Stimulating adoption of the MindDistrict platform by GGzE mental healthcare professionals

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Stimulating adoption of the MindDistrict platform by GGzE mental healthcare professionals

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Preface

In 2009 I started the Bachelor Industrial Design, which consisted of a creative and practical approach. In between, I joined the board of Lucid, the study association of Industrial Design to broaden my experiences and perspectives. In 2013, due to my minor Entrepreneurship and Innovation, I was able to start the Master Innovation Management. In my opinion this was a contribution to my previous education by its theoretical approach with a focus on business. This report is the result of my graduation project at GGzE, which marks the end of my Master in Innovation Management at the TU/e. The internship gave me the opportunity to combine the knowledge acquired during the master courses and apply it to the field of practice. The master project gave me the experience how to deal with an organizational problem and work on my own by trial and error. It has been a struggle to define the right research- and sub-question(s), to get in contact with the right persons and to gather the right information regarding organizational interventions. The results nevertheless represent a useful set of values regarding eHealth. It is an interesting but broad topic that deserves further attention for theoretical and practical relevance.

Furthermore, I would like to express my gratitude to some people who have made this research project possible. First of all, I would like to thank Meddy, my company supervisor, who was always prepared to discuss my ideas. Additionally, I would like to thank GGzE's management and employees for being so open minded about the project, which I appreciate. They took the time and were patient in sharing their experiences. Without their input I wouldn't be able to finalize this study. Second, I would like to thank my university supervisors, prof. dr. Ed Nijssen and dr. Jeroen Schepers who have guided me through the research process. In the process, Ed Nijssen told me I should not focus on designing the hammer and nail, but look at the way to use them to perform my work. The trick is to combine methods and make it applicable for the new context and study the pink elephants. This helped me more then he might realize, despite his peculiar metaphors. Going through the process while choosing my own path he made me feel confident about my capabilities. His feedback and perspective helped me to take this project to a higher level. Last, but not least, I would like to thank my family and friends. My mother gave me the chance to study and supported me in every decision I made, in my study and in my life. For this, I am indescribably thankful. Thanks to my dad and Martine I was able to refine this research. They supported me in my learning process and I am thankful for their input. Also I would like to thank Ferdi. He cheered me up and was of big support. My brothers and friends gave me the necessary distraction in my spare time but also helped me with their advice.

Sanne van Wingen

Summary

This master thesis graduation project concerns the technology acceptance model (TAM), which is defined as how users come to accept and make use of a technology. The study focuses on successful implementation of a digital platform that enriches the service of healthcare professionals and is performed at the Foundation for Integrated Mental Healthcare Eindhoven and the Kempen (GGzE). The combination of a theory and design approach aims to improve the organizational impact on the implementation among healthcare professionals by creating a refined framework.

The challenge

Increasing healthcare costs, shortage of qualified healthcare personnel, new regulations, requirements from healthcare insurers and increasing mental disorders that are in need for support put pressure on the available healthcare budgets. All these influences have an effect on the organization and their stakeholders: doing more with less. This requires a more efficient and effective healthcare system. However, research shows that within the healthcare sector there have been more failures than successes concerning the implementation of new technologies that aim for this.

Literature points out that especially physicians show resistance. Because of that technology implementations haven't got the intended results. Also GGzE faces challenges with regard to MindDistrict (MD) adoption by healthcare professionals. MindDistrict is an eHealth platform that enables a more intense and supportive treatment. Clients are able to contact their therapists easier if they have a question and don't have to wait for the next meeting. In order to stimulate adoption among the employees, MD is promoted and facilitated. To upgrade organizational performance an overview of GGzE's current use and process is required as well as insights into the healthcare professional's perspective. Contributing to the success of the technology adoption in practice, the research question is: *How can GGzE's management effectively stimulate adoption of platform MindDistrict by GGzE healthcare professionals and what is the role of training/support in this process?*

Theoretical review

TAM suggests that a number of aspects have an impact users' decision whether on how and when they use a new technology. Particularly, perceived usefulness (PU) and perceived ease of use (PEOU). Although, the effectiveness depends as well on human and social factors that are not specified within this model. Healthcare professionals differ from other technology users and face several barriers. In order to enhance adoption and realize a more efficient healthcare system, organizational tools should positively influence the significant factors.

Knowledge from existing literature resulted in a new conceptual framework, which focuses on input and output variables, presented in Figure 1. Personal-, organizational- and system characteristics

influence healthcare professionals' willingness to use the new system. Combining these allows GGzE to assess the process and provide tools to create short and long-term benefits.

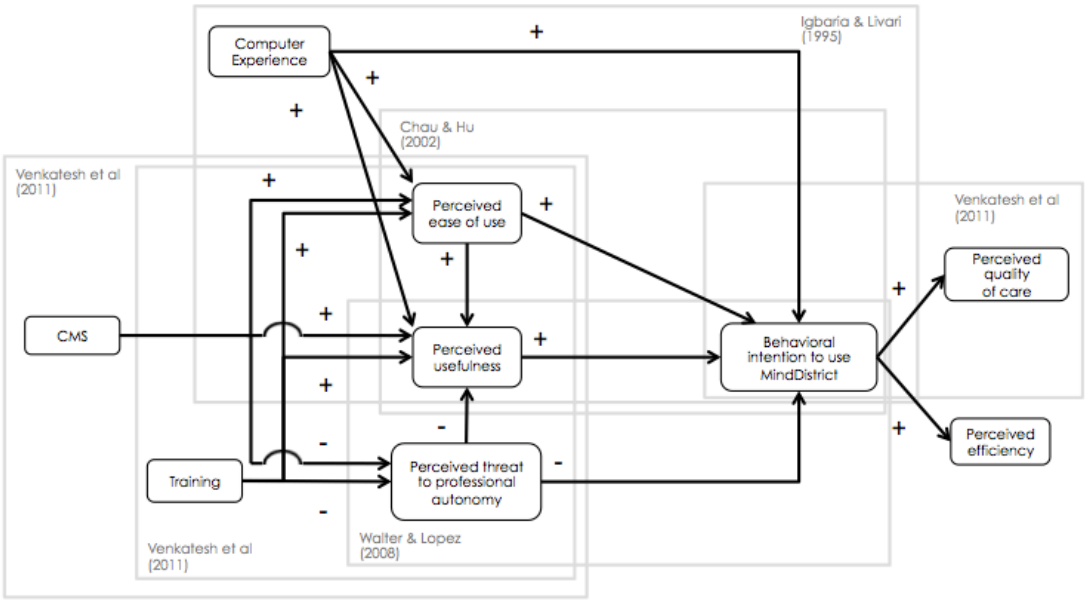

Figure 1: Conceptual framework of healthcare professionals' technology acceptance

Analysis and evaluation

By combining qualitative and quantitative data collection (examining company documents, observations, and a questionnaire) current adoption and implementation process of GGzE is analyzed. The results are aligned with the theoretical review to enhance understanding of the context and stimulate implementation success.

The qualitative results show that there are internal and external variables influencing the implementation process. GGzE's vision and support, varying from training to communication to continuous system optimization, should facilitate and provide direction. This tackles the greatest part of identified challenges regarding mental healthcare professional's technology acceptance. In general, privacy is a main concern, which can be guided by complete information and transparent communication. Moreover, educational involvement can be beneficial to shape the future healthcare professional.

The results of the questionnaire show that MD implementation is still in its infancy as less than half of the respondents make use of MD, most use it less than 6 months and for less than 10% of their work. Besides, the system itself should be continuously improved to make it user-friendlier, which prevents further resistance. Organizational support can convince those not making use of the MD platform. Nevertheless, 19% of the respondents did receive specific MD training. However, findings indicate that this specific type of training contributes to healthcare professionals' belief MD is free from effort. But there is a need for more training and time to learn. The content of the training can be improved

by showing the platform's possibilities, implementation successes and examples from practice for each specific target group. Training seems valuable in reducing healthcare professional's perceived threat to their autonomy. It makes them more willing to use the MD platform. Besides, presence of champions and internal communication has a moderating effect on the threat. These two organizational tools affect the strength of the relation between healthcare professionals' threat and perceived usefulness. Furthermore, MD use contributes to the quality of care, which is an important benefit as it represents client's satisfaction. The treatment is improved by more accurate information, which eases the decision-making process and reduces mistakes made.

Recommendations

GGzE experiences difficulties in use of the MindDistrict platform by healthcare professionals, which does not lead to an effective implementation. To improve the current process and create a more efficient healthcare system, change is required. By facilitating continuous computer and MD trainings, making use of management-level persons who persuade the rest, highlighting the benefits of the MD platform and providing technical support the attitude of healthcare professionals can be positively influenced. Several aspects are summarized for enhancement:

- Evaluations are useful and contribute to the MD platform's optimization. However, better documentation and integration enhance progression. Functionalities can be added, bugs treated accurately and modules can be evaluated to boost success
- Vision with a clear road-map including responsibilities and realistic goals can increase the process' efficiency
- Highlight the benefits: most clients are mentally able to work with MD and the platform contributes to the quality of care
- Invest in trainings to stimulate acceptance
- Provide time to learn and integrate the MD platform within their work processes
- Support of clients: access to computers and provide instructions
- Accountability regarding privacy and security

List of concepts' operationalization

Technology acceptance model (TAM): This model defined parameters to stimulate technology adoption

Perceived ease of use: The extent of one's belief in the perceived ease of use of the MD platform

Perceived usefulness: The extent of one's belief in the usefulness of the MD platform

Behavioural intention: The degree to which a person has an intention to behave in a certain way, in this case the intention to use the MD platform

Perceived threat to professional autonomy: The extent of threat regarding professional's control over the conditions, processes, procedures, and content of their work and individual judgment of their knowledge and expertise.

Perceived quality of care: The extent of one's belief in the perceived quality of care of the MD platform

Perceived efficiency: The extent of one's belief in the perceived efficiency of the platform

Technical support: the extent of technical support provided by the organization

Presence of champions: The extent of available management-level person who recognize the usefulness, lead authority and resources of the innovation

Communication: The extent of communication support

Top management support: The extent of top management support available

Training satisfaction: The extent of one's training satisfaction

Computer experience: The degree of awareness concerning computer's contribution to execute tasks

List of abbreviations

GGzE	Mental health care Eindhoven
MD	MindDistrict
R&D	Research and Development
CCP	Client Coordination Point
ICT	Information and communication technology
IT	Information technology
IS	Information System
EMR	Electronic Medical Record
EHR	Electronic Health Record
TAM	Technology acceptance model
IDT	Innovation Diffusion Theory
UTAUT	Unified Theory of Acceptance and Use of Technology
PU	Perceived Usefulness
PEOU	Perceived Ease of Use
BI	Behavioral Intention
CE	Computer Experience
PT	Perceived Threat
T	Training satisfaction
CMS	Change Management Support
TS	Technical Support
PC	Presence of Champions
C	Internal Communication
TMS	Top Management Support
PQC	Perceived Quality of Care
PE	Perceived Efficiency
GEN	Gender
AGE	Age
TEN_HC_YR	Tenure healthcare years
TEN_COM_YR	Tenure company years

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1 Introduction

This report describes the master thesis graduation project performed at GGzE that operates in the mental health sector. The first chapter addresses the research project referring to theoretical and empirical background. Then the experienced problem is defined, which resulted in the research question. In order to answer this question, the document formulated provides an overview of the findings related to this topic. The created document set-up serves as backbone to maintain structure during the process.

