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e-Health as an enabler for public governance?

citizen participation; compliance; e-Health; patient empowerment; self-autonomy; transparency

e-Health is more than information and communication technology. It offers innovative ways to enhance the encouragement, education and power of the patients and enables them to gather information about their diseases and treatments. These facts are also part of public governance which e-Health can assist and improve. The traditional relationship concerning knowledge and power between patients and health care providers is shifting in the other direction. In Austria there are several e-Health projects supporting patient empowerment and citizen participation, many of them still in a nascent state, which are evaluated in the paper. The projects are able to empower the citizens and encourage them to actively take part in the health care process.

I. Introduction

The health care sector in Austria is facing a great challenge due to increasing costs in the last years. The well-known reasons for the increasing health care costs are the demographic changes such as an aging population and the technical progress (Riedel/Röhrling 2009, p. 94). In Austria health care costs rose from 8.4 % of the gross domestic product in 1990 to 11.1 % in 2012 (Statistik Austria 2013 a). Therefore, it is necessary to look for new ways to enhance quality, transparency, efficiency and effectiveness in the health care sector and consequently to reduce costs. Decision makers within the public sector – as the main funders of health care services in Austria – expect from information technology and especially e-Health to provide a solution by improving the processes and the health care provision (Pfeiffer 2011, p. 334; Rohner/Winter 2008, p. 330). According to Eysenbach (2001, pp. 20) "e-health is an emerging field in the intersection of medical informatics, public health and business administration, referring to health services and information delivered or enhanced through the Internet and related technologies. In a broader sense, the term characterises not only a technical development, but also a state-of-mind, a way of thinking, an attitude, and a commitment for networked, global thinking, to improve health care locally, regionally, and worldwide by using information and communication technology."

e-Health deals not simply with information and communication technology. It is still a tool to establish new ways of thinking and improving the literacy in health care for the citizens (Jacobs et al. 2014, pp. 1).

Public governance can be defined as "how an organisation works with its partners, stakeholders and networks to influence the outcomes of public policies" (Bovaird/Loeffler 2009, p. 6). Net-

works have become an important aspect of public governance along with stakeholders who can be citizens, non-profit organisations and other organisations (Loeffler 2009, pp. 219). According to the definitions of e-Health and public governance, e-Health can be described as a multi-stakeholder network with relations to diverse stakeholders involved in the health care system e.g. ambulant physicians, hospitals, rehab hospitals, (social) insurances, government, patient advocacy groups and citizens. Thus the focus of the health care provider lies on the patient-centred view instead of the previous resource-centred focussing on different health care resources (Rohner/Winter 2008, p. 330). Patient-centric means that the patients obtain a more active role in the management of their diseases by increasing the self-management, e.g. the patient data is available right after the medical check for additional checks or medications (Alpay/van der Boog/Dumaj 2011, p. 248; Ahern/Phalen/Eaton 2008, p. 79). Several health care activities can be used independent of time and location and establish a new way of patient or so called citizen participation and self-organisation (Pagliari et al. 2005, p. 2; Blobel 2008, p. 331). Therefore, e-Health can be seen as a form of co-production with citizens gathering empowerment over the quality and efficiency of public services as well as responsibility for their lives (Martin 2009, p. 285).

Against this background the guiding research question is: does e-Health have the ability to empower the patients in their own health care processes by enhancing education, encouragement and information exchange?

To address this research question, the paper is organised in the following way. Section II. will give an overview of the relation of e-Health and public governance. It focusses on the different ways of e-Health enabling public governance and its similarities. In section III. patient empowerment by e-Health is described and the change of patients' behaviour in the health care process from acceptance to control. Section III. also discusses the cost aspects of e-Health in connection to the transaction cost theory as well as asymmetric information between patients and physicians from the principal-agent theory perspective. Corresponding to the facts described in section III. a methodology is developed for the categorisation of e-Health projects in section IV. Section V. gives an overview about various patient empowering e-Health projects in Austria. The basic findings are summarised in section VI. along with critical reflections on the topic of e-Health and directions to further research.

II. e-Health enabling public governance

According to Eysenbach (2001, pp. 20), e-Health addresses many aspects in connection to public governance. The following ten e-factors belong to different parts of public governance e.g. transparency, equity, effectiveness and efficiency (Loeffler 2009, p. 217).

- e-Health promises cost reduction in health care by increasing *efficiency*. Health care costs can be decreased by avoiding duplicate and unnecessary diagnostic and therapeutic interventions by enhanced communication between health care establishments and through patient involvement.

- e-Health may *enhance the quality of health care* by allowing comparisons between different providers, involving consumers as additional concept for quality assurance, and directing patients to the best quality providers for example.
- e-Health treatments should be *evidence-based*. The effectiveness and efficiency of e-Health treatments have to be proven by rigorous scientific evaluation.
- Consumers can access medical knowledge bases and personal electronic records over the Internet. This fact gives the consumers and patients *empowerment.* E-Health opens new avenues for patient-centred medicine and enables evidence-based patient choice.
- Decisions between patients and health professionals are made in a shared manner. Partnerships are established between patient and health professionals by *encouragement*.
- Physicians and consumers (patients) are educated through online sources (continuing medical education, health education, tailored preventive information for consumers) in a new way by e-Health.
- Information exchange and communication can be established in a standardised way between health care establishments and providers. In this sense, e-Health plays an *enabling* function. Hence, the efficacy of self-management programs can be improved (Ahern/Phalen/Eaton 2008, p. 80).
- The scope of health care beyond its conventional boundaries can be *extended* by e-Health. This can be seen from a geographical as well as from a conceptual perspective. E-Health enhances the possibility to easily obtain health services online from global providers. The range of services is increased from simple advice to more complex interventions or products such as pharmaceuticals.
- Due to the new forms of patient-physician interaction, e-Health provides new challenges and threats to *ethical* issues, e.g. online professional practice, privacy and equity issues. The Internet is still a medium for misinterpretations as well as for decoupling the contact between patient and physician (Groß/Schäfer 2007, p. 25).
- e-Health promises an improvement of *equity* (Ahern/Phalen/Eaton 2008, p. 76), but there is still a considerable threat that e-Health may deepen the gap between the "haves" and "have-nots". People cannot use e-Health properly without having personal and technical skills as well as money and no access to computers and networks. Therefore, this group of patients (who would actually benefit the most from health information) are those who are the least likely to benefit from the advances of e-Health, unless political measures ensure equitable access for all. This can be seen as a result of the digital divide of different groups of the population even in the developed countries (Groß/Schäfer 2007, p. 25).

