.eu/commission/2014-2019/moe-das/announcements/eu-approach-science-diplomacy_en
- Moedas, C. (2016). Science Diplomacy in the European Union. *Science & Diplomacy*. (March). Retrieved from <http://www.sciencediplomacy.org/perspective/2016/science-diplomacy-in-european-union>
- Morgan, L. (2010, March 3). *Letter to Mrs Maria Vamvakinou MP*. Letter. Canberra.
- Moro-Martín, A. (2017). How dare you call us diplomats. *Nature*, 543(7645), 289. <https://doi.org/10.1038/543289a>
- Mosch, K. (2009). Deutsche Wissenschafts- und Innovationshäuser: Was das Goethe-Institut für die Kultur ist, sollen die DWIH für die Wissenschaft werden. *Wissenschaftsmanagement. Zeitschrift Für Innovation*, 15(6), 4–5.
- Moses, J. W., & Knutsen, T. (2001). Inside Out: Globalization and the Reorganization of Foreign Affairs Ministries. *Cooperation and Conflict*, 36(4), 355–380. <https://doi.org/10.1177/00108360121962506>
- Mukherjee, I., & Bali, A. S. (2019). Policy effectiveness and capacity: two sides of the design coin. *Policy Design and Practice*, 2(2), 103–114. <https://doi.org/10.1080/25741292.2019.1632616>
- Mukherjee, J. (2022, March 5). A price to pay: What science diplomacy means in wartime. Retrieved from <https://www.universityworldnews.com/post.php?story=202304085448544>
- Netzwerk Future (2019). *Förderung von Bildung, Forschung und Innovation in den Jahren 2021-2024: Gemeinsames Positionspapier der Schweizer Hochschulen und der Institutionen der Forschungs- und Innovationsförderung*. Bern.
- Newman, P. (2009). Methods for analyzing policy tools: the case of new planning instruments in the UK. *Planum — the European Journal of Planning Online*, 1–7.

- Nordic Innovation House (2021, August 13). About Us. Retrieved from <https://www.nordicinnovationhouse.com/#about-nih>
- Nye, J. S. (1990). Soft Power. *Foreign Policy*, 80, 153–171.
- Nye, J. S. (2008). Public Diplomacy and Soft Power. *The ANNALS of the American Academy of Political and Social Science*, 616(1), 94–109. <https://doi.org/10.1177/0002716207311699>
- Ostrowski, D. (2010). *Die Public Diplomacy der deutschen Auslandsvertretungen weltweit: Theorie und Praxis der deutschen Auslandsöffentlichkeitsarbeit* (1st edn.). Wiesbaden: VS Verlag für Sozialwissenschaften. https://doi.org/10.1007/978-3-531-92263-8_3
- Oxford Research A/S (2015). *Evaluation of the Danish Innovation Centres: For the Ministry of Foreign Affairs of Denmark and the Danish Ministry of Higher Education and Science*.
- Oxford Research A/S (2020). *Evaluation of the swissnex Network: Evaluation report by Oxford Research for the Swiss State Secretariat for Education, Research and Innovation (SERI)*. Denmark.
- Özkaragöz Dogan, E. (2015). *Science Diplomacy in the Global Age: Examples from Turkey and the World*. Middle East Technical University, Ankara.
- Padgett, J. F., & Powell, W. W. (2012). The Problem of Emergence. In J. F. Padgett & W. W. Powell (eds.), *The Emergence of Organizations and Markets* (pp. 1–29). Princeton, Oxford: Princeton University Press.
- Pasternack, P., Maue, I., Hechler, D., Kolasinski, T., & Schulze, H. (2016). *Die BFI-Policy-Arena in der Schweiz: Akteurskonstellation in der Bildungs-, Forschungs- und Innovationspolitik* (1st edn.). Hochschul- und Wissenschaftsforschung Halle-Wittenberg. Berlin: BWV Berliner Wissenschafts-Verlag.
- Peters, B. G. (2005). The Problem of Policy Problems. *Journal of Comparative Policy Analysis: Research and Practice*, 7(4), 349–370. <https://doi.org/10.1080/13876980500319204>
- Peters, B. G., Capano, G., Howlett, M., Mukherjee, I., Chou, M.-H., & Ravinet, P. (2018). *Designing for Policy Effectiveness*. Cambridge: Cambridge University Press. <https://doi.org/10.1017/9781108555081>
- Peters, B. G., & van Nispen, F. K. M. (eds.) (1998). *New horizons in public policy. Public Policy Instruments: Evaluating the Tools of Public Administration*. Cheltenham, Northampton: Edward Elgar.