1.1 Theoretical background

The leading cause of absence and incapacity at work in most high-income countries is mental illness (Mallen, C.D., Wynne-Jones, G. & Dunn, K.M., 2011). Increasing economic and social costs are a burden for society, which is a high priority for policy. Due to this, the healthcare industry is exploring how information technology (IT) and information system (IS) can redesign the healthcare paths. IT adoption in service industries changes the service delivery process as technology complements or substitutes the interactions (Parasuraman, 2000). The services delivered through the Internet and other related technologies vary in contexts and needs. The application of information and communication technologies (ICT) within the healthcare domain is called eHealth. It is an answer to the economic challenges healthcare faces now (Weinder, J.P., Yes, S. & Blumenthal, D., 2013).

Despite promise, usage is fragmented, user reactions vary and adoption is slow (Liddell, 2007). Literature states that regarding technology implementation in healthcare there are more failures than successes, complexity increases this even more, and success is depended on the user (Berg, 2001) (Wiley-Patton, 2002). Organizational members need to use a new technology in order to implement it (Jha et al, 2009). Half of the researched organizations face employee resistance while implementing an innovation (Venkatesh, V., Morris, M.G., Davis, G.B. & Davis, F.D., 2003). Especially, physicians' adoption is slow (Lowenhaupt, 2004). To make eHealth applications succeed, these physicians are the ones who need to change their practice patterns and integrate the system in their daily work activities. eHealth's benefits will only appear when it is used properly.

Research of the acceptance of eHealth has the potential to guide healthcare organizations to create more effective and efficient services. However, theoretical insights need to be generated for healthcare specific (Chiasson, M.W. & Davidson, E., 2005). Although quite some studies to predict and understand users are performed (Davis, 1989) (Igbaria, 1993), these models aren't specifically targeted at physicians. Concerning a study of physicians' acceptance of telemedicine, the results indicate that this user group differs from other types of IT users (Chau, P.Y.K. & Hu, P.J., 2002b). The reasons are their autonomous practices, their specific trainings, and professional work processes. The scientific significance and practical applicability of new healthcare systems is required, as well as understanding the factors that drive the use.

1.2 Empirical context

The Foundation for Integrated Mental Healthcare Eindhoven and the Kempen (GGzE) is a mental health care provider located in Eindhoven. They provide care and support to people with severe, multiple, and often long-term psychiatric problems for more then 20.000 clients of all ages each year. GGzE is the only provider in this area that offers this special kind of care. They cooperate with other organizations to ensure the client can participate within society (GGzE, 2013). Clients' problems are approached together with close family and friends in order to reintegrate them successfully. GGzE treats most of their clients by providing ambulant care. This means that the clients can stay home while receiving the care they need to continue their daily life as good as possible. If needed, clients get support to live independently. And if necessary, clients can stay at one of the clinics for a certain period.

GGzE wants to support more clients with fewer resources, while aiming at an optimal service tailored to the clients' needs. GGzE approaches this in different ways, by initiating and implementing innovative developments like eHealth, ePad and serious gaming (GGzE, 2013). The opportunities of online treatments are seen as a necessary completion on the current services and support that fits the vision to become more efficient. GGzE has been working on the implementation of eHealth and started to use the MindDistrict (MD) platform since 2011 to give clients a tool to manage their treatment more at home. The innovative eHealth application MD is a service delivered via the Internet. Since 2013 a wide range of online programs for diverse health problems are available and a substantial amount of treatments can be performed protocolled with the use of Internet.

GGzE aims to be innovative and has the ambition to be one of the national leaders when it comes to eHealth implementation. This means that every center must have online treatment services that are implemented within their business; alignment of services with needs of the client.

1.3 Problem definition

GGzE focuses on implementation of the platform MindDistrict. This platform enables clients to manage their treatment anywhere and anytime. However, the implementation of MD does not only require changing behaviour of its clients, but also from the healthcare professionals. The nature of eHealth lies between the healthcare professional and the technology (Berg, 2001). Nowadays, new clients receive an account at the start of their treatment, which engages employees in a new style of working. The MD platform is a system that integrates communication via secured mail and treatment. The first thing new clients can do is to walk through the welcome modules of MD, which are developed by GGzE. In that way, clients can immediately get familiar with the platform and GGzE. Since the availability of MD, GGzE employees do not adopt as expected. The initial project aim was to provide each new ambulant client a MD account, starting on the 1st of January 2014 on (GGzE, 2014). GGz has done a study of the MD implementation in its largest institutions that revealed adoption is hampered by resistance of its employees (GGz, 2014). Training and support should enhance MD use, although the effects remain unclear. GGzE wants to know how to successfully stimulate healthcare professionals'' MD adoption and in particular wonders what the impact of the provided trainings is.

To stimulate adoption among the employees, MD is promoted within GGzE via Intranet, magazines, trainings and champions. The provided trainings can be divided into the inspiration session and hands on training, a nutshell presentation of the platform's options. GGzE's management wonders how effective their support is. In addition they like to know more about the level of use and effectiveness of the new tool. The latter is important because evidence based care is still limited, but recognized as one of the most essential steps towards better and more effective and efficient healthcare services.

Another issue that is stated is management support. GGzE does not seem to merge the vision and practicalities, which influences the attitude throughout the organization.

Based on the formulated problem definition, depicted in Insight 1, the research question arises. This is discussed next.

> GGzE wants to stimulate adoption of the MD platform by its healthcare professionals and wonders how effective the provided trainings are

Insight 1: Problem definition

1.4 Research question

As the problem definition indicates, GGzE wants healthcare professionals to accept the MindDistrict platform and assess the effectiveness of their support. Since they are not the only organization that faces difficulties to successfully implement a new technology, the goal of this study is twofold. First, a conceptual framework is developed for practicing technology adoption in the healthcare context. The framework aligns personal, organizational and performance factors, identified in literature and the qualitative part. This can also be beneficial to other healthcare organizations to help them enhance the application of new technologies. Second, the aim is to develop an advice for GGzE regarding further proficient implementation. Included in the research are insights gained from the theoretical review and conducted interviews, and GGzE's preferences. Based on these two objectives, the following research question is formulated:

> How can GGzE's management effectively stimulate adoption of the platform MindDistrict by GGzE healthcare professionals and what is the role of training/support in this process?

Insight 2: Research question

The following four sub-questions serve as basis to find an answer to the main research question:

1. How can the individual technology acceptance process be defined regarding mental healthcare professionals?
2. What barriers do they face and are the influences on their technology acceptance process?
3. To what extent do organizational interventions, like support and training, influence mental healthcare professionals' perspective regarding MindDistrict?
4. Does healthcare professionals' use of the mental eHealth tool, the MD platform, contribute to the perceived quality and efficiency of care?

1.5 Contribution

Some previous studies have provided insights in healthcare professionals' intentions regarding specific healthcare IT systems like Electronic Health Records (EHRs)/Electronic Medical Records (EMRs) and tele variations. But none of them have explored mental healthcare professionals with regard to systems consisting of modules or comparable systems during treatment. Due to the technological developments, there is a need for evidence-based research how enhanced systems influence the care delivered. This study makes a contribution to science and practice of eHealth in the mental care setting. Specifically, the results explain to some extent healthcare professional's perspectives and intentions, which are helpful in developing GGzE's eHealth strategy. As the system is still in its infancy, the gained knowledge can increase the chance of successful implementation. Besides it can be helpful for other mental healthcare institutions that cope with the implementation of an eHealth intervention.

1.6 Structure of the thesis

In order to answer the questions formulated in this study, a combination of theoretical research and empirical analysis has been conducted. The introduction addresses the research context and the main research question, created according to the problem faced, in chapter 1. Chapter 2 describes the methodology used for the theoretical review and empirical analysis. Hereafter, the theoretical review is supported with a framework discussed in chapter 3 and supported by data in chapter 4. Chapter 5 presents the discussion in which the results are evaluated. The theoretical findings, empirical insights and evaluation are used as input to formulate an advice regarding implementation of the MD platform, which is discussed in chapter 6. Recommendations are addressed while answering the main research.

2 Methodology

The study includes a theoretical- and empirical analysis of literature and qualitative/questionnaire data respectively. The challenge faced by GGzE served as guide for the literature analysis. This resulted in a conceptual framework and guides the data collection and evaluation. The data analysis is formed by several steps taken to ensure the research' validity and reliability. In that way, the quality is guaranteed, answers to the questions are given and a proper advice formulated. The findings serve as basis for further research and implementation.

2.1 Literature review

First a literature study was performed. The individual technology acceptance process within healthcare forms the basis, which is in accordance with the topic of eHealth implementation. Healthcare professionals need to make use of the innovation and organizational interventions may enhance the process.

Keywords were identified to search databases. This strategy was combined with the snowballing technique to identify additional relevant articles. The initial list of keywords that was used is shown in Appendix A. They were applied using the article management systems ABI inform, Scopus and Web of Science. Adapting search strings and constraints in the search engine has been an iterative process. A selection of useful articles was the result of reviewing titles, abstracts and conclusions. After this iterative process, the Journal Citation Report (JCR) Impact Factor and ABS ranking were checked to help focus on high quality papers (Appendix B). The selected articles were read and summarized and integrated in a coherent review. Moreover, a model was developed which is tested and evaluated.

2.2 Empirical analysis

The model was tested using questionnaire data. However, first a qualitative study was done to better understand the specific context and the MD platform. Interviews with people from the responsible committee of MD "Kerngroep", eLab (responsible for the development of some MD modules) and those organizing trainings were conducted. In addition to that, company documents were also studied. Thereafter the quantitative study was done. Table 1 provides an overview.

Studying company documents helped to get familiar with GGzE regarding goals, structure and terminology. Besides, the processes and protocols available were identified. This and attendance of the biweekly meetings of "Kerngroep" provided input for the interviews. In order to shape a comprehensive image of the organization interviews were arranged with management, therapists, CCP personnel and technical personnel of several centers. Interviewees represent diverse functions, from different levels, several centers and with various responsibilities. In that way, the processes in practice, influential factors and arising problems are revealed. As reactivity bias is involved with interviews, guides were developed for each specific function according to the critical incident

technique (CIT) (Appendix C) (Flanagan, 1954). This technique is especially attractive as practicalities relate to training. Interviewees report incidents they experienced and provide positive/negative factual aspects. To understand the process, check correspondence with the interviews and company documents the observations of the "Kerngroep" meetings were supportive. With use of triangulation the processes and problems are identified and the research quality safeguarded.