Referring to these ten facts, e-Health can be seen as an enabling mechanism in many different sections of public governance, e.g. empowerment, enabling, encouragement, education and ethical issues. Citizen participation is one key issue of public governance which actively involves citizens in the decision-making process and encourages dialogue between the citizens and the government as well as strengthens the individual rights (Holtkamp 2012, p. 242). It is a major democratic tool to translate the wishes of the citizens into action not just in election time (Peters 2010, pp. 41). Apart from that, public governance changes the role of the government from a service provider to a co-producer in case for service design, resource management, service delivery and service access including the citizens or patients in the decision-making process

(Loeffler 2009, p. 225). Patient empowerment can be identified as one crucial aspect to enhance citizen participation. Here, the focus does not lie on the legal perspective of human rights. Instead empowerment by information gathering, information exchange, education and shared-decision making is the key. Consequently, this paper concentrates on the patient empowerment effect of e-Health by citizen participation.

III. Patient empowerment by e-Health

First, the empowerment factor of e-Health should not be restricted to the function of gaining information from the Internet without any time constraints. e-Health can be seen as a source to check the health state of the citizens and getting more power and autonomy out of it (Donnelly/Shaw/van den Akker 2008, p. 504). The health care related literature distinguishes between three types of patient empowerment. At first, there is a distinction between isolated and complete patient empowerment. Isolated patient empowerment only deals with one special health care situation which will be handled by the patient. Complete patient empowerment allows patients to fully control their health care status e.g. the documentation of the pharmaceuticals they will take for further treatments (Gouthier 2001, pp. 62).

The second type deals with the intensity of empowerment. It ranges from the possibilities of patient proposal at the lowest level to full self-determination and self-autonomy at the highest level. The main factor of this schema is the power shifting from the physician (proposal) to the patient (self-determination) (Gouthier 2001, pp. 64).

The third type deals with the level of empowerment which can be divided into individual, collective or structural. At the individual level patients have to be engaged and educated to participate in the health care process on their own. At the collective level networks are built up e.g. self-help groups to support the patients in their daily lives. The relations are very tight between members due to the mutual support in personal situations. At this level a distinction between empowering organisations which support their members in the empowerment process and empowered organisation which deals with problems in empowerment process can be made. The structural empowerment is supported by public institutions which encourage the patients to actively take part in health care decisions. On the one hand, the decision making process has to be revised and patients are able to make own decisions. On the other hand, patients get more obligations in case of health care preventions (Gouthier 2001, pp. 67).

Patient empowerment can be established integrating different enabling factors in e-Health applications e.g. information and education as well as self-care (Alpay/van der Boog/Dumaj 2011, pp. 248; Monteagudo Pena/Gil 2007, pp. 33)

- C*ommunication* between patients and physicians has to be facilitated. Patients have to be able to communicate their needs to the physicians. Physicians have to be familiar with using different channels for the communication. Improving the doctor-patient-relationship has to be of great interest in this context. Using standard telecommunication tools e.g. e-mail or the Internet should be common for contact between patient and physician.
- *Education* as well as *health literacy* has to be a precondition for patient empowerment. Without having the knowledge, ability or motivation patients cannot process personal

healthcare information effectively to establish a healthier lifestyle. Without health education patients do not know enough about the health care system to criticise it. Hence, physicians should be able to transfer and explain health care information in an understandable way.

- Access to patient health *information* is one central mechanism of empowerment to gain control over the personal health. Patients should be able to search for information and understand their health conditions as well as the treatments.
- Patients should be able to execute routine activities of health management on their own. Different communities support *self-care* and *self-responsibility* by supporting and empowering the patients.
- The capacity of patients making informed decisions about their treatments can be done with *decision aids*. This should be seen as an addition to traditional physician counselling. On the one hand, patients get more responsibility for their own health. On the other hand, physicians have the knowledge and should be able to inform the patients about all possible treatment methods objectively.
- Patients with chronic diseases have to be engaged in self-care and self-education. As a precondition, patients need a personalised care and an active partnership between physicians and patients.

One central point of empowerment is the change of the traditional doctor-patient-relationship by distributing health care information to the physicians and to the patients. The typical doctor-patient-relationship consists of a structural asymmetry because the doctor has the professional know-how as well as the power to define the disease and the treatment of the patient (Groß/Schäfer 2007, p. 14). Principal-agent theory discusses the same problem of structural asymmetries in a broader sense. This theory discusses the relation between the agency (contractor) and the principal (customer) where the agency works for the principal in a dependent manner (Saam 2002, pp. 6). The delegation of work from the principal to the agent often results in opportunistic behaviour by the agent which leads to an informational advantage for the agent (Häckl 2010, p. 110). Principal-agent theory includes two core characteristics asymmetric information and different levels of risk tolerance. In case of informational asymmetry which consists of hidden characteristics, hidden intentions, hidden knowledge and hidden action the agent has an advantage over the principal as well as more power. In a broader sense, informational asymmetries in case of hidden knowledge lead to moral hazards for the physicians. It provides the possibility to induce demand for health care services by the physicians, so called supplier-induced demand, due to information patients do not have about their illnesses and the necessary treatments. The core problem for health financing and health economics is the increase in health care expenditures without any benefit for the patient (Cassel/Wilke 2001, pp. 332; Reiners 2006, pp. 101).