- Pierson, P. (2000). Increasing Returns, Path Dependence, and the Study of Politics. *American Political Science Association*, 94(2), 251–267.
- Pierson, P. (2004). *Politics in Time: History, Institutions, and Social Analysis*. Princeton, N.J., Oxford: Princeton University Press. Retrieved from <http://swb.ebib.com/patron/FullRecord.aspx?p=768545>
- Powell, J. J. W. (2018). Higher Education and the Exponential Rise of Science: Competition and Collaboration. In R. A. Scott, M. Buchmann, & S. M. Kosslyn (eds.), *Emerging trends in the social and behavioral sciences: An interdisciplinary, Searchable, and Linkable resource* (pp. 1–17). New York: John Wiley & Sons. <https://doi.org/10.1002/9781118900772>

References

- Powell, J. J. W. (2020). Comparative education in an age of competition and collaboration. *Comparative Education*, 56(1), 57–78. <https://doi.org/10.1080/03050068.2019.1701248>
- Powell, J. J. W., Baker, D., & Fernandez, F. (eds.) (2017). *International perspectives on education and society: Vol. 33. The Century of Science: The Global Triumph of the Research University* (1st edn.). Bingley: Emerald Publishing Limited.
- Powell, W. W. (1991). Expanding the Scope of Institutional Analysis. In W. W. Powell & P. J. DiMaggio (eds.), *The new institutionalism in organizational analysis* (pp. 183–203). Chicago, London: University of Chicago Press.
- Powell, W. W., & Sophe, B. (2015). Boundaries and New Organization Forms. In J. Wright (ed.), *International Encyclopedia of the Social & Behavioral Sciences* (pp. 768–772). Elsevier. <https://doi.org/10.1016/b978-0-08-097086-8.73050-9>
- Quevedo, F. (2013). The Importance of International Research Institutions for Science Diplomacy. *Science & Diplomacy*. (Vol. 2, No. 3 (September)).
- Raev, A. (2020). *Transnationale Bildung im Wandel: Grenzüberschreitende Hochschulbildung ‚made in Germany‘ (1990–2016)*. *Kultur und Außenpolitik: Vol. 1*. Baden-Baden: Nomos Verlagsgesellschaft mbH & Co. KG. <https://doi.org/10.5771/9783748920960>
- Raev, A., & Minkman, E. (2020). Emotional policies: Introducing branding as a tool for science diplomacy. *Humanities and Social Sciences Communications*, 7(1), 1–10. <https://doi.org/10.1057/s41599-020-00617-5>
- Rapley, T., & Rees, G. (2018). Collecting Documents as Data. In U. Flick (ed.), *The SAGE handbook of qualitative data collection* (pp. 548–565). Los Angeles: Sage.
- Ravinet, P. (2011). European Coordination alla bolognese.: Notes on the Instrumentation of the European Higher Education Area. *Revue Française De Science Politique (English Edition)*, 61(1), 19–42.
- Reale, E., & Seeber, M. (2011). *The transformation of steering and governance in Higher Education: funding and evaluation as policy instruments* (Working Paper CNR-CERIS No. 2).
- Rist, R. C. (1998). Choosing the Right Policy Instrument at the Right Time: The Contextual Challenges of Selection and Implementation. In M. L. Bemelmans-Videc, R. C. Rist, & E. Vedung (eds.), *Comparative policy analysis series. Carrots, Sticks & Sermons: Policy Instruments and their Evaluation* (pp. 156–171). New Brunswick, NJ: Transaction Publishers.
- Rittmeyer, F., & Forster, N. (2013). High-Tech-Diplomat, übernehmen Sie! In *Wissenschaftsdiplomatie: Die Schweiz vernetzt sich neu* (Dossier: «Wissenschaftsdiplomatie» Ausgabe 1003, pp. 64–67).
- Roberts, N. C., & King, P. J. (1991). Policy Entrepreneurs: Their Activity Structure and Function in the Policy Process. *Journal of Public Administration Research and Theory: J-PART*, 1(2), 147–175. Retrieved from <http://www.jstor.org/stable/1181732>
- Roulston, K., & Choi, M. (2018). Qualitative Interviews. In U. Flick (ed.), *The SAGE Handbook of Qualitative Data Collection* (pp. 349–372). Los Angeles, London, New Delhi: SAGE Publications Ltd.

- The Royal Society, & AAAS (2010). *New frontiers in science diplomacy: Navigating the changing balance of power*. London.