Collection method	Resources
Company documents	Website, magazines, meetings minutes, etc.
Semi-structured interviews	12 interviews; 3 managers, 5 therapists and 1 responsible of "inspiration day", 1 person of CCP, 1 person of ICT, 1 MD content developers
Observations	Observing meetings of Kerngroep that address the implementation process of MD throughout GGzE
Questionnaire	Survey sent to therapists. A response rate of 34%

Table 1: Data collection methods

The questionnaire was distributed among healthcare professionals, defined as those who should work with the MD platform. A selection has been made of psychologists, psychiatrists, (social psychiatric) nurse, social worker, therapist (creative-, system-, verbal-, etc.), experience expert and others. They have to work with the MD platform to make the implementation succeed. Formulated questions are based on literature review and qualitative results that shape the conceptual framework. The outcomes illustrate an advice to improve GGzE's current situation. Differences between data results and the conceptual framework provide an assessment of GGzE's current strengths and weaknesses.

Quality measurements	Method	Approach
Construct validity	• Validated instruments • Evaluation by expert • Triangulation	• Literature review, exploratory meetings • Check by supervisor and therapists • Company documents, interview, observations, questionnaire
Internal and external validity	• Theoretical perspectives • Evaluation measurements	• Literature review and explanation: TAM, organizational support, eHealth performance • Evaluation conceptual framework (data analysis)
Reliability	• Use of research methods • Documentation of procedures	• Setting-up research • Theory search, meetings minutes and interview transcriptions and evaluations

Table 2: Research validity and reliability

In order to establish the research quality, the validity and reliability are presented in Table 2. Construct validity is concerned with the measuring instruments (Van Aken, J., Berends, H. & Van De Bij, H., 2007). Existing and validated measurements instruments have been used next to newly developed instruments. Evaluation by university supervisor and GGzE therapists ensure the quality. With use of several research methods, the problem is analyzed from diverse sources, which increases

the validity. The iterative process was useful in formulating the questionnaire, to validate the causes, and creating an appropriate advice to enhance implementation. Internal validity is concerned with explanation of the relations with support of theory. The diversity of perspectives on the problem faced and alignment with the questionnaire outcomes contribute to it. External validity is concerned with the generalizability of the findings. Although the type of technology and context is specific, theoretical support shapes the formulated advice. Documentation of the procedures and findings contribute to use in other contexts.

3 Literature review

An overview of literature will be presented in this chapter. First, understanding of the individual technology acceptance process within social sciences is necessary. Paragraph 3.1 sheds light on the most used and significant model developed. As this research focuses on healthcare, paragraph 3.2 illustrates the evolution of technology in this domain. Focus lies on the adoption of a new service or technology, the changing relation between professional and client and the barriers faced by healthcare professionals. Based on the gained insights, a conceptual framework is created and discussed in paragraph 3.3. To answer the sub-questions 'How can the healthcare professionals' acceptance process be defined?' and 'What barriers do they face and influence their acceptance process?' the subject will be defined, next to the objectives and requirements. Furthermore, the extensive literature review provides insights into the sub-question 'To what extent do organizational interventions influence healthcare professionals' perspective?'

3.1 Individual technology acceptance

Technology acceptance is the user's willingness to operate with supportive technologies (Davis, 1989). Supportive technologies can help make business processes more efficient and effective. However, implementation of these technologies often meets user resistance. The reason why people accept or reject innovations are several and need to be understood to stimulate adoption. Technological and psychological factors have been identified since the 1980s and several models were developed.

Rogers (1995) developed the first model of technology adoption: the Innovation Diffusion Theory (IDT). The adoption of an innovation is distributed over five groups and certain people and those with sufficient knowledge of the technology and communities' needs can steer the process (Wenger, E., White, N. & Smith, J.D., 2010). The most significant model and where external variables can be assessed is the Technology Acceptance Model (TAM) (Davis, 1989) (Chen, L., Gillenson, M.I. & Sherell, D.I., 2002). The basis of this model is shaped by the prediction of system use by the user's motivation, which is again influenced by the system's features and capabilities. The original TAM model explains user's motivation by two factors and is presented in Figure 2. The first one is perceived usefulness,

defined as “the degree a person believes the innovation would enhance the job performance”. The second one is perceived ease of use, defined as “the degree a person believes the innovation would be free form physical and mental effort”. The individual’s motivation to perform a given behavior defines the intention. Furthermore, several developed models regarding the individual technology acceptance’ process are predecessors or successors of TAM. One of them is the Unified Theory of Acceptance and Use Technology (UTAUT) that explains the intention to use an information system (Venkatesh, V., Morris, M.G., Davis, G.B. & Davis, F.D., 2003). Nevertheless, all the models are general; they not specify technology and context antecedents. While technology acceptance is still a researched area, understanding of it is essential. The above-mentioned models are all also applied in the healthcare context, although the TAM model has been most popular.

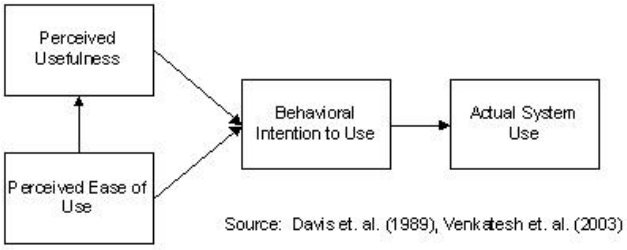


Figure 2: Original Technology Acceptance Model (TAM) proposed by Davis

Nevertheless, TAM received criticism regarding external variables, self-reported data, controlled environments, and use in mandatory settings (Lee, Y, Kozar, K.A. & Larsen, K.R.T., 2003). This general model requires supplementation of other theories to include human and social factors. Constructs influencing one’s belief towards a technology vary from their personal characteristics, user trainings, user participation in the design and nature of implementation (Venkatesh, V. & Davis, F.D., 1996) (Venkatesh, V., Speier, C. & Morris, M.G., 2002). By optimizing the model, strategies can be developed to enhance user adoption.

3.2 Healthcare and technology

eHealth concerns technology that supports digital processes and communication within healthcare (Eysenbach, 2001). Forms of it encompass a range of services/systems: EHR’s, Computerized Physician Order Entry, ePrescribing, Clinical Decision Support (CDS), telemedicine, Consumer Health Informatics, Health Knowledge Management, Virtual Health, and Healthcare Information Systems. In general, they can be classified into clinical, administrative or special purpose services. Clinical systems are concerned with the patient’s care varying from monitoring, electronic prosthetics and computer-based surgery. EMR systems are an example of administrative applications. Software applications that cope with schedules, control data, and communicate with other systems fall into this category. The last one, special purpose systems, includes software that is used in trainings for the healthcare professional, research, self-help, and scanning (Wiley-Patton, 2002). There are two types of eHealth forms: back-end data exchange and front-end data exchange. The first one concerns patient’s health

records like x-rays and blood test results. The second one concerns interaction with the patient like email contact, which avoids a hospital visit. Especially for chronic patient care well defined actions enables standard communication, while ensuring the quality. Front-end data exchange seems to be useful and easy to implement for these types of patients. Diverse tools in both forms have been developed the last years, affecting the healthcare services.

E-mental health refers to an Internet or ICT intervention to support mental health conditions is. It has been first introduced by Riper, Smit & Van der Zanden et al (2007) and stems from concept eHealth. A broad spectrum like alcohol/drug addiction, depression, dementia, Alzheimer's disease, schizophrenia and anxiety disorders fall into the mental disorders. Addressed are screening, promotion, prevention, treatment, professional education, and online research (Riper, H, Andersson, G, Christensen, H, Cuijpers, P, Lange, A & Eysenbach, G., 2010). The advantages of e-mental health are: fewer costs involved, increasing accessibility, and anonymity. However, the disadvantages concern credibility, privacy, and confidentiality (Musiat, P., Goldstone, P. & Tarrier, N., 2014).

3.2.1 Mediated interaction

The difference between eHealth and the traditional treatments is that physical contact is replaced by technology. Hence the interaction becomes mediated by technology. eHealth has two main purposes. The first one is that the consumer has more responsibility. Internet increases the accessibility of clients; they can work at their own pace, at home, and are able to review the material later on (Cline, R.J.W. & Haynes, K.M., 2001) (Gega, L., Marks, I. & Mataic-Cols, D., 2004). Distance doesn't play a role, so a greater population is given access. Clients are empowered as they become less dependent on professionals, through information and choices offered by the Internet. They take an active role in their own health care process. However, patients and their family engagement depend on the patient, the organization and the society (Carman, K.L., Dardess, P., Maurer, M., Sofaer, S., Adams, K., Bechtel, C. & Sweeney, J., 2013).

Second, ICT enables a more effective and efficient treatment supporting the interaction between client and healthcare provider (Baldwin, L., Clarke, M., Eldabi, T. & Jones R., 2002a). eHealth applications can reduce the costs in healthcare, as physical time spend will be lowered. Due to increased exchange and accuracy of information the quality of the care can be enhanced. Quality is an important factor regarding healthcare service satisfaction (Hadwich, K., Georgi, D., Tuzovic, S., Büttner, J. & Bruhn, M., 2010). Besides, patient satisfaction improves through online viewing and self-management (Ng, H.S., Sim, M.L., Tan, C.M. & Wong, C.C., 2006). However, a drawback is the lack of group interaction, which is in some cases a success factor (Hoencamp, E. & Haffmans, P.M.J., 2008). And, although access to healthcare is improved, access to the Internet is required. The changing relationship is challenging for physicians and clients and requires further empirical research (Boonstra, A. & Broekhuis M., 2010).

3.2.3 Professionals' technology acceptance

The future of eHealth depends on the understanding of the user's perspective regarding the service and usage (Brown, S.A., Massat, A.P., Montoya-Weiss, M.M. & Burkman, J.R., 2002). Identified publications that look into the healthcare professionals' technology acceptance are presented in (Appendix D). Provided is an overview of the performed type of study, type of technology, performance level, sample size and country, theoretical basis and influential factors. The type of studies is mostly characterized by surveys, while limited attention is paid to the qualitative part. Various technologies are assessed, although most common are EHRs/EMRs and tele-systems. The settings consisted mainly of hospitals and physicians' practices. Most of the researches were conducted in the U.S. The theoretical basis consisted mainly of TAM, emphasizing perceived usefulness more than perceived ease of use. Rogers' innovation model, UTAUT, organizational theory, social theory, and social network theory characterize the rest.