Due to information asymmetries, conflicts of interests arise between patients and physicians (Saam 2002, pp. 8; Jensen/Meckling 1976, pp. 4). In relation to the traditional doctor-patient-relationship the principal is the patient and the physician is the agent. Apart from that, in case of missing compliance of the patient e.g. refusing the medication, the roles could still change in the other direction and the patient takes over the role of the agent (Häckl 2010, p. 112). The main issue of the agency problem in this case is the asymmetric information which consists of the physician's knowledge and power over the decision-making process (Häckl 2010, pp. 113). In case of patient empowerment by information exchange, communication, encouragement and

education the information asymmetries can be decreased. Apart from that, transparency can be enhanced which puts more pressure on the physician to reveal incorrect treatments. This change reduces the physician's latitude for action-taking and decision making (Häckl 2010, p. 115).

In regard to e-Health, this traditional, passive relationship between patients and physicians changes completely due to a fundamental change in thinking and acting of the patients (Gouthier 2001, p. 55). Patients are able to get information about their own health state without consulting the physician. Hence, the face-to-face contact and the relationship of trust between patient and physician decline (Stachwitz/Aly 2009, p. 33).

As a result of this change, four different levels of patient relationships can be distinguished.

- In the traditional relationship the patient acts in the accepting role, so the physician is the only decision maker regarding the health of the patient. The patient does not participate in the decision making process (Groß/Schäfer 2007, p. 17; Warda 2006, p. 376).
- At the next level, patients are well-informed about the health status. In many cases the patients have chronic diseases and have to do some medical interventions on their own after some training, e.g. a diabetic person has to check the insulin level several times a day and has to do some interventions if necessary (Groß/Schäfer 2007, p. 17; Krones/Richter 2008, p. 819).
- At the third level patients are involved in the health care process and show engagement getting information about their health care status as well as actively asking the physicians about information. Mostly, patients are willing to initiate preventative actions to establish a suitable health care status for the future (Groß/Schäfer 2007, p. 17; Warda 2006, p. 376).
- Patients of the fourth level participate actively and self-confidently in the whole health care process using e-Health and other communication tools for gathering and processing health care information. Use of the health care information increases the autonomy, transparency, power, responsibility and the know-how for their health status. Apart from that, the patients are in the control position and also check the physician's treatment decisions on the Internet or in other online platforms as well as asking other physicians. Motives of control play an essential role in the health care sector. Perceived control is important for the patients gathering power (Groß/Schäfer 2007, pp. 17, Gouthier 2001, pp. 55, Ball/Lillis 2001, p. 2; Eichenberg/Malberg 2011, p. 131).

According to the patients at the fourth level described above, even the communication style between physicians and patients changes significantly. Due to the increased autonomy, the literature calls the relation between patient and physician in some cases *patient-doctor-relationship* now. The reason for this change can be found in four ways patients are empowered (Groß/Schäfer 2007, pp. 18).

- The possibility to gathering health care information through different channels e.g. Internet, platforms, mobile devices or video streams enhances the patient's knowledge significantly. Hence, the former role of acceptance and the asymmetric constellation between patients and physicians change. The patients belong to a group of health-seekers and health-networkers instead of simply confirm physicians' treatments. Even the communication structure between patient and physician becomes an active one due to better discussion basis (Ahern/Phalen/Eaton 2008, p. 79).

- Actually, health can be seen as consuming goods, hence patients are focused on health instead of disease management.
- The traditional face-to-face communication changes to an interactive one using new ways of communication channels e.g. e-mail, chat rooms, online platforms (Ball/Lillis 2001, p. 5).
- Patients assume control over the treatment decision as well as costs. Apart from that, the patient's level of confidence changes and they take an active control of their health instead.

Establishing patient empowerment with or without e-Health must include acceptance of the health care providers. Physicians as well as all other health care providers have to change their minds and accept patients as full partners. Acceptance is still a long way due to the traditions in this area (Gouthier 2001, p. 68)

Furthermore, patient empowerment increases the requested transparency which often discloses in efficiency and low quality work e.g. duplicate or unnecessary treatments as well as medical errors (Gouthier 2001, p. 56; Bertelsmann Stiftung 2007, pp. 7). Transparency in the treatment process as well as the empowerment by information exchange helps inappropriate choices such as duplicate treatments or medications and thus reduces health care costs (Bertelsmann Stiftung 2007, p. 7).

Referring to the cost perspective of e-Health applications investment costs have to be considered as well as implementation and maintenance costs. E-Health applications often require quite specialised equipment. Hence, additional costs for medical staff training as well as patient training and maintenance of the systems arise which constitute an obstacle to implement e-Health applications (Pelletier-Fleury et al. 1997, pp. 6). Patient participation by measuring the blood sugar levels or blood pressure using e-Health applications at home reduces the workload of the primary care sector and outpatient departments and, in case of the routine tasks, consequently will reduce health care costs. Apart from that, the results using e-Health have still to be considered in combination with preventative actions and a healthier life style to accomplish cost savings (Kreps/Neuhauser 2010, p. 331; Ball/Lillis 2001, p. 3).