- Rüffin, N. V. (2018). *Case Study Science and Innovation Diplomacy Agencies at the nexus of research, economics, and politics* (Working Paper No. 2018/10). Berlin.
- Rüffin, N. V., & Schreiterer, U. (2017a). *Case Study Science and technology agreements in the toolbox of science diplomacy: Effective instruments or insignificant add-ons?* (EL-CSID Working Papers No. 6). Brussels.
- Rüffin, N. V., & Schreiterer, U. (2017b). *Emerging Practices of Diplomacy for Science in Europe: Tensions and Potentials? Panel T05P06 Session 2 Challenges in Global Policy Making: The 'Practice Turn' in the New Diplomacy*. Singapore.
- Ruffini, P.-B. (2017). *Science and diplomacy: A New Dimension of International Relations. Science, Technology and Innovation Studies*. Cham, Switzerland: Springer.
- Ruffini, P.-B. (2018). The Intergovernmental Panel on Climate Change and the Science-Diplomacy Nexus. *Global Policy*, 9 (53), 73–77.
- Ruffini, P.-B. (2020a). Collaboration and Competition: The Twofold Logic of Science Diplomacy. *The Hague Journal of Diplomacy*, 15(3), 371–382. <https://doi.org/10.1163/1871191X-BJA10028>
- Ruffini, P.-B. (2020b). Conceptualizing science diplomacy in the practitioner-driven literature: a critical review. *Humanities and Social Sciences Communications*, 7(1), 1–9. <https://doi.org/10.1057/s41599-020-00609-5>
- Rungius, C. (2020). SESAME – a synchrotron light source in the Middle East: an international research infrastructure in the making. In M. Young, T. Flink, & E. Dall (eds.), *Science Diplomacy in the Making: Case-based insights from the S4D4C project*.
- Rungius, C., & Flink, T. (2020). Romancing science for global solutions: on narratives and interpretative schemas of science diplomacy. *Humanities and Social Sciences Communications*, 7(1), 1–10. <https://doi.org/10.1057/s41599-020-00585-w>
- Sabzalieva, E., Sá, C. M., Martinez, M., & Kachynska, N. (2021). Science Diplomacy Policy Processes in Comparative Perspective: The Use of Scientific Cooperation Agreements in Canada, India, Norway, and the UK. *Minerva*, (59), 149–172. <https://doi.org/10.1007/s11024-020-09429-y>
- Salamon, L. M. (2000). The Tools of Government: A Guide to the New Governance and the Tools of Public Policy Action: An Introduction. *Fordham Urban Law Journal*, 28(5).
- Sartori, G. (1960). Der Begriff der "Wertefreiheit" in der politischen Wissenschaft. *Politische Vierteljahresschrift*, 1(1), 12–22.
- Sauruger, S. (2014). The Changing Nature of Instruments: Why and how instruments of participation change in the European Union. In C. Halpern, P. Lascoumes, & P. Le Galès (eds.), *L'instrumentation de l'action publique: Controverses, résistances, effets* (pp. 317–341). Paris: Presses de la Fondation nationale des sciences politiques.
- SBF (2006). *Jahresbericht 2006 über die Schweizer Häuser für wissenschaftlichen und technologischen Austausch*. Bern.
- Schaffer, F. C. (2006). Ordinary Language Interviewing. In D. Yanow & P. Schwartz-Shea (eds.), *Interpretation and method: Empirical research methods and the interpretive turn*. Armonk, NY u. a.: M. E. Sharpe.

- Schaper, R. (2016, April 8). Frank-Walter Steinmeier: „Man muss das Gespräch vor Ort suchen“: Außenminister zur Auswärtigen Kultur- und Bildungspolitik. *Der Tagesspiegel*. Retrieved from <https://www.tagesspiegel.de/kultur/ausenminister-zur-auswaertigen-kultur-und-bildungspolitik-frank-walter-steinmeier-man-muss-das-gespraech-vor-ort-suchen/13423998.html>
- Schavan, A. (2010, February 19). *Rede der Bundesministerin für Bildung und Forschung, Prof. Dr. Annette Schavan, MdB, anlässlich der Eröffnung des Deutschen Wissenschafts- und Innovationshauses*, New York. Retrieved from <http://www.annette-schavan.de/reden/mr20100219.pdf>
- Schlegel, F., Jacot, O., & Fetscherin, M. (2011). Science diplomacy with swissnex China: A Swiss nation brand initiative. *Place Branding and Public Diplomacy*, 7(4), 289–298. <https://doi.org/10.1057/pb.2011.14>
- Schneider, A., & Ingram, H. (1990). Behavioral Assumptions of Policy Tools. *The Journal of Politics*, 52(2), 510–529.