Investments in innovations will only be beneficial when healthcare professionals make use of it. Understanding of factors influencing their acceptance makes it possible to smoothen the implementation within the healthcare industry. Of all publications identified in the literature review an overview of barriers faced by healthcare professionals has been created (Appendix E). The most common mentioned factors are present in the TAM model: perceived ease of use and perceived usefulness. Second, threat, training and leadership were mentioned as influencing variables. A study showed that the perceived threat of EMRs has a direct and negative effect on the perceived usefulness of physician's (Lin, C, Lin, I.C. & Roan, J., 2012). Third, interoperability, age, computer literacy and available time came to front. Prove of efficient and effective technologies in healthcare are a main barrier for physicians. Concerning studies of technology implementation within healthcare findings are that there are more failures than successes, more complex technologies lead to more failures, and the success of the system is determined its users (Berg, 2001) (Wiley-Patton, 2002). Researchers identified a gap of investigating the antecedents within the eHealth literature (Kelley, H., Chiasson, M., Downey, A. & Pacaud, D., 2011). More awareness of the factors influencing healthcare professionals' technology acceptance can improve technological implementations in the healthcare sector.

3.3 Developing a generic model of professionals' eHealth adoption

Drawing on the previous literature review and focusing on the topic of adoption of eHealth technology by a healthcare provider's professional a generic model was developed. It is shown in Figure 1. The model consists of the TAM model that has been extended with the following variables: computer experience, perceived threat to autonomy, management support, training, quality of care and perceived efficiency. The model will be briefly discussed next to the hypotheses developed.

The conceptual model consists of a TAM enriched with the elements of training and management support. The basic TAM model is shown center stage of Figure 1. The training aspects are placed left hand bottom corner. Training has been added based on research that shows positive influence of training on the acceptance of new technologies and routines (Quinones, 1995) (Gallivan, M.J., Spliter,

V.K. & Koufaris, M., 2005). Computer experience is a strong antecedent of ease of use, usefulness and usage (Igbaria, M. & Livari, J., 1995). Because employees with a higher level of computer knowledge may have a better understanding of eHealth solutions, also this variable is accounted for. As some organizations provide general motivation courses or "Inspiration Day" trainings next to applied courses also these are accounted for. Such trainings may act as an additional and preceding motivation.

In the top hand left corner change management support represents several relevant management support related drivers of the implementation process. These are drawn from the extent literature and include: internal communication and promotion for the innovation, quality of project champions, level of technical support to assist (new) users, and top management support (Greenhalgh, T., Pott, H., Wong, G., Bark, P. & Swinglehurst, D., 2009) (Lee, C.P. & Shim, J.P., 2007) (Schon, 1963) (Ash, J., Gorman, P., Lavelle, M., Payne, T., Massaro, T., Frantz, G. & Lyman, J., 2003) (Venkatesh, V., Zhang, X. & Sykes, T., 2011) (Boonstra, A. & Broekhuis M., 2010).

Next the model is detailed. Specifically, hypotheses are developed for each of the relationships. Starting point is the baseline model, i.e. the relationship between the constructs of TAM. Next, influence of the training-model related variables are discussed. Where after the impact of variables of management support-model related influences are hypothesized. At last, the quality and efficiency of the platform is evaluated. Although new technologies should enhance the treatment, evidence-based research of eHealth is limited.

3.3.1 Sub model 1: TAM-model related hypotheses

The baseline TAM model consists of the constructs: perceived ease of use, perceived usefulness, and behavioural intention. Because these relationships have been hypothesized and tested many times in literature, these will not be discussed in detail and simply retested. The idea is that healthcare professionals who have a more positive image of the innovation accordingly will have more positive associations with it. This results in a higher perceived level of the new technology's usefulness, and thus healthcare professionals will also be more inclined to adopt. As the ease of use may also trigger emotional involvement next to functional (usefulness) also a direct effect of perceived ease of use on behavioural intention may exist, especially in the beginning phases of implementation (Hu, P.J.H., Chau, P.Y.K. & Sheng, O.R.L., 2002). These relationships are captured by the following hypotheses:

H1a: Healthcare professionals' perceived ease of use is positively associated with perceived usefulness of the innovation

H1b: Healthcare professionals' perceived usefulness is positively associated with behavioural intention, i.e. adoption of the MD platform

H1c: Healthcare professionals' perceived ease of use is also positively associated with behavioural intention to use the MD platform

3.3.2 Sub model 2: The effect of computer literacy, threat to autonomy and training

One of the first things employees lack is adequate computer skill or they already have negative technological experiences that influence their attitude (Halamka, J., Aranow, M., Ascenzo, C., Bates, D.W., et all, 2006). Computer literacy influences user's satisfaction with computer based innovations (Alasmary, M., Metwally, A.E. & Househ, M., 2014). It increases confidence in capabilities, which is positively affects perceptions of usefulness and behavioral intention. Therefore:

H2a: Healthcare professional's computer experience is positively related to perceived ease of use
H2b: Healthcare professional's computer experience is positively related to perceived usefulness
H2c: Healthcare professional's computer experience is positively related to behavioural intention

Next to a positive impact of computer literacy expected is a negative effect of the degree to which the innovation is considered threatening to the professional's practices for treating their clients. The innovation and its technology may reduce autonomy by imposing routines and scripts. IT systems generally imply codification of knowledge, which may be considered threatening as it enables objectively measuring performance by non-providers, i.e. management. The extent of threat to their control over conditions, processes, procedures, and content of their work, next to judgement of their knowledge and expertise is defined as perceived threat (PT). PT is an important construct with regard to IT adoption and it has shown to be a significant, negative antecedent of healthcare professionals' perceived usefulness (Walter, Z. & Lopez, M.S., 2008) (Lin, C, Lin, I.C. & Roan, J., 2012). Therefore:

H3a: Perceived threat negatively influences the perceived usefulness of the MD platform
H3b: Perceived threat negatively influences the behavioural intention to use the MD platform

One of the most critical interventions to support successful implementation of innovations is end-user training (Gallivan, M.J., Spliter, V.K. & Koufaris, M., 2005) (Ifinedo, 2012). Satisfying training is associated with a positive assessment (Alpay, L, Needham, G. & Murray, P., 2000). It has proven to be significant that training affects the user's willingness to follow the new procedures or use of the innovations (Quinones, 1995). Local support of training is essential to develop the workforce and achieve the results (Smith, S.E., Drake, L.E., Harris, J.B., Watson, K. & Pohlner, P.G., 2011) (Alasmary, M., Metwally, A.E. & Househ, M., 2014). One-on-one training is helpful in setting the expectations, communicating the system features, customize the technology for each specific client group, and support the professionals to integrate the platform in their workflow (Halamka, J., Aranow, M., Ascenzo, C., Bates, D.W., et all, 2006). Extensive information about the system's possibilities via education can enhance the adoption rate (Gulmans, J., Vollenbroek-Hutten, M.M.R., van Gemert-Pijnen, L.J.E.W.C. & van Harten, W.H., 2011). Training brings, next to educating the employees regarding the system, information about the process. The organizational intervention enables users to

gain the required knowledge and it is effective in satisfying the employees' needs, promote use and enhance return on investment (ROI) (Sharma, R. & Yetton, P., 2007). One of the barriers faced by healthcare providers is income reduction, as technologies should make the processes more efficient (Jai Ganesch, 2004). By informing the employees, such prejudices can be tackled.

It is important to be aware that the initial training in the beginning is not enough. New and experienced employees need support throughout the development and implementation of a new technology (Leonard, 2004). Regular retraining the users regarding the continuously changing technologies and possibilities is an important factor (Germanakos, P, Georgiadis, D., Buzzi, M., Buzzi, M.C. & Fenili, C., 2011). To challenge certain myths regarding mental illness and gain insights into the service delivered, users can be involved in training (McAndrew, S. & Samocuik, G.A., 2003).

Training has been examined as an influential external factor within TAM. It enhances the shift to make use of a new technology (Anderson, G.F., Frogner, B.K., Johns, R.A. & Reinhardt, U.E., 2006). Physicians require training to adopt to EMR's (Boonstra, A. & Broekhuis M., 2010). Training is measured as the extent of user's satisfaction. Training breeds proficiency, which is positively associated with the willingness to make use of an innovation. Furthermore, it can overcome the perceived threat of healthcare professionals, making it an useful tool to enhance the implementation process. Therefore hypothesized is:

H4a: Training is positively associated with the healthcare professional's perceived ease of use

H4b: Training is positively associated with the healthcare professional's perceived usefulness

H4c: Training is negatively associated with the healthcare professional's perceived threat to autonomy

Especially in high knowledge contexts the effectiveness of training is higher than in low knowledge (Sharma, R. & Yetton, P., 2007). Implementation success is higher for organizations that invest in technological and task training. The type of training that is most influenced by the type of technology is defined as strategic training (Boothby, D., Dufour, A. & Tang, J., 2010). Strategic training leads to higher productivity and has been specified into basic literacy, computer literacy, technical skills, quality control skills and safety skills. Computer literacy and technical skills are most popular in organizations. Boothby et al (2010) proved that strategic training increases productivity for technology adopters and some types of training do reinforce this effect. The skill level of employees and their shortage are important factors for firms to choose a specific type of training.

Training enhances usage although more knowledge about the design, its impact and organizational influence is required. The relation between group perceptions of the innovation and its actual use is complex (Gallivan, M.J., Spliter, V.K. & Koufaris, M., 2005). These researchers propose that training has an effect on the group's attitude and intentions to use the innovation. Creating a community focusing on the specific technology can offer proper support. A collaborative environment contributes

to the distribution and evaluation, which enhances development. Collaboration with healthcare professionals is a necessity for the progress of innovations (Von Hippel, 2005).

Furthermore, it should be noted that communication and computing anxieties effect individual's interaction with technology tools with regard to eLearning (Fuller, R.M., Vician, C. & Brown, S.A., 2006). Access to knowledge is essential in system implementation when formal trainings are not effective (Venkatesh, V., Zhang, X. & Sykes, T., 2011).

In this regard is noted that motivational training or courses are helpful in making professionals more open to innovation and particularly receiving training to use such innovations. These inspiration sessions break down barriers to change, which free the mind and removes blockage. The expected positive effect is:

H5a: The "Inspiration Day" training/courses positively affect participation in training

H5b: The "Inspiration Day" training/courses reduces perceptions of an innovation as threatening

3.3.3 Sub model 3: Impact of management support and actions to implementation

Return on investments (e.g. decreasing costs due to enhanced efficiency) will not be beneficial if the innovation adoption rate does not take off. The acceptance of healthcare providers is a crucial determinant of eHealth's success (Gagnon, M.P., Orruno, E., Asua, J.M.D., Abdeljelil, A.B. & Emparanza, J., 2012), which requires organizational change. Examples of changes can be new policies, new procedures and workflows next to the changes in medical processes and documentation. Such facilitating conditions contribute to system's use (Kijsanayotin, B, Pannarunothai, S. & Speedie, S.M., 2009), as it has an effect on the behavior of healthcare professionals (Kaplan, B. & Shaw, N.T., 2004). However, research so far done doesn't provide practicalities for management to deal with the acceptance of new technologies (Weiner, B.J., Amick, H. & Lee, S.D., 2008). Influencing the employees is difficult for them (Jha et al, 2009). This highlights the necessity to research factors that determine healthcare professional's intention to use a new system and how to influence them.