Transaction cost theory discusses this topic in a broader sense. According to McCann et al. (2005, p. 530) transaction costs are "cost of resources used to define, establish, maintain and transfer property rights." On the one hand, e-Health and e-Health applications reduce information imperfections which reduce transaction costs (Ferguson/Keen 1996, p. 27). On the other hand, they include monitoring, training and maintenance costs which increase the transaction costs. Hence, the cost topic has to be investigated in the future to provide a cost-benefit analysis including the outcome of e-Health.

Another factor is compliance which can be seen from the point of willingness for cooperation between patients and physicians. Patients should be involved to accomplish the greatest success for medical treatments. This can be enhanced by a shared-decision making process for the treatment (Bertelsmann Stiftung 2007, pp. 11) e-Health applications can support compliance by reminding the patients about missing treatments and information in the system. Relating to the shared-decision making process, even if the majority of patients want to be involved in health care some will refuse to actively participate. Instead they want to leave the final treatment decision to the physician. Age, sex, education, experience of illness and medical treatments as well as health conditions affect whether patients actively take part in the decision making process of their health status or not (Härter/Simon 2013, pp. 57). Men and people over the age of 45 tend

to prefer a physician-directed style (Levinson et al. 2005, pp. 533). Furthermore, the seriousness of the illness can cause patients to refuse to participate in a shared-decision making process (Härter/Simon 2013, pp. 55).

IV. Methodology

According to the issues described in section III. the following scheme for distinguishing e-Health projects can be developed. Referring to the *level of empowerment*, the difference between the three categories of individual, collective and structural empowerment can be found in the amount of participation. At the individual level, the patients play an active part and have to collaborate with the health care providers. Hence, the citizen participation factor is quite high. Collective empowerment is done at the group level to enhance the building of networks which assume an active part in the citizen participation. Furthermore, public institutions lay the foundation for citizen participation on the structural level which should empower the patients to participate.

Relating to the *intensity of power* supported by citizen participation, it directly correlates to the empowerment level. The lowest level of power is defined as a treatment proposal by the patient in contrast to the highest level which implies self-determination about the health care process. Once the patient gets information about the health care status as well as the treatments to encourage discussions at the same level the intensity of power exceeds lowest proposal level. In case of active participation the power level is high due to the self-determination about the treatment process. Concerning public governance and patient empowerment, e-Health projects can be distinguished by the *enabling factors* mentioned in section II. which support public governance. Besides, patient and physician *acceptance and compliance* have to be considered seriously. Both factors have to be considered to guarantee active and appropriate citizen participation. Apart from that, one essential characteristic of e-Health projects is the actual *implementation level* which can be differentiated between pilot projects and already rolled-out projects. The schema created will be applied to the e-Health projects based on a qualitative analysis of the e-Health project descriptions.

V. Patient empowering e-Health projects in Austria

Since 1998, there have been several political health care reforms introducing the possibility for exchanging health care information between health care providers and physicians as well as patients electronically in Austria. These can be seen as the first steps implementing e-Health and the necessary technical infrastructure for the further development and implementation by initiating a working group for an e-Health initiative. One focal point of the e-Health initiative is to establish interoperability as well as information exchange (Pfeiffer/Auer 2009, p. 325). Besides, e-Health should be an enabler for health care reforms to modernise and enhance the quality of the health care sector. The main problems are that there are many isolated applications which

have to be combined to achieve the aim of decreasing health care costs as well as missing regulations in connection to data protection and compensation. In particular, the protection of health care data is one core reason for resistance against e-Health applications (Pfeiffer 2007, pp. 6). Nevertheless, e-Health is seen as a way for patient-centred treatment through better communication by the health care providers in Austria (Pfeiffer 2011, p. 334).

The paper focuses on e-Health projects supporting empowerment in the ways mentioned in section IV. In Austria there are many e-Health pilot projects as well as a few rolled-out projects supporting patient empowerment in different ways. The following list of projects is a small selection to give some insights about the range of topics covered.

- Elektronische Gesundheitsakte (*ELGA*) is an electronic health record (EHR) which offers the patient and health care providers access to all relevant patient electronic health care data. The data are available without any time and location constraint for all authorised persons. Patients are allowed to create their own personal health records (PHR) which contains data added by the patients that usually are not be part of the EHR (Pfeiffer/Auer 2009, p. 326; Ahern/Phalen/Eaton 2008, p. 82). Since January 2014, patients are able to cancel the registration. This is a crucial point as patient participation in ELGA is voluntary. At the end of 2014, all subscribed patients have access to their health care information (e-Radiologiebefund/e-Laborbefund), prescribed medications (e-Medikation) and doctor's record (e-Arztbrief). Furthermore, they are allowed to actively change the personal health care information (Bundesministerium für Gesundheit 2014).
- Since 2010 *Austrian Health Portal* is an accessible service offering quality-assured information on health matters and health care provision. The platform includes information about healthy lifestyle, health promotion, prevention as well as diagnosis and treatments. It is the first step of launching ELGA and offers access to the PHR for all Austrian citizens at least (Hofmarcher 2013, p. 66).
- *Gesundheitsdialog Diabetes Mellitus* (DiabMemory) is a project of the insurance institution for rail and mining in Austria offering the possibility to support diabetes mellitus patients. The patients send different vital signs e.g. blood sugar, blood pressure, weight and general condition to a physician via mobile devices. The physician examines the patient's vital signs and returns the suitable treatment back via mobile device. The patients do not need to go to the physician and have a good view about their personal vital signs. At the moment DiabMemory is a pilot project which is only available for this special target group (Gesundheitsdialog Diabetes Mellitus 2010; e-Health-Initiative 2013, p. 7).
- *Hospitals Directory* offers structured information on process quality and aggregate data on admission and treatment number for various symptoms. It is an online directory containing information of Austrian hospitals for searching appropriate facilities as well as symptoms and medical services (Hofmarcher 2013, p. 67).
- ELGA-konformes ambulantes Vitaldatenmonitoring (*Elgamon*) is a pilot project to monitor the vital signs for patients with heart or chronic diseases. The main target group are elderly people who measure their vital signs and send them directly to a physician or to the hospital via a smartphone app. The physicians could look through the data and can react if necessary, so the patients are monitored continuously and can check their vital signs without leaving their house. In this case, participation is mandatory. In the first step, the pilot project was

tested with a defined test group in Upper Austria from January to September 2014. The outcome of this pilot study will be presented at the end of 2014 (FH Oberösterreich 2014).