- Schneider, G., Schiller, J., & Goethe, J. W. (2000). Goethe ist nicht überall. Eine empirische Analyse der Standortentscheidungen in der Auswärtigen Kulturpolitik. *Zeitschrift Für Internationale Beziehungen*, 7(1), 5–32.
- Schreier, M. (2014). Qualitative Content Analysis. In U. Flick (ed.), *The SAGE Handbook of Qualitative Data Analysis* (pp. 170–183). Los Angeles: Sage. <https://doi.org/10.4135/9781446282243.n12>
- Schultes, N. (2011). Deutsche Außenwirtschaftsförderung. In T. Jäger, A. Höse, & K. Oppermann (eds.), *Deutsche Außenpolitik: Sicherheit, Wohlfahrt, Institutionen und Normen* (2nd edn., pp. 349–369). Wiesbaden: VS Verlag für Sozialwissenschaften.
- Schütte, G. (2006, April 12). Diplomatie der Forscher: Wenn Deutschland international mithalten will, braucht es eine Außenwissenschaftspolitik. Ein Plädoyer. *Die Zeit*.
- Schütte, G. (2007). Resümee: Außenwissenschaftspolitik – Wissenschaftsaußenpolitik: eine Querschnittsperspektive internationaler Politikgestaltung in modernen Wissensgesellschaften. In Stiftung Wissenschaft und Politik & Alexander von Humboldt Stiftung (eds.), *Außenwissenschaftspolitik-Wissenschaftsaußenpolitik: Arbeits- und Diskussionspapier 7/2007* (pp. 28–39). Bonn,
- Schütte, G. (ed.) (2008). *Wettlauf ums Wissen: Außenwirtschaftspolitik im Zeitalter der Wissensrevolution* (1. Aufl.). Berlin: Berlin Univ. Press.
- Schütte, G. (2009). Innovativ, sichtbar, glaubwürdig – Repräsentanzen der deutschen Wissenschaft im Ausland. In A. Borgwardt (ed.), *Wissenschaftsaußenpolitik: Deutschland als Knotenpunkt im weltweiten Wissensnetzwerk; Konferenzbericht der Veranstaltung vom 13. November 2008 Friedrich-Ebert-Stiftung* (1st edn., pp. 14–19). Berlin: Friedrich-Ebert-Stiftung.
- Schütte, G. (2010). Außenwissenschaftspolitik – Wissenschaft im globalen Wandel gestalten. In D. Simon, A. Knie, & S. Hornbostel (eds.), *Handbuch Wissenschaftspolitik* (pp. 151–161). Wiesbaden: Springer VS. https://doi.org/10.1007/978-3-531-91993-5_11
- Schütte, G. (2022, March 31). Eiszeit für die Wissenschaft. *Frankfurter Allgemeine Zeitung*. Retrieved from <https://zeitung.faz.net/faz/politik/2022-03-31/e3d23c4a67bfaa46420d292ae6e188ce/?GEPC=s3>

- Schweizer Bundesrat (2002, November 29). *02.089 Botschaft über die Förderung von Bildung, Forschung und Technologie in den Jahren 2004–2007* (No. 2002–1417). Bern.
- Schweizer Bundesrat (2007, January 24). *07.012 Botschaft über die Förderung von Bildung, Forschung und Innovation in den Jahren 2008–2011* (No. 2006–1630). Bern.
- Schweizer Bundesrat (2010, December 3). *10.109 Botschaft über die Förderung von Bildung, Forschung und Innovation im Jahr 2012*. Bern.
- Schweizer Bundesrat (2012, February 22). *12.033 Botschaft über die Förderung von Bildung, Forschung und Innovation in den Jahren 2013–2016*. Bern.
- Schweizer Bundesrat (2016, February 24). *16.025 Botschaft zur Förderung von Bildung, Forschung und Innovation in den Jahren 2017–2020* (No. 2015–2540). Bern.
- Schweizer Bundesrat (2018). *Internationale Strategie der Schweiz im Bereich Bildung, Forschung und Innovation: Strategie des Bundesrates*. Bern.
- Schweizer Bundesrat (2020a). *Botschaft zur Förderung der Kultur in den Jahren 2021–2024: (Kulturbotschaft 2021–2024)*. Bern.
- Schweizer Bundesrat (2020b, February 26). *20.028 Botschaft über die Förderung von Bildung, Forschung und Innovation in den Jahren 2021–2024*. Bern.