Technical and implementation issues cause physician's resistance (Ash, J., Gorman, P., Lavelle, M., Payne, T., Massaro, T., Frantz, G. & Lyman, J., 2003). A key determinant for system implementation is change management support, which is the extent of support available that is perceived by the healthcare professional (Venkatesh, V., Zhang, X. & Sykes, T., 2011). Although, to overcome user resistance, change management should understand the factors causing it (Bhattacherjee, A. & Hikmet, N., 2007).

The interview results indicated some general aspects that are involved when implementing an eHealth system (see Appendix F). A roadmap requires guidelines, goals, and responsibilities to steer the process. A therapist said: *"Who is responsible for the system? It is not clear, although required. An overview in one document would be fine. Describing the responsible person and how to work with the platform"*. Besides, the implementation timing does affect acceptance, as the first impressions last:

"When the timing is wrong, the system doesn't fit into the work processes. And if someone has a aversion towards it, you will probably not get a second chance."

Boonstra & Broekhuis (2010) showed that technical support does stimulate physicians EMR use. Especially implementation of complex technologies requires technical support, which consists of equipment and accurate trouble shooting. Nevertheless, therapist mentioned: *"I think it should be helpful to have a more practical and structured approach. Having a roadmap with guidelines on paper to systematically introduce the tool within the whole organization."* And *"The MD tools do not work correctly, while expectations are created and system supports fails."* To avoid frustration concerning software problems, the software should operate according to the needs (Scott, J.T., Rundall, T.G., Vogt, T.M. & Hsu, J., 2005). This implies that lack of appropriate support creates resistance towards MD use.

Next to this, central individuals or opinion leaders are key in affecting the diffusion of technology (Venkatesh, V., Zhang, X. & Sykes, T., 2011). Forducey et al (2012) indicated that community opinion leaders are essential for success in telehealth technologies. A champion, the management-level person who recognizes the system's usefulness, leads authority and resources, is more important than any other factor in the adoption process (Lee, C.P. & Shim, J.P., 2007)(Goldwater, J. & Harris, Y., 2011). Especially, in the early stages of the system's implementation this can significantly impact the decisions to use the system (Ifinedo, 2012). A strong advocate of the innovation, a project champion, is assumed to positively influence the mental healthcare professionals perception of the platform's merits and thus usefulness (Neufeld, D.J., Dong, L. & Higgins, C., 2007). Often a champion is seen as an independent mind that acts on behalf of the management but also risks her/his own credibility.

Organizational communication informs the employee's about the new tool, it creates awareness. Excellent communication also highlights benefits and thus facilitates the implementation process. The vision should provide direction. Nevertheless, a therapist experiences the following: *"Policy should guide the implementation process of the platform and not impose it on the employees. There are hardly any effectiveness studies on eHealth. So, targets are unrealistic. This implies the vision on decreasing costs, which increases resistance among the employees. In this way the advantages of the system are forgotte*n." By providing knowledge about the system, mental healthcare professionals are educated and convinced. The communication will also signal management support and set expectations regarding goal accomplishment. This will help convince members of the tool's usefulness. Communication (C) is the extent of perceived organizational communication regarding the MD platform.

Lastly, time to get familiar with MD and integrate it within the work processes is indicated as a main barrier faced: *"There is a lack of time to learn and explore what is offered."* Currently, GGzE's healthcare professionals face a high workload and experienced with past implementations it increases accordingly. Nevertheless, it should be noted hours are paid by the organization.

The identified organizational conditions consist of an implementation roadmap, technical support, presence of champions, communication and time. These are formulated as change management support. In general, hypothesized is:

H6a: Change management support is positively related with perceived ease of use
H6b: Change management support is positively related with perceived usefulness
H6c: Change management support is negatively related with perceived threat to autonomy

3.3.4 Sub model 4: eHealth performance

Limited evidence of IT increasing the quality within healthcare exists (Yarbrough, A.K. & Smith, T.B., 2007). According to Venkatesch et al (2011) the core elements of health care quality are technical quality, communication, interpersonal interactions, and time spent. Technical quality concerns the healthcare professional' competence, communication addresses the satisfactory information about the care, interpersonal relations is the extent of empathy and friendliness, and time spent is defined as the extent of satisfactory time spent with the client. The system enables better access to patient information due to enhancement of the technical quality. In that way, healthcare providers can focus on the quality of care. More complete information also affects communication, interpersonal interactions, time spent and error rate favourably. Healthcare professionals can focus on interactions and spend more time due to richer information. eHealth aims at improvement of the perceived quality of care (PQC). This is the extent of the healthcare professional's belief that the MD platform enhances quality. The consequences of its use will positively influence the several above-mentioned metrics of the PQC construct. Therefore:

H7a: The healthcare professional's behavioural intention is positively associated with the perceived quality of care

IT has increased efficiency and effectiveness in many industries. Nevertheless, healthcare professionals lack adoption of new technologies, which results in limited existing research proving the efficiency and effectiveness of IT in this domain (Christensen, H., Griffiths, K.M. & Evans, K., 2002) (Berger, R. & Kichak, J., 2004). Lack of evidence can probably be a barrier for physician's technology acceptance (Yarbrough, A.K. & Smith, T.B., 2007). Regarding an EHR system, physicians indicate that it improves their practice operations and allocation of time (Schade, C.P., Sullivan, F.M., De Lusignan, S. & Madeley, J., 2006). Especially regarding chronic care better documentation increases access to information. Most of the previous researches focused on ICT support for administrative purposes within hospitals (Hussey, P.S., de Vries, H. & McGlynn, E.A., 2009). The MD platform should improve the treatments' efficiency, which should result as well in decreasing costs if adoption takes off. Perceived efficiency (PE) is formulated as the extent of the employee's belief in the platform's efficiency regarding the processes and client's health. Thus:

H7b: The healthcare professional's behavioural intention is positively associated with the perceived efficiency

Within Figure 3 the conceptual framework is depicted.

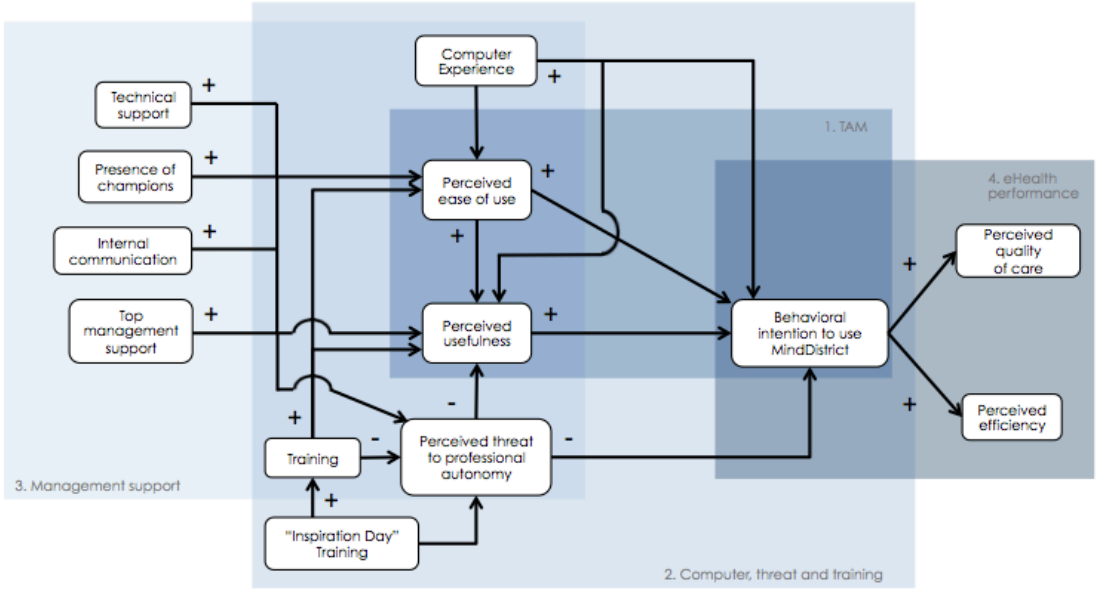


Figure 3: Conceptual framework

4 Data analysis and evaluation

Qualitative research was performed before the model could be tested. 12 interviews were done with employees representing several centers at GGzE. As healthcare professionals are MD's direct users, 5 of them were interviewed. Besides, interviews with 3 managers were arranged in order to understand the process at organizational level. Furthermore, included are people from the Client Coordination Point (CCP), ICT and content developers to broaden the view regarding MD implementation. The interviews helped to better understand the organization and context, contextualize constructs and their measures and it also acted as a test of completeness of the model.

Within Appendix F an overview is provided of all identified factors illustrated by its description and quotes of the interviewees. More specifically, several internal and external aspects influencing the implementation process were identified.

4.1 Sample characteristics

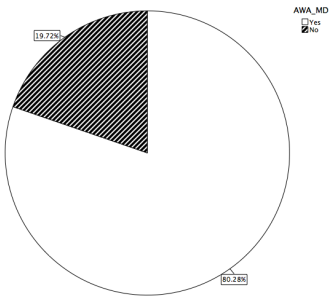
137 employees, of the 416 invited, completed the questionnaire (Appendix H), which implies a response rate of 32.93%. Nevertheless, 142 respondents had an acceptable level of missing values, representing a response rate of 34.13%. The mail addresses for those invited has been drawn from a list of GGzE professionals. Only 60 respondents used MD at that moment. Their data has been used for estimation of the model.

Of the total net sample most were female, representing 65.9%. The average age is 44.4 years, ranging from 23 up to 65. The greatest part is educated at academic level (42.0%). Regarding work experience the average tenure within healthcare is 17,0 years and the average tenure at GGzE is 11.8 years. The respondent's location is evaluated as a multiple responses set. This means some are working for more than just one center or specific department at GGzE. The centers Child&Youth (12.9%), Elderly (11.2%), GGzE Direct (8.2%) and De Omslag (7.6%) are represented for the greatest part. MindDistrict started at GGzE Direct, which served as example for further implementation in other centers (GGzE, 2013). The majority of the respondents have a functional background as psychologist (39.1%). They are the ones who guide the psychiatric problems of clients, varying from consultations, diagnostics and interventions. Digital modular treatments offered via MindDistrict contribute to their job characteristics. Demographics of the total sample, MD non-users and users are presented in Table 3.