- Patientenzentriertes Netzwerk zur Versorgung im Alter (*PIN*) is a pilot project supporting elderly people monitoring their vital signs at home and to enforce the social networks after a cardiological intervention. In both cases, the patients have to measure their vital signs by themselves. The vital signs are sent to the physicians by mobile applications. Apart from that, video telephony is also installed to keep the patients in touch with friends or family (FH Oberösterreich 2013).
- Herzschrittmacher. Elektronische Gesundheitsakte (*H.ELGA*) supports patients having a cardiac pacemaker. The patients will be monitored by primary care physicians instead of going to the hospital or to specialists for the cardiovascular system. The health care data will be sent by an Internet platform to the cardiac pacemaker outpatient department. After checking the data, patients receive feedback about their current status. All data measured are stored in the platform so the progression of the disease can be tracked efficiently. This application should reduce the workload of pacemaker centres as well as decrease the costs of pacemaker therapy (Austrian Institute of Technology 2014; Haydn et al. 2013, pp. 456).
- *Kilocoach-TM* is a fee-based online application which monitors the eating habits of patients, in most situations of overweight patients. Patients are able to enter their eating, sports activities and job activities in the online application and receive their daily calorie requirements so they can actively control and regulate their weight. The Kilocoach fee will be paid by the Oberösterreichische Gebietskrankenkasse (Upper Austrian regional health insurance fund), Burgenländische Gebietskrankenkasse (Burgenland regional health insurance fund) and Betriebskrankenkasse Mondi if the patient loses weight fixed in the terms and conditions (Forumgesundheit 2013; Kilocoach 2014).

The e-Health projects described above can be categorised by the methodology defined in section IV. They provide an overview of the current implementation status as well as the level of empowerment concerning participation, the power of the e-Health projects for the patients, enabling factors and compliance and acceptance.

Project name	Level of empowerment	Intensity of power	Enabling factor	Compliance/ acceptance	Level of implementation
ELGA	structural and individual empowerment	medium to high	information exchange, education, transparency, extension	acceptance on both sides as well as compliance from the patient necessary	initial roll out
Austrian Health Portal	structural and individual empowerment	medium	transparency, information exchange, education, extension	acceptance from the physicians necessary to enhance the gathering of information by the patients; compliance updating medical information needed from the government	rolled-out
DiabMemory	individual empowerment	medium	education, information, encouragement	acceptance necessary on both sides; compliance is obliged for monitoring correctly by the patients	pilot project
Hospitals Directory	structural and individual empowerment	medium	education, information, transparency, extension	acceptance and compliance by the government preconditions for updating data	rolled-out
ELGAMON	individual empowerment	medium to high	education, information exchange, encouragement	acceptance by the physicians necessary; compliance to actively take part mandatory by the patients	pilot project
PIN	individual empowerment	medium to high	education, information exchange, encouragement	acceptance by the physicians necessary; compliance to actively take part mandatory by the patients	pilot project
H.ELGA	individual empowerment	medium to high	efficiency, information exchange, education	acceptance by the physicians necessary; compliance to actively take part mandatory by the patients	pilot project in Styria
Kilocoach-TM	individual and structural empowerment	medium to high	information exchange, education, encouragement, extension	acceptance and compliance of the patient is mandatory to fulfil the defined aims	rolled-out

Table 1: Overview of e-Health projects
Source: Author's compilation

The sample of e-Health projects included in table 1 gives a view about the current structure of patient empowerment. Actually, there are several pilot studies as well as rolled-out projects. The pilot projects include more individual patient empowerment by actively measuring vital signs like blood pressure or blood sugar levels. The rolled-out projects offer the possibility gathering and exchanging health care information at different levels by enhancing structural empowerment. None of the selected projects establish a collective empowerment. According to the intensity of empowerment, all projects increase the power level distinctly. The projects measuring vital signs enhance the power to self-autonomy and self-determination significantly because the patients themselves are responsible for the data. Each e-Health project increases the information exchange, encouragement, and extension as well as education level of the patients which are still main determinants of public governance. e-Health applications can increase the transparency and efficiency of the health care processes. In terms of acceptance and compliance, both variables have to be considered to build up patient empowerment and are included in all projects but in different levels.

VI. Discussion and conclusion

e-Health offers a chance to face the challenge of increasing health care costs in Austria by changing the traditional treatment methods. It is also an enabling factor for patients getting more power over their own health care status by actively taking part in the health care process. Nevertheless, there are only few e-Health projects for Austrians or people in Germany and Switzerland. Many projects end in the pilot phase without going public even if they support patient empowerment significantly. The core reasons can be found in the failure to provide regulations concerning data protection and compensation of the physicians and medical staff. Without addressing these points e-Health is not able to grow adequately and fulfil its potential (Pingitzer 2014, pp. 89). The Austrian government is strongly advised to enact and update the regulations. The e-Health projects described offer the possibility to empower the patients in different ways. In many cases, individual empowerment is most popular by bringing patients into the health care processes and treatment decisions. At this level, the patients are well informed about their health care status and are obliged to assist. The increased level of information still empowers and enhances the patients to discuss at the same level with the physicians. Hence, the typical doctor-patient-relationship changes significantly because both parties possess the information needed to discuss the treatment process. This enhances the transparency as well as the efficiency of the treatments which are key aspects of public governance too.