- Schweizer Eidgenossenschaft (2010). *Internationale Strategie der Schweiz im Bereich Bildung, Forschung und Innovation*. Bern.
- Scott, W. R. (2001). *Institutions and Organizations* (2nd edn.). *Foundations for organizational science*. Thousand Oaks, Calif: Sage Publications.
- Scott, W. R. (2008). *Institutions and Organizations: Ideas and interests* (3rd edn.). Los Angeles, Calif.: Sage Publications.
- Seawright, J., & Gerring, J. (2008). Case Selection Techniques in Case Study Research: A Menu of Qualitative and Quantitative Options. *Political Research Quarterly*, *61*(2), 294–308. <https://doi.org/10.1177/1065912907313077>
- Seeber, M. (2014). *ERAWATCH Country Reports 2013: Switzerland* (EUR – Scientific and Technical Research series No. EUR 26770 EN). Luxembourg. <https://doi.org/10.2791/10268>
- Sending, O. J., Pouliot, V., & Neumann, I. B. (2011). The future of diplomacy: Changing practices, evolving relationships. *International Journal*. (66 (3)), 527–542.
- SERI (2015a). *Eine Roadmap für die Weiterentwicklung des swissnex Netzwerkes: Bilanz, Perspektiven und Leitlinien*. Bern: Staatssekretariat für Bildung, Forschung und Innovation.
- SERI (2015b). *Staatsrechnung – swissnex Netzwerk*. Bern. Retrieved from SBFi website: http://annualreport.swissnex.org/wp-content/uploads/2017/04/Financial-Statement_Jahresbericht_2016_D.pdf
- SERI (2016). *swissnex Annual Report 2015*. Bern. Retrieved from SERI website: <http://annualreport15.swissnex.org/>
- SERI (2017). *swissnex Netzwerk: Jahresbericht 2016 – Highlights*. Bern.
- SERI (2020). *Bildung, Forschung und Innovation in der Schweiz: Chronologie*. Bern.
- SHARE Boston (2000). *Swiss House for Advanced Research and Education*. Boston.

References

- Simm, C. (2021). The only constant at swissnex is change. In *Revealing the Dots: Eleven interviews with some of the most influential figures in swissnex's 20-year history* (pp. 35–38). Boston: Swissnex Boston.
- Simon, D. [Dagmar], & Knie, A. (2010). Stabilität und Wandel des deutschen Wissenschaftssystems. In D. Simon, A. Knie, & S. Hornbostel (eds.), *Handbuch Wissenschaftspolitik* (pp. 26–33). Wiesbaden: Springer VS.
- SIN (2018). Science & Innovation Network (SIN). Retrieved from https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/604011/SIN_Strategy_Mar_2017.docx
- Singer, O. (2003). *Auswärtige Kulturpolitik in der Bundesrepublik: Konzeptionelle Grundlagen und institutionelle Entwicklung seit 1945* (No. WF X – 095/03).
- Skodvin, T. (1994). *Structure and Agent in Leadership Diplomacy: Institutional design and leadership performance in the science-politics interface of climate change* (1994:14).
- Skolnikoff, E. B. (2001). The political role of scientific cooperation. *Technology in Society*, 23(3), 461–471. [https://doi.org/10.1016/S0160-791X\(01\)00026-4](https://doi.org/10.1016/S0160-791X(01)00026-4)
- Smelser, N. J. (2003). On Comparative Analysis, Interdisciplinarity and Internationalization in Sociology. *International Sociology*, 18(4), 643–657. <https://doi.org/10.1177/0268580903184001>
- Smith III, F. L. (2014). Advancing science diplomacy: Indonesia and the US Naval Medical Research Unit. *Social Studies of Science*, 44(6), 825–847. <https://doi.org/10.1177/0306312714535864>
- Soss, J. (2006). Talking our way to meaningful explanations. In D. Yanow & P. Schwartz-Shea (eds.), *Interpretation and method: Empirical research methods and the interpretive turn*. Armonk, NY u. a.: M. E. Sharpe.
- Srugies, A. (2016). *Competition or Cooperation? A comparative analysis of the public diplomacy of the European Union and selected member states* (Dissertation). Technische Universität Ilmenau, Ilmenau.
- Stein, J. A. (2002). Globalisation, science, technology and policy. *Science and Public Policy*, 29(6), 402–408.