	Total		Non-users		Users	
Characteristic	**Number**	**Percent**	**Number**	**Percent**	**Number**	**Percent**
Gender	138	97.18	82	100	56	93.33
Male	47	34.1	32	39.0	15	26.8
Female	91	65.9	50	61.0	41	73.2
Age	137	96.48	82	100	55	91.67
Mean	44.36		44.85		43.64	
Std. Dev.	11.34		11.74		10.78	
Educational level	138	97.18	82	100	56	93.33
Vocational	11	8.0	9	11.0	2	3.6
University of Applied Science	42	30.4	24	29.3	18	32.1
Academic education	58	42.0	33	40.2	25	44.6
PhD	9	6.5	2	2.4	7	12.5
Other	18	13.0	14	17.1	4	7.1
Tenure healthcare (years)	137	96.48	82	100	55	91.67
Mean	17.01		15.08		19.89	
Std. Dev.	12.20		12.33		11.52	
Tenure company (years)	137	96.48	82	100	55	91.67
Mean	11.80		11.00		13.00	
Std. Dev.	10.36		10.45		10.22	
Functional background	138	97.18	82	100	56	93.33
Psychiatrist	12	8.7	11	13.4	1	1.8
Psychologist	54	39.1	23	28.0	31	55.4
(Social psychiatric) nurse	33	23.9	16	19.5	17	30.4
Social worker	1	0.7	0	0	1	1.8
Therapist (creative-, system-, verbal-, etc.)	13	9.4	8	9.8	5	8.9
Experience expert	16	11.6	16	19.5	0	0
Other	9	6.5	8	9.8	1	1.8

Table 3: Demographic attributes respondents; non-users vs. users

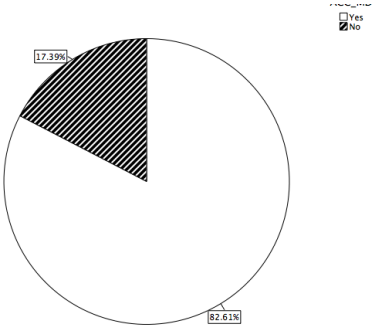
Respondents are guided through the questionnaire, based on their answers. Figure 4 and Figure 5 display the percentages and the categorized reasons when answered 'no'. Of the total sample, 80.3% is aware of the MD platform and 66.2% has an MD account. The main reason respondents are not familiar with MD is that they don't know the platform. For not having a MD account is the most frequent answer that they received insufficient training or have insufficient knowledge of the platform. The number one reason why respondents don't use MD is that they don't know the platform's possibilities.



Why are healthcare professionals not familiar with MD?

1. Don't know the platform
2. Didn't worked with it (heard of it from colleague's)
3. Didn't have training and received any information yet
4. Recently employed by GGzE
5. Didn't study it yet
6. There are already many changes, the learn the platform hasn't been necessary so far

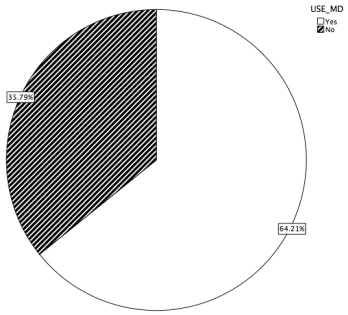
Figure 4: MD's familiarity and reasons if not



Why don't healthcare professionals have a MD account?

1. Received insufficient training or have insufficient knowledge
2. Not working with MD
3. No account yet
4. Can't activate it
5. Still have a training account
6. Still waiting to get the account
7. Didn't have the time yet
8. Just received the account
9. Account expired
10. Recently employed by GGzE (although some applied for an account)

Figure 5: MD's accounts and reasons if not



Why don't healthcare professionals use MD?

1. Don't know the platform's possibilities (lack of awareness)
2. No time
3. Only practiced with the test account
4. Want to learn how to use it
5. No linked clients yet or clients who can use it
6. Changed center; MD aren't introduced yet & lack suitable modules
7. Limited client response and secretarial processing
8. It hasn't been implemented within our work processes
9. Just installed it
10. Account not yet activated

Figure 6: MD's use and reasons if not

4.2 Reliability and validity of measures

To measure the internal consistency between the variables it's reliability can be tested. Theoretically, all items should be intercorrelated with each other positively as they are all supposedly measuring the same thing. The lower limit of the Cronbach's alpha is 0.70. Although in exploratory research the reliability coefficient should exceed 0.60 (Hair, J.F., Black, W.C., Babin, B.J. & Anderson, R.E., 2009).

As can be seen in Table 4 for most cases the Cronbach's alpha is sufficiently high to justify taking the items of the constructs together. Except the Perceived Threat items, where as well the patterns of correlations are suggesting the items are not really measuring the same phenomena. All combinations of the items are tested, but the results barely increase Cronbach's alpha. Therefore chosen is to continue with one of the items: PT1.

Construct	Abbreviation	N (MD users)	Items	Cronbach's alpha (MD users)
Perceived Usefulness	PU	60	4	0.763
Perceived Ease of Use	PEOU	60	4	0.890
Behavioral Intention	BI	60	3	0.818
Perceived Quality of Care	PQC	60	3	0.638
Efficiency	E	60	4	0.720
Technical Support	TS	59	3	0.827
Communication	C	56	2	0.911
Top Management Support	TMS	56	4	0.887
"Inspiration Day" Training	TI	39 (20)	5	0.93 (0.966)
Hands-on training	T	27 (14)	7	0.84 (0.906)
Computer Experience	CE	137 (55)	5	0.79 (0.866)

Table 4: Cronbach's alpha

Note that the underlined constructs do not meet the standard Cronbach's alpha criterion of .70

Item reliability, composite reliability, and the average variance extracted were computed as well to assess the validity of the questionnaire items. The extent to which a set of measures represents the concept is the validity. The results are presented in Table 5. The factor loadings should be higher than 0.5 to assure an acceptable level of item reliability and 0.7 is the threshold for the composite reliability (Hair, J.F., Black, W.C., Babin, B.J. & Anderson, R.E., 2009). The data meets these requirements. Next to the average variance extracted, indicating the amount of variance explained by constructs, which should and does exceed the threshold of 0.5.

Construct	Abbreviation	Item	Factor loading	Composite reliability	Average Variance Extracted (AVE)
Behavioral Intention	BI	BI1	0.902	0.893	0.736
		BI2R	0.784		
		BI3	0.882		
Perceived Usefulness	PU	PU1	0.713	0.850	0.589
		PU2R	0.872		
		PU3	0.776		
		PU4R	0.696		
Perceived Ease of Use	PEOU	PEOU1R	0.872	0.924	0.752
		PEOU2	0.826		
		PEOU3R	0.897		
		PEOU4	0.872		
Perceived Threat	PT	PT1	1.000	1.000	1.000
Efficiency	E	E1	0.589	0.808	0.517
		E2	0.754		
		E6	0.693		
		E7	0.820		
Perceived Quality of Care	PQC	PQC2	0.816	0.804	0.584
		PQC3	0.859		
		PQC5	0.591		
Hands-on training	T	T1	0.865	0.926	0.642
		T2	0.898		
		T3	0.832		
		T4	0.699		
		T5	0.818		
		T6	0.679		
		T7R	0.795		
'Inspiration Day' Training	TI	TI1	0.970	0.966	0.852
		TI2	0.980		
		TI3	0.978		
		TI4	0.819		
		TI5	0.852		
Technical Support	TS	CMS5	0.860	0.897	0.743
		CMS6	0.876		
		CMS7	0.849		
Champions	PC	CMS9	1.000	1.000	1.000
Communication	C	C1	0.994	0.943	0.893
		C2	0.893		
Top Management Support	TMS	C4	0.909	0.911	0.720
		C5	0.798		
		C6	0.853		
		C7	0.831		
Computer Experience	CE	CE1	0.861	0.902	0.653
		CE2	0.867		
		CE3	0.865		
		CE4R	0.557		
		CE5	0.844		

Table 5: Convergent validity

4.2.1 Correlation matrix

To reveal the relationships among the (in)dependent and control variables within the research model, the correlation matrix is presented in Table 6.

Construct	GEN	AGE	TEN_HC_YR	TEN_COM_YR	CE	EXP_MD	PU	PEOU	BI	PT	PQC	
GEN	1											
AGE	0.601	1										
TEN_HC_YR	0.397	0.964**	1									
TEN_COM_YR	0.664	0.961**	0.906**	1								
CE	-0.403	-0.059	-0.045	-0.326	1							
EXP_MD	-0.149	-0.310	-0.234	-0.292	0.073	1						
PU	0.540	-0.144	-0.349	-0.134	-0.079	0.321	1					
PEOU	-0.372	-0.027	0.070	-0.166	0.654	0.442	0.115	1				
BI	0.130	-0.186	-0.175	-0.127	-0.108	0.386	0.000	-0.193	1			
PT	-0.708	0.011	0.262	-0.043	0.361	0.149	-0.810*	0.434	0.097	1		
PQC	0.702	0.185	0.008	-0.097	0.137	-0.056	0.607	-0.279	0.304	-0.702	1	
E	0.284	0.648	0.659	0.529	0.214	-0.633	-0.461	-0.370	-0.028	0.089	0.339	1
TECH_SPPRT	-0.045	0.150	0.189	-0.023	0.628	-0.319	-0.290	0.100	0.401	0.280	0.365	0
PC	-0.367	-0.275	-0.215	-0.406	0.618	-0.174	-0.238	0.273	0.419	0.367	0.103	0
INTERN_CMM	0.196	-0.408	-0.557	-0.490	0.213	0.093	0.764*	-0.058	-0.153	-0.746	0.640	-
TMS	0.471	0.086	-0.057	-0.041	0.427	0.028	0.611	0.288	0.340	-0.430	0.795*	0
"Inspiration Day" Training (TI)	0.433	-0.052	-0.234	-0.124	0.136	-0.514	0.387	-0.399	0.151	-0.642	0.788*	0
Hands-on training (T)	0.469	-0.265	-0.503	-0.202	-0.275	-0.080	0.868*	-0.171	-0.157	-0.904**	0.489	-

Table 6: Correlation matrix

*. Correlation is significant at the 0.05 level (2-tailed); **. Correlation is significant at the 0.01 level (2-tailed)

Positive and significant relations are present at age, tenure within healthcare and at GGzE. This implies that those who work relatively longer within healthcare and at GGzE are older. There is also an, expected, interaction effect between the two types of tenure. Furthermore, PT is negatively correlated with PU, indicating when PT increases it has a negative influence on the belief that MD enhances job performance. Additionally, the two organizational tools, INTERN_CMM and hands-on training, correlate with PU. Besides, hands-on training is negatively correlated with PT. Moreover, increase of top management's communication and "Inspiration Day" Training lead to an increase of Perceived Quality of Care. Added to this, championing people is positive correlated with technical support. Lastly, hands-on training is positively correlated with Communication, implying that this type of training influences communication accordingly. In general it can be concluded that there are diverse organizational tools that affect the healthcare professionals' attitude and these can be used to manage the implementation process effectively.