Collective empowerment which is also a topic in the literature cannot be found in the projects described above (see table 1). The collective empowerment is organised by self-help groups which can be initiated by private groups or the public. Concerning e-Health many platforms or blogs are created by private persons or clubs without involvement by public or private companies.

One main point at the individual as well as structural and collective level of empowerment concerns the quality, reliability and the benefits of the information. It depends on the information provider. The quality of information from the Internet is often criticised due to incomplete or

incorrect information. According to the information providers, a systematic information bias can be provided which leads to uncertainty among the patients. Hence, the quality of the information should be considered seriously to guarantee reliability and trust (Eichenberg/Malberg 2011, pp. 128). For example, in Austria the public health internet portal offers reliable und independent health care information for the citizens to support a healthy lifestyle and prevention measures (Öffentliches Gesundheitsportal Österreich 2013).

Patient empowerment is a tool for gathering power in the decision-making process of treatments by increased information and the possibility for information exchange. Referring to projects with active patient involvement, their power increased significantly. One central point is that the patients stay at home measuring their vital signs and are not stressed due to a long journey and waiting times (Pingitzer 2014, p. 64). On the one hand, this factor enhances self-autonomy and self-determination as well and decreases the costs in outpatient departments. Compliance participation may increase in the same proportion to power.

Relating to the various factors of e-Health described in section II. information exchange for enabling, education, extension, efficiency and encouragement are already discussed and included in e-Health applications. Referring to quality, transparency is one factor to improve the quality of treatments which is covered by e-Health applications (Bertelsmann Stiftung 2007, pp. 6).

The rolled-out projects e.g. ELGA are still at the beginning. Hence, it is not possible to speak about evidence-based e-Health which needs to be evaluated in the next years. In connection to the pilot projects it is not yet possible to get scientific evaluation due to the limited time period as well as the limited population tested.

In terms of ethics, privacy issues are often mentioned as core concerns of the patients and the public in connection to e-Health. Data protection must be guaranteed to avoid the loss of patient confidence to the physician and in public institutions (Wirtz/Mory/Ullrich 2010, p. 287). As a result, the patients do not provide the physicians with all necessary health care information needed and the treatment process cannot be effectively executed (Duquenoy/Mekawie/Springett 2013, p. 281).

In connection to equity and accessibility, 80.9 % of Austrian households had a computer as well as Internet access in 2013. Almost 20 % of the population are not able to communicate and exchange data by the Internet (Statistik Austria 2013 b). Therefore, the gap between citizens who can take part in e-Health applications and citizens who are not able to do it is still worth mentioning. The reason for having no Internet access has not been queried so it could be a matter of having no money or skills or refusing to take part in the Internet world.

According to the topics of acceptance and compliance, both sides play an important role in the empowerment process. Acceptance is a precondition to enable information exchange and to encourage patients to inform them about their diseases and possible treatment methods. The physicians have to change their ways of thinking and working because the relation between patients and physicians shifts towards a more balanced partnership and the physicians lose their power of knowledge. The compliance factor needs to be supervised to ensure patients' cooperation. Otherwise the treatment process cannot be handled efficiently and effectively. As a result, the benefits of e-Health are lost as well as the patients' health status is put at risk.

Addressing our research question, we can conclude that e-Health and in narrow sense e-Health applications enhance the patients' power by gathering health care information about their ill-

nesses and treatment as well as improve their education and encouragement. e-Health provides the opportunity to encourage patients to actively control their health care processes and change the typical doctor-patient-relationship towards an equal partnership.

e-Health should not only be reduced to communication and information technology supporting the health care process. Instead it offers a new way of thinking and working together to establish a good health care system without additional costs. Actually, we have to deal with the problem that too few e-Health projects are part of medical practice in Austria according to the document and literature analysis. Hence, the implications of the e-Health projects described have no rigorous scientific evaluation and are based on the literature and the pilot studies. We must strongly encourage government to continue pilot projects and make them part of practice. After the complete roll-out of ELGA at the end of 2014, additional studies focussing on patient empowerment as well as of cost topics have to be executed to evaluate the outcome. Apart from that, the state has come to a decision rolling-out additional e-Health projects because even pilot projects cost a lot of money which is strongly needed elsewhere in the health care system.

Zusammenfassung

Daniela Haugeneder; e-Health als Unterstützungsmechanismus für Public Governance

Bürgerbeteiligung; Compliance; e-Health; Stärkung der Patientenrechte; Selbstautonomie; Transparenz

e-Health bedeutet mehr als Informations- und Kommunikationstechnologie. Es ermutigt und ermächtigt den Patienten sich Informationen hinsichtlich Krankheiten und Behandlungen zu beschaffen und damit aktiv beim Gesundheitsprozess mitzuarbeiten. Die Gangart hinsichtlich Bildung und Ermutigung der Bürger ist auch im Public Governance ein zentraler Punkt, der mittels e-Health bei der Umsetzung unterstützt werden kann. Diese neue Denkweise verändert auch die klassische Arzt-Patienten-Beziehung vom akzeptierenden zum steuernden Patienten. Aktuell gibt es in Österreich nur wenige bereits umgesetzte e-Health-Projekte zur Stärkung der Patientenrechte und Erhöhung der Bürgerbeteiligung.