- Steinmeier, F.-W. (2008a). Partner gewinnen und Potenziale nutzen – Warum sich Außenpolitik für die Wissenschaft einsetzt. In G. Schütte (ed.), *Wettlauf ums Wissen: Außenwirtschaftspolitik im Zeitalter der Wissensrevolution* (1st edn., pp. 28–30). Berlin: Berlin Univ. Press.
- Steinmeier, F.-W. (2008b, February 13). *Rede vor dem Ausschuss für Kultur und Medien des Deutschen Bundestags* [Press release]. Berlin. Retrieved from <http://www.auswaertiges-amt.de/DE/Infoservice/Presse/Reden/2008/080213-SteinmeierKulturausschuss.html>
- Steinmeier, F.-W. (2009, January 19). *Rede zur Eröffnung der Auftaktkonferenz zur Initiative Außenwissenschaftspolitik* [Press release]. Berlin. Retrieved from http://www.auswaertiges-amt.de/sid_6176B0B6F3F1114753AE1DD9BA614C37/DE/Infoservice/Presse/Reden/2009/090119-BM-AWP.html

- Stiftung Wissenschaft und Politik, & Alexander von Humboldt Stiftung (2007). *Außenwissenschaftspolitik-Wissenschaftsaußenpolitik: Arbeits- und Diskussionspapier 7/2007*. Bonn.
- Stoll, M. (2018, April 15). Der Bund setzt auf Discount-Diplomaten: Wissenschaftsräte repräsentieren den Forschungsplatz Schweiz im Ausland – zu Kassierinnen-Löhnen. *SonntagsZeitung*, p. 10.
- Strasser, B. J. (2009). The Coproduction of Neutral Science and Neutral State in Cold War Europe: Switzerland and International Scientific Cooperation, 1951–69. *Osiris*, 24(1), 165–187. <https://doi.org/10.1086/605974>
- Streeck, W., & Thelen, K. (2005). Introduction: institutional change in advanced political economies. In W. Streeck & K. Thelen (eds.), *Beyond continuity: institutional change in advanced political economies* (1–39). Oxford: Oxford Univ. Press.
- Stucke, A. (2010). Staatliche Akteure in der Wissenschaftspolitik. In D. Simon, A. Knie, & S. Hornbostel (eds.), *Handbuch Wissenschaftspolitik* (pp. 363–376). Wiesbaden: Springer VS.
- Swire, H. (2014, December 15). *The UK, Brazil and Science Diplomacy* [Press release]. Harwell Science Park. Retrieved from <https://www.gov.uk/government/speeches/the-uk-brazil-and-science-diplomacy>
- Swiss Federal Audit Office (2016, April 26). *Wirtschaftlichkeitsprüfung des Aussennetzes für Bildung, Forschung und Innovation (Swissnex): Staatssekretariat für Bildung, Forschung und Innovation* (EFK-15312). Bern.
- Swissinfo.ch (2000). Swiss House in Cambridge eingeweiht. Retrieved from <https://www.swissinfo.ch/ger/swiss-house-in-cambridge-eingeweiht/1699438>
- Swissinfo.ch (2001). Swiss House wins Massachusetts award. Retrieved from <https://www.swissinfo.ch/eng/swiss-house-wins-massachusetts-award/2318922>
- Swissinfo.ch (2015, June 26). *Swissnex to close Singapore office* [Press release]. swissinfo.ch. Retrieved from https://www.swissinfo.ch/eng/research-promotion_swissnex-to-close-singapore-office/41515588
- Swissnex (2016). ERI Network: Learn more about the swissnex network, its outposts, and the role of science and technology counsellors. Retrieved from <https://www.swissnex.org/about/erinetwerk/>
- Swissnex (2017). Brief history of the swissnex Network: Formation and development of the Swiss science attachés network. Retrieved from <https://www.swissnex.org/about/history/>
- Swissnex (2019). Our Mission. Retrieved from <https://www.swissnex.org/about/mission/>
- Swissnex (2021a). Annual Report: We are Swissnex. Retrieved from <https://annualreport.swissnex.org/>
- Swissnex (2021b). Governance: Organization and structure. Retrieved from <https://swissnex.org/about-us/governance>
- Swissnex (2021c, April 13). Our mission – Swissnex. Retrieved from <https://swissnex.org/about-us/mission>

References

- Swissnex (2021d, August 2). Coming soon: Consulate of Switzerland in Osaka & 6th Swissnex location! Retrieved from <https://swissnex.org/news/new-swissnex-location-japan>
- Swissnex Boston and New York (2010, March 3). *Ruth Dreifuss on swissnex Boston* [Youtube]. Retrieved from <https://www.youtube.com/watch?v=D4C6K0ADNFc>
- Swissnex in Boston and New York (2022). Our Team – Swissnex in Boston and New York. Retrieved from <https://swissnex.org/boston/about-us/our-team/>
- ThinkSwiss (2010). *The Swissnex Role Model: How Philanthropists and Government Worked Together for Switzerland*.