4.3 Test of hypotheses

Due to the relatively small data set and a broad range of variables, the separate pathmodels were estimated using PLS software (SmartPLS 2.0) (Ringle, Christian M. & Wende, Sven Will Alexander , 2005). The path coefficients represent the percentage of construct's variance (Chin, 1998). In the analyses several controls were added to allow for correct model estimation. These included: personal characteristics, tenure within healthcare and at the company.

According to previous studies with regard to the technology acceptance process within healthcare, personal characteristics are a significant barrier to technology acceptance (Venkatesh, V., Morris, M.G., Davis, G.B. & Davis, F.D., 2003)(Venkatesh, V., Zhang, X. & Sykes, T., 2011). Besides, educational level does seem to influence the use of computers and Internet (Chan, F.T.S. & Chong, A.Y.L., 2013). This may be relevant for MD modules to create more suitable designs and attract its users. Employees who are used to old practices show more resistance to change (Venkatesh, V., Zhang, X. & Sykes, T., 2011). This is reflected by organizational tenure: those who have more work experience at the same organization would seem to use the eHealth system less. Nevertheless, a study on the effect of the Internet on the patient-doctor relation in a hospital showed that especially younger and less experiences mental healthcare professionals have more negative feelings with the empowerment of patients (Figueiredo de Oliveira, 2014).

4.3.1 Pathmodel 1: TAM

Figure 7 and Table 7 present the findings of the basis. The retested TAM model shows only that the ease of use and intention relationship is not significant. Within literature it is not always present and when it is, mainly in the beginning of implementation (Davis, F.D., Bagozzi, R.P. & Warshaw, P., 1989). The findings reflect that healthcare professionals' PU shapes their intention, which is again positively influenced by the ease of use. As expected, computer experience plays an important role regarding the personal beliefs towards the MD platform. The qualitative part, see next section, states some healthcare professionals lack these skills. Extra support provided by GGzE is necessary to enhance healthcare professionals' level of experience, which influences the intention accordingly.

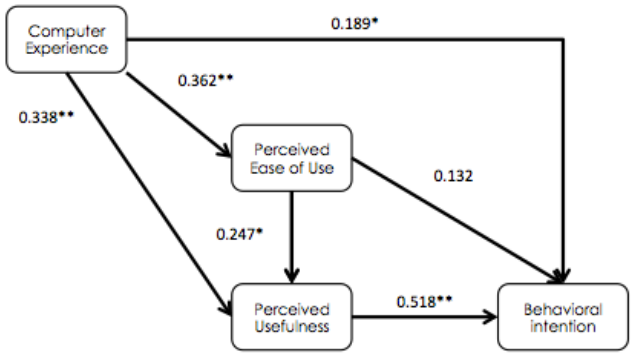


Figure 7: Pathmodel 1

Hypothesis	Relation	Std. path coefficient	t-value	Result
H1a	PEOU -> PU	0.247**	1.868	Supported
H1b	PU -> BI	0.518**	5.505	Supported

H1c	PEOU -> BI	0.132	1.156	Not supported
H2a	CE -> PEOU	0.362**	3.708	Supported
H2b	CE -> PU	0.338	2.395	Not supported
H2c	CE -> BI	0.189*	1.859	Supported

Table 7: Results of hypotheses testing model 1

* Path coefficients significant at p<.1 (*1 = one sided), ** Path coefficients significant at p<.05 (**1 = one sided)

4.3.2 Pathmodel 2: trainings and perceived threat to autonomy

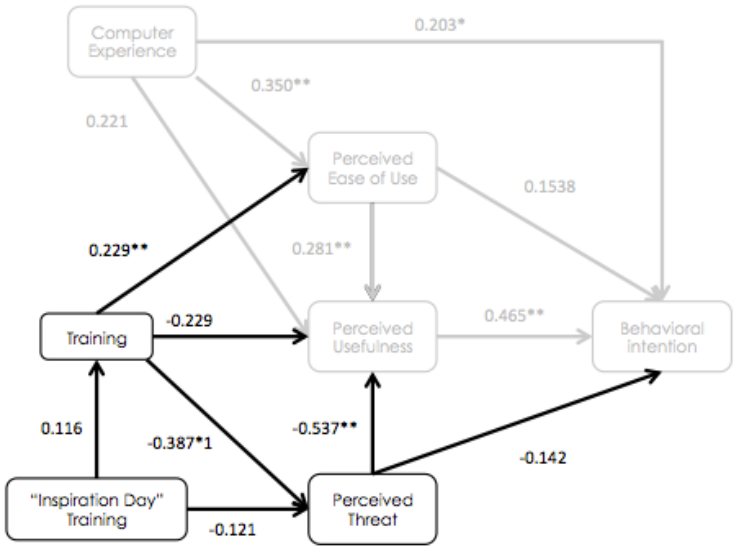


Figure 8: Pathmodel 2

Figure 8 represents the pathmodel that combines sub models 1 and 2. The results show that perceived threat of MD to professional autonomy affects healthcare professional's belief that the platform would enhance job performance. This is supported by previous research (Lin, C, Lin, I.C. & Roan, J., 2012). The platform codifies to some degree their knowledge among non-healthcare professionals, resulting in an objective assessment of one's performance (Walter, Z. & Lopez, M.S., 2008). Healthcare professionals are concerned with the traditional client relationship. They interpret such a new service as an attack on their competence, which causes resistance.

According to Venkatesch et al (2011) training is an essential intervention for system's adoption success. The training construct has been divided into the two types of training provided by GGzE: an "Inspiration Day" and hands-on training. The latter one enhances ease of use, which makes it an effective tool to improve personal skills. Nevertheless, the training can be optimized, by focusing on the work processes, to address as well job performance, known as usefulness. The first one has no effect, which can be explained by the fact it aims at bringing stakeholders together evaluating the future of healthcare. In that sense, it doesn't address the MD platform. The hands-on training has a significant and negative effect on PT when it is tested one-sided. It can be stated that this type of training reduces the threat to autonomy.

Besides, previous literate stated research is required regarding the moderating effect of variables on PT (Walter, Z. & Lopez, M.S., 2008). Although their research indicates a moderating effect of

computer experience, the results of this study show that hands-on training and CE do both not moderate with PT. Within Table 8 the results are presented.

Hypothesis	Relation	Std. path coefficient	t-value	Result
H1a	PEOU -> PU	0.281**	2.307	Supported
H1b	PU -> BI	0.465**	4.147	Supported
H1c	PEOU -> BI	0.138	1.191	Not supported
H2a	CE -> PEOU	0.350**	3.088	Supported
H2b	CE -> PU	0.221	1.610	Not supported
H2c	CE -> BI	0.203*	1.891	Supported
H3a	PT -> PU	-0.537**	4.068	Supported
H3b	PT -> BI	-0.142	1.118	Not supported
H4a	T -> PEOU	0.229**	2.363	Supported
H4b	T -> PU	-0.229	1.081	Not supported
H4c	T -> PT	-0.387*1	1.580	Supported
H5a	TI -> T	0.116	0.964	Not supported
H5b	TI -> PT	-0.121	0.875	Not supported
	CE * PEOU -> PU	-0.054	0.433	Not supported
	Training * PEOU -> PU	0.142	0.53	Not supported
	Training * PT -> PU	0.030	0.197	Not supported
	CE * PT -> BI	0.119	0.941	Not supported

Table 8: Results of hypotheses testing model 2

* Path coefficients significant at $p<.1$ (*1 = one sided), ** Path coefficients significant at $p<.05$ (**1 = one sided)

4.3.3 Pathmodel 3: organizational implementation tools

Pathmodel 3 combines sub models 1 and 3. It focuses on other organizational tools involved with implementation: change management support and communication. Nevertheless, these two constructs are concretized into technical support, champions, internal communication and top management support. The coefficients and their significance are provided within Figure 9 and Table 9. The only, significant and positive, relation is technical support and ease of use: a positive organizational asset, functioning accordingly. Technical and implementation issues are one of physician's resistance causes (Ash, J., Gorman, P., Lavelle, M., Payne, T., Massaro, T., Frantz, G. & Lyman, J., 2003). A key determinant for system implementation is change management support (Venkatesh, V., Zhang, X. & Sykes, T., 2011). Although, to overcome user resistance, change management should understand the factors causing it. Boonstra & Broekhuis (2010) showed that technical support does stimulate physicians EMR use. Especially implementation of complex technologies requires technical support, which consists of equipment and accurate trouble shooting. However, different from previous pathmodels is the significant relation of computer experience on perceived usefulness. Despite the finding, computer experience has been associated with ease of use and usefulness (Igbaria, 1993).