References

Ahern, David, Judith M. Phalen and Charles B. Eaton (2008), The Role of eHealth in Patient Engagement and Quality Improvement, in: eHealth Solutions for Healthcare Disparities, edited by Michael Christopher Gibbons, New York, pp. 75-92.

Alpay, Laurence, Paul van der Boog and Adrie Dumaij (2011), An empowerment-based approach to developing innovative e-health tools for self-management, in: Health Informatics Journal, vol. 17, no. 4, pp. 247-255.

Austrian Institute of Technology (2014), http://www.ait.ac.at/research-services/research-services-safety-security/health-information-systems/biomedical-and-translational-research/helga/, (access: 2.6.2014)

Ball, Marion J. and Jennifer Lillis (2001), E-health: transforming the physician patient relationship, in: International Journal of Medical Informatics, vol. 61, no. 1, pp. 1-10.

Bertelsmann Stiftung (2007), Unser Gesundheitswesen braucht Qualitätstransparenz, http://www.bertelsmann-stiftung.de/cps/rde/xbcr/SID-AA3874C8-F4F8C071/bst/xcms_bst_dms_21439_21440_2.pdf (access: 1.6.2014).

Blobel, Bernd (2008), Wie kann Wirtschaftsinformatik helfen, E-Health voranzubringen, in: Wirtschaftsinformatik, vol. 4, pp. 331-332.
Bovaird, Tony and Elke Loeffler (2009), Understanding Public management and Governance, in: Public Management and Governance, edited by Tony Bovaird and Elke Loeffler, London, pp. 3-14.
Bundesministerium für Gesundheit (2014), https://www.gesundheit.gv.at/Portal.Node/ghp/public/content/ELGA/elga-elektronische-gesundheitsakte.html (access: 5.5.2014).
Cassel, Dieter and Thomas Wilke (2001), Say's Law in the Health Care Sector: Do Physicians Create Their Own Demand? An Analysis of Supplier-Induced Demand in Germany, in: Journal of Public Health, vol. 9, no. 4, pp. 331-348.
Donnelly, Louise, Rachel L. Shaw and Olga BA van den Akker (2008), eHealth as a challenge to 'expert' power: a focus group study of internet use for health information and management, in: Journal of the Royal Society of Medicine, vol. 101, no. 10, pp. 501-506.
Duquenoy, Penny, Nermeen Magdi Mekawie and Mark Springett (2013), Patients, Trust and Ethics in Information Privacy in eHealth, in: eHealth: Legal, Ethical and Governance Challenges, edited by George Carlisle, Diane Whitehouse and Penny Duquenoy, Heidelberg et al., pp. 275-295.
Eichenberg, Christiane and Demetris Malberg (2011), Gesundheitsinformationen im Internet – Zur Notwendigkeit der Qualitätsevaluation und -sicherung, in: Psychotherapie im Dialog, vol. 12, no. 2, pp. 128-131.
Eysenbach, Gunther (2001), What is e-health?, in: Journal of medical Internet research, vol. 3, no. 2, pp. 20-21.
e-Health-Initiative (2013), Positionspapier Disease Management Diabetes, http://ehi.adv.at/fileadmin/user_upload/adv_author/pdfs/Positionspapiere2013/Positionspapier_eHI_DMP_Diabetes_20130403_V1.1.pdf (access: 20.1.2014).
Ferguson, Brian and Justin Keen (1996), Transaction costs, externalities and information technology in health care, in: Health Economics, vol. 5, no. 1, pp. 25-36.
FH Oberösterreich (2013), http://pin.fh-ooe.at/, (access: 2.3.2014).
FH Oberösterreich (2014), http://research.fh-ooe.at/de/project/1068, (access: 2.3.2014).
Forumgesundheit (2013), http://www.forumgesundheit.at/portal27/portal/forumgesundheitportal/content/contentWindow?action=2&viewmode=content&contentid=10007.688417, (access: 2.6.2014).
Gesundheitsdialog Diabetes Mellitus (2010), https://www.diabmemory.at/ (access: 20.1.2014).
Gouthier, Matthias (2001), Patienten-Empowerment, in: Handbuch Gesundheits- und Medizinmarketing, Chancen, Strategien und Erfolgsfaktoren, edited by Volker J. Kreyher, Heidelberg, pp. 53-82.
Groß, Dominik and Gereon Schäfer (2007), Die Auswirkungen von E-Health auf die Arzt-Patienten-Beziehung – Medizinethische Überlegung zu einem ungeklärten Verhältnis, in: E-Health und technisierte Medizin, edited by Dominik Groß and Eva-Maria Jakob, Berlin, pp. 13-28.
Häckl, Dennis (2010), Neue Technologien im Gesundheitswesen: Rahmenbedingungen und Akteure, Wiesbaden.
Härter, Martin and Daniela Simon (2013), Wollen Patienten partizipative Entscheidungsfindung und wie wird das gemessen?, in: Bessere Ärzte, bessere Patienten, bessere Medizin, edited by Gerd Gigerenzer and J.A. Muir Gray, Berlin, pp. 55-60.
Haydn, Dieter et al. (2013), A randomized controlled clinical trial of pacemaker follow-up in clinic and by telemedical interpretation of the pacemakers' magnet mode, in: Journal of Telemedicine Telecare, vol. 19, no. 8, pp. 456-465.
Hofmarcher, Maria M. (2013), Austria: Health system review, in: Health Systems in Transition, vol. 15, no. 7, pp. 1-292.
Holtkamp, Lars (2012), Verwaltungsreformen: Problemorientierte Einführung in die Verwaltungswissenschaft, Wiesbaden.
Jacobs, Robin J. et al. (2014), A systematic review of eHealth interventions to improve health literacy, in: Health Informatics Journal, vol. 20, no. 3, pp. 1-18.
Jensen, Michael C. and William H. Meckling (1976), Theory of the firm: Managerial behavior, agency costs and ownership structure, in: Journal of Financial Economics, vol. 3, no. 4, pp. 305-360.
Kilocoach (2014), https://www.kilocoach.com/at-de/CMS/ContentLanding.aspx?id=936359533315271258609 2 (access: 2.6.2014).
Kreps, Gary L. and Linda Neuhauser (2010), New directions in eHealth communication: Opportunities and challenges, in: Patient Education and Counseling, vol. 78, no. 3, pp. 329-336.
Krones, Tanja and Gerd Richter (2008), Ärztliche Verantwortung: das Arzt-Patient-Verhältnis, in: Bundesgesundheitsblatt, vol. 51, no. 8, pp. 818-826.
Levinson, Wendy et al. (2005), Not All Patients Want To Participate in Decision Making, in: Journal of General Internal Medicine, vol. 20, no. 6, pp. 531-535.
Loeffler, Elke (2009), Public governance in the public domain, in: Public Management and Governance, edited by Tony Bovaird and Elke Loeffler, London, pp. 215-232.
Martin, Steve (2009), Engaging with citizens and stakeholders, in: Public Management and Governance, edited by Tony Bovaird and Elke Loeffler, London, pp. 279-296.
McCann, Laura et al. (2005), Transaction cost measurement for evaluating environmental policies, in: Ecological economics, vol. 52, no. 4, pp. 527-542.