- Thorhallsson, B., & Bailes, A. J. (2016). Small State Diplomacy. In C. M. Constantinou, P. Kerr, & P. Sharp (eds.), *The SAGE Handbook of Diplomacy* (294–307). Los Angeles, London, New Delhi: SAGE Publications Ltd.
- Turchetti, S. (2020). The (Science Diplomacy) Origins of the Cold War. *Historical Studies in the Natural Sciences*, 50(4), 411–432. <https://doi.org/10.1525/hsns.2020.50.4.411>
- Turekian, V. C. (2018). The Evolution of Science Diplomacy. *Global Policy*, 9 (53), 5–7.
- Turekian, V. C., Macindoe, S., Copeland, D., Davis, L. S., Patman, R. G., & Pozza, M. (2015). The Emergence of Science Diplomacy. In L. S. Davis & R. G. Patman (eds.), *Science Diplomacy: New Day Or False Dawn?* (pp. 3–24). Singapore: World Scientific Publishing Co. Pte. Ltd.
- Turekian, V. C., & Neureiter, N. (2012). Science and Diplomacy: The Past as Prologue. *Science & Diplomacy*, 1(1).
- Turekian, V. C., & Wang, T. C. (eds.) (2012). National Approaches to Science Diplomacy: An Education Resource [Special issue]. *Science & Diplomacy*. (March).
- UK Science & Innovation Network (2015). *UK Science & Innovation Network Report*.
- Ulnicane, I. (2021). Self-Organisation and Steering in International Research Collaborations. In K. Kastenhofer & S. Molyneux-Hodgson (eds.), *Sociology of the Sciences Yearbook: volume 31. Community and identity in contemporary technosciences* (Vol. 31, pp. 107–125). Cham, Switzerland: Springer. https://doi.org/10.1007/978-3-030-61728-8_5
- UNESCO (2021). SESAME. Retrieved from <https://en.unesco.org/themes/science-sustainable-future/sesame#story>
- Välismaa, J., & Hoffman, D. (2008). Knowledge society discourse and higher education. *Higher Education*, 56(3), 265–285. <https://doi.org/10.1007/s10734-008-9123-7>
- Van den Besselaar, P., Hemlin, S., & van der Weijden, I. (2012). Collaboration and Competition in Research. *Higher Education Policy*, 25(3), 263–266. <https://doi.org/10.1057/hep.2012.16>
- Van der Wende, M. C. (2001). Internationalisation policies: About new trends and contrasting paradigms. *Higher Education Policy*, 14(3), 249–259. [https://doi.org/10.1016/S0952-8733\(01\)00018-6](https://doi.org/10.1016/S0952-8733(01)00018-6)
- Van Langenhove, L. (2016). Global Science Diplomacy as a New Tool for Global Governance. Retrieved from https://media.wix.com/ugd/0bc3be_8d3a721735e84a1e8f40c6f949c7132d.pdf

- Van Langenhove, L. (2017). *Tools for an EU Science Diplomacy*. Brussels. <https://doi.org/10.2777/911223>
- Van Vught, F., & de Boer, H. (2015). Governance Models and Policy Instruments. In J. Huisman, H. de Boer, D. D. Dill, & M. Souto Otero (eds.), *The Palgrave International Handbook of Higher Education Policy and Governance* (pp. 38–56). Houndmills, Basingstoke, Hampshire, New York, NY: Palgrave Macmillan. https://doi.org/10.1007/978-1-137-45617-5_3
- Vlaamse Regering (2020). *Science & Technology Offices Roadmap voorinternationale valorisatie van Vlaamse innovatie – Vlaanderen wereldwijd sterker op de kaart als innovatieve technologiegedreven regio*. (No. VR 2020 1707 MED.0259/IBIS).
- Vogel, D., & Funck, B. J. (2018). Immer nur die zweitbeste Lösung? Protokolle als Dokumentationsmethode für qualitative Interviews. *Forum: Qualitative Social Research*, 19(1).
- Von Arb, C. (2004). *SHARE – Diplomatie im Zeichen der Wissenschaft: Menschen verbinden, Innovationen fördern* (BIOforum No. 7–8). Darmstadt.