Monteagudo Pena, Jose Luis and Oscar Moreno Gil (2007), e-Health for patient empowerment in Europe, http://www.epractice.eu/files/media/media2499.pdf (access: 4.6.2014).
Öffentliches Gesundheitsportal Österreich (2013), https://www.gesundheit.gv.at/, (access: 22.9.2014).
Pagliari, Claudia et al. (2005), What Is eHealth (4): A Scoping Exercise to Map the Field, in: Journal of medical Internet research, vol. 7, no. 1, p. e9.
Pelletier-Fleury, Natalie et al. (1997). Transaction costs economics as a conceptual framework for the analysis of barriers to the diffusion of telemedicine, in: Health Policy, vol. 42, no. 1, pp. 1-14.
Peters, B. Guy (2010), Meta-governance and public management, in: The new public governance? Emerging perspectives on the theory and practice of public governance, edited by Stephen P. Osborne, London, pp. 36-51.
Pfeiffer, Karl P. (2007), Was Systeme verändert, Die E-Health-Strategie aus der Sicht der österreichischen E-Health Initiative, in: ÖKZ, vol. 48, no. 5, pp. 6-11.
Pfeiffer, Karl P. (2011), Ist-Zustand und Perspektive von e-Health in Österreich und International – ein Überblick, in: Wiener Medizinische Wochenschrift, vol. 161, no. 13-14, pp. 334-340.
Pfeiffer, Karl P. and Clemens Martin Auer (2009), Herausforderungen bei der Umsetzung der elektronischen Patientenakte und Gesundheitskarte in Österreich, in: Bundesgesundheitsblatt, vol. 52, no. 3, pp. 324-329.
Pingitzer, Nicole (2014), Stand und Entwicklungsperspektiven von Telemedizin-Anwendungen in der DACH-Region, Masterthesis , Linz.
Reiners, Hartmut (2006), Der homo oeconomicus im Gesundheitswesen, in: Gesundheitsökonomie und Gesundheitspolitik im Spannungsfeld zwischen Wissenschaft und Politikberatung, edited by Herbert Rebscher, Heidelberg, pp. 101-126.
Riedel, Monika and Gerhard Röhrling (2009), Ursachen für Kostensteigerungen und zukünftige Herausforderungen im österreichischen Gesundheitssystem, in: WISO – Wirtschafts- und sozialpolitische Zeitschrift, vol. 32, no. 1, pp. 93-112.
Rohner, Peter and Robert Winter (2008), Was kann die Wirtschaftsinformatik dazu beitragen, E-Health voran zu bringen?, in: Wirtschaftsinformatik, vol. 50, no. 4, pp. 330-334.
Saam, Nicole J. (2002), Prinzipale, Agenten und Macht, Tübingen.
Stachwitz, Philipp and Armin-Farid Aly (2009), Einfluss von Telemedizin auf die Arzt-Patienten-Beziehung, in: Praktische Telemedizin in Kardiologie und Hypertensiologie, edited by Franz Gross, Stuttgart, pp. 32-35.
Statistik Austria (2013 a), Gesundheitsausgaben in Österreich laut Systems of Health Accounts (OECD) 1990-2011, http://www.statistik.at/web_de/static/gesundheitsausgaben_in_oesterreich_laut_system_of_health_accounts_oecd_199_019701.pdf, (access: 5.5.2014).
Statistik Austria (2013 b), IKT-Einsatz in Haushalten 2013, http://www.statistik.at/web_de/static/haushalte_mit_computer_und_internetzugang_2013_022213.pdf, (access: 1.5.2014).
Warda, Frank (2006), Patienten-Empowerment durch den Einsatz elektronischer Gesundheitsakten, in: Telemedizinführer Deutschland, edited by Achim Jäckel, pp. 374-378, Bad Nauheim.
Wirtz, Bernhard W., Linda Mory and Sebastian Ullrich (2010), E-Health Management im Kontext des E-Government, in: E-Government, Grundlagen, Instrumente, Strategien, edited by Bernhard W. Wirtz, Wiesbaden, pp. 267-292.