- Von Arb, C. (2021). “Something new and different could emerge”. In *Revealing the Dots: Eleven interviews with some of the most influential figures in swissnex’s 20-year history* (pp. 25–27). Boston: Swissnex Boston.
- Wagner, C. S. (2002). Science and foreign policy: The elusive partnership: science and foreign policy. *Science and Public Policy*, 29(6), 409–417.
- Wagner, C. S., & Leydesdorff, L. (2005). Network Structure, Self-organization, and the Growth of International Collaboration in Science. *Research Policy*, 34(10), 1608–1618. <https://doi.org/10.1016/j.respol.2005.08.002>
- Waldvogel, M., & Huang, J. (1999). *Swiss House: The physical/virtual consulate of Switzerland*.
- Wanat, C. L. (2008). Getting Past the Gatekeepers: Differences Between Access and Cooperation in Public School Research. *Field Methods*, 20(2), 191–208. <https://doi.org/10.1177/1525822X07313811>
- Wang, J. (2006). Managing national reputation and international relations in the global era: Public diplomacy revisited. *Public Relations Review*, 32(2), 91–96. <https://doi.org/10.1016/j.pubrev.2005.12.001>
- Wang, T. C. (2013, June 27). *The Evolution and Future of Science Diplomacy: A US Perspective*, University of Tokyo. Retrieved from http://www3.grips.ac.jp/~gist/en/events/document/gistseminar_50.pdf
- Weigel, S. (2019). *Transnationale Auswärtige Kulturpolitik – Jenseits der Nationalkultur: Voraussetzungen und Perspektiven der Verschränkung von Innen und Außen* (ifa-Edition Kultur und Außenpolitik). Stuttgart: Institut für Auslandsbeziehungen.
- Weingart, P. (2018). Foreword. In *New International Science and Technology Policies: Key Issues and Questions in Switzerland: An exploratory study conducted on behalf of the Swiss Science Council SSC* (ISBN 978-3-906113-54-8, pp. 10–13). Bern: Swiss Science Council SSC.
- Weiss, C. (2005). Science, technology and international relations. *Technology in Society*, 27(3), 295–313. <https://doi.org/10.1016/j.techsoc.2005.04.004>

References

- Weiss, R. S. (1994). *Learning from strangers: The art and method of qualitative interview studies*. New York: The Free Press.
- Westerwelle, G. (2012a, February 14). *Eröffnung des Deutschen Wissenschafts- und Innovationshauses São Paulo*. DWIH São Paulo, São Paulo. Retrieved from http://www.auswaertiges-amt.de/DE/Infoservice/Presse/Reden/2012/120214_BM_DWIZ.html?nn=608946
- Westerwelle, G. (2012b, November 13). *Rede zur Eröffnung des Deutschen Wissenschaftszentrums in Kairo*, Cairo. Retrieved from <http://www.auswaertiges-amt.de/DE/Infoservice/Presse/Reden/2012/121113-BM-DWZ-Kairo.html>
- Whitley, R. (2008). Universities as strategic actors: limitations and variations. In L. Engwall & D. L. Weaire (eds.), *Wenner-Gren international series: v. 84. The University in the Market: Proceedings from a symposium held in Stockholm, 1–3 November 2007*. London: Portland Press.
- WIPO (2021). *Global Innovation Index 2021: Tracking Innovation through the COVID-19 Crisis*. Geneva.
- Witjes, N., & Sigl, L. (2015). Internationalization of STI. In A. Franzmann, A. Jansen, & P. Münte (eds.), *Legitimizing Science: National and Global Public (1800–2010)* (1st edn.). Frankfurt am Main: Campus Verlag.
- Wuchty, S., Jones, B. F., & Uzzi, B. (2007). The Increasing Dominance of Teams in Production of Knowledge. *Science (New York, N.Y.)*, 316(5827), 1036–1039. <https://doi.org/10.1126/science.1136099>
- Yin, R. K. (2003). *Case Study Research: Design and Methods* (3rd edn.). *Applied social research methods series: v. 5*. Thousand Oaks, Calif., London: SAGE Publications Ltd.
- Zapp, M. (2022). Revisiting the Global Knowledge Economy: The Worldwide Expansion of Research and Development Personnel, 1980–2015. *Minerva*, 60, 1–28. <https://doi.org/10.1007/s11024-021-09455-4>
- Zito, A. R. (2018). Instrument constituencies and epistemic community theory. *Policy and Society*, 37(1), 36–58. <https://doi.org/10.1080/14494035.2017.1416929>