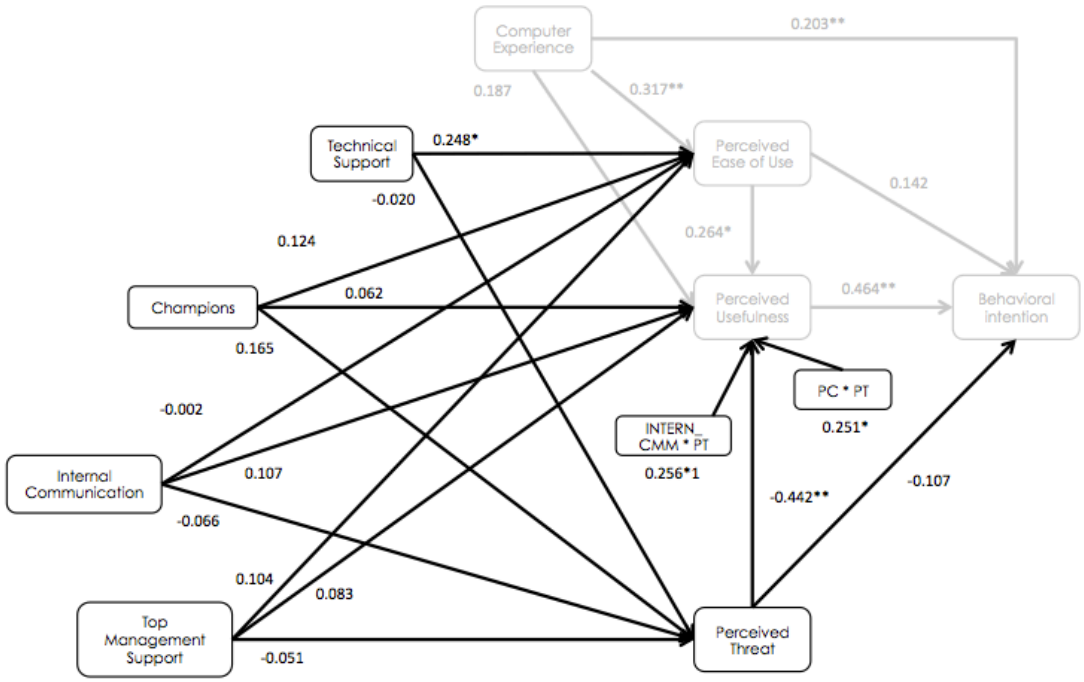


Figure 9: Pathmodel 3

Unfortunately, findings show there are no other direct interactions caused by the presence of champions (PC), communication and top management support on the ease of use or usefulness. While internal communication, the extent of organizational communication, is positively and significantly related to organizational innovativeness and implementation success (Meyers, P.W., Sivakumar, K. & Nakata, C., 1999)(Greenhalgh, T., Pott, H., Wong, G., Bark, P. & Swinglehurst, D., 2009). Regarding the presence of champions, previous findings differ from this research' results. A champion is a person who recognizes the system's usefulness and aims to succeed in connecting the technology to the market (Schon, 1963). They are defined as important determinant of organizational innovation (Greenhalgh, T., Pott, H., Wong, G., Bark, P. & Swinglehurst, D., 2009), can overcome resistance and increase use (Lee, C.P. & Shim, J.P., 2007) (Neufeld, D.J., Dong, L. & Higgins, C., 2007). Furthermore, the changing environment, like regulations, makes especially those at the top of the organization more willing to make use of new technologies (Scott, 2001). Boonstra & Broekhuis (2010) showed that management support in system use and believe influences healthcare professional's adoption.

Perceived threat to autonomy has only a negative and significant relation with usefulness. This makes PT an important antecedent for the healthcare professional's PU. Although the relation of threat to intention is as well supported in previous literature (Walter, Z. & Lopez, M.S., 2008). None of the organizational factors has a significant relation with the threat to autonomy. Nevertheless, champions and internal communication have a moderating effect on the healthcare professional's belief that MD would enhance job performance. A social positive atmosphere seems to shape the attitude. The

significant relation of communication is explored with one-sided testing. This implies that GGzE has two tools in place that interact with the perceived threat of healthcare professionals.

Hypothesis	Relation	Std. path coefficient	t-value	Result
H1a	PEOU -> PU	0.264*	1.663	Supported
H1b	PU -> BI	0.464**	4.171	Supported
H1c	PEOU -> BI	0.142	1.277	Not supported
H2a	CE -> PEOU	0.317**	2.893	Supported
H2b	CE -> PU	0.187	1.144	Not supported
H2c	CE -> BI	0.203**	2.154	Supported
H3a	PT -> PU	-0.442**	3.264	Supported
H3b	PT -> BI	-0.107	1.086	Not supported
H6a	TECH_SPPRT -> PEOU	0.248*	1.944	Supported
H6b	TECH_SPPRT -> PT	-0.020	0.112	Not supported
H6c	PC -> PEOU	0.124	1.031	Not supported
H6d	PC -> PU	0.062	0.394	Not supported
H6e	PC -> PT	0.165	1.277	Not supported
H6f	INTERN_CMM -> PEOU	0.00	0.013	Not supported
H6g	INTERN_CMM -> PU	0.107	0.660	Not supported
H6h	INTERN_CMM -> PT	-0.066	0.437	Not supported
H6i	TMS -> PEOU	0.104	0.512	Not supported
H6j	TMS -> PU	0.083	0.416	Not supported
H6k	TMS -> PT	-0.051	0.225	Not supported
	CE * PEOU -> PU	-0.050	0.380	Not supported
	PC * PEOU -> PU	0.194	1.219	Not supported
	PC * PT -> PU	0.251*	1.657	Supported
	INTERN_CMM * PEOU -> PU	0.152	1.011	Not supported
	INTERN_CMM * PT -> PU	0.256*1	1.361	Supported
	TMS * PEOU -> PU	-0.139	0.660	Not supported
	TMS * PT -> PU	-0.087	0.396	Not supported

Table 9: Results of hypotheses testing model 3

* Path coefficients significant at $p<.1$ (*1 = one sided), ** Path coefficients significant at $p<.05$ (**1 = one sided)

4.3.4 Pathmodel 4: eHealth outcome

Within Figure 10 a visualization of pathmodel 4 is depicted. The values of sub models 1 and 4 combined are given in Table 10. The results show that healthcare professional's intention is positively and significantly related with the perceived quality of care. Quality of care has been identified as key element of patient satisfaction (Venkatesh, V., Zhang, X. & Sykes, T., 2011), which is one of eHeatlh aims. Use of the MD platform improves communication and interaction and reduces mistakes made. More accurate information available leads to better, quicker and friendlier decisions made by the healthcare professionals. The negative but not significant relation of intention and efficiency finds its origin in the early stages of implementation. GGzE needs to change in order to become more efficient. Therefore it would be interesting to examine this framework again in later stages, as it's aim is to make work processes more efficient. The platform should function properly and support is necessary for clients to be in charge of their own healing process.

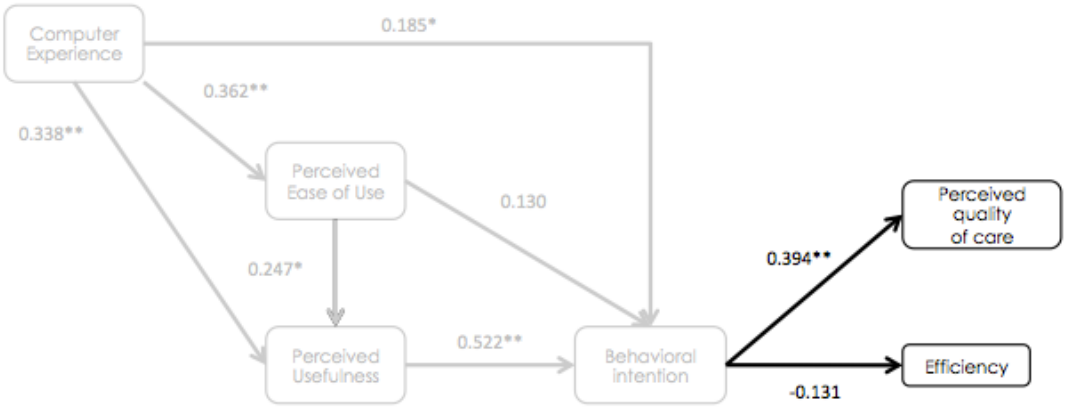


Figure 10: Pathmodel 4

Hypothesis	Relation	Std. path coefficient	t-value	Result
H1a	PEOU -> PU	0.247*	1.879	Supported
H1b	PU -> BI	0.522**	5.668	Supported
H1c	PEOU -> BI	0.130	1.222	Not supported
H2a	CE -> PEOU	0.362**	3.552	Supported
H2b	CE -> PU	0.338**	2.370	Supported
H2c	CE -> BI	0.185*	1.902	Supported
H7a	BI -> PQC	0.394**	4.117	Supported
H7b	BI -> E	-0.131	0.500	Not supported

Table 10: Results of hypotheses testing model 4

* Path coefficients significant at *p*<.1 (*1 = one sided), ** Path coefficients significant at *p*<.05 (**1 = one sided)

4.4 MD users

41.55% of the respondents make actual use of the platform MindDistrict. The majority is female (73.2%). Although males are less presented within the theoretical model, they do make less use of the MindDistrict platform. The average user age is 43.6 years. Most are educated at academic level (44.6%). Compared to the total sample size PhD education increased and vocational education decreased. The average work experience within healthcare is 19.9 years and at GGzE 13.0. Non-users have a lower average mean for work experience. Nevertheless, Venkatesh et al (2011) revealed that organizational tenure has a negative effect on eHealth use, as employees are steeped in old practices. Furthermore, the centers GGzE Direct (19.6%), Elderly (17.9%), Child&Youth (14.3%), TRTC (14.3%), and De Wende (10.7%) are for the greatest part represented among users. The total sample size differs regarding the presence and categorization of centers. Psychiatrists, therapists and experience experts make less actual use of the platform and psychologists are overrepresented.

	MD users	
Characteristic	**Number**	**Percent**
Use intensity MD	59	100
Less than 1x per week	18	30.5
Approximately 1x per week	12	20.3
2 or 3 times per week	0	0
Several times a week	26	44.1
Every day	3	5.1
Several times a day	0	0
Use MD functions	59	100
Messaging	59	100
Yes	44	74.6
No	15	25.4
Welcome modules	59	100
Yes	24	40.7
No	35	59.3
Treatment/expert modules	59	100
Yes	47	79.7
No	12	20.3
Diaries	59	100
Yes	5	8.5
No	54	91.5
Other	59	100
Yes	4	6.8
No	55	93.2
Suitable MD modules	59	100
Yes	57	96.6
No	2	3.4
Environment MD	59	100
Training environment	59	100
Yes	20	33.9
No	39	66.1
Treatment environment	59	100
Yes	57	96.6
No	2	3.4
E-learning environment	59	100
Yes	51	86.4
No	8	13.6
Type of treatment MD	59	100
One on one	51	86.4
Groups	2	5.1
Both	4	6.8
Not applicable	1	1.7
Time MD usage	59	100
<6 months	33	55.9
6-12 months	15	25.4
>12 months	10	16.9
Not applicable	1	1.7
% of MD activities	59	100
<10%	32	54.2
10-25%	19	32.2
26-50%	5	8.5
51-75%	0	0
76-99%	0	0
100%	0	0
Not applicable	3	5.1

Table 11: Characteristics MD use

4.4.1 Actual use

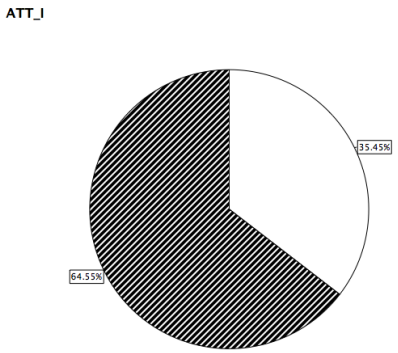
From **Error! Reference source not found.** can be concluded that most respondents use the platform several times a week (44%) and refer to the treatment environment (96.6%). The MD functions' questions consist of multiple responses. The treatment/expert modules (79.7%) and messaging (74.6%) are mostly referred to, compared to diaries (8.5%). 96.6% indicates suitable modules are available. Healthcare professionals operate with the platform particularly during one-on-one treatments (86.4%), less than 6 months (55.9%) and use it for less than 10% of their work (54.2%). GGzE makes use of MindDistrict since 2011, all new clients receive a MD account since February 2014 and management set the goal to treat 80% of the clients with support of MD by the end of 2015. Concluded from this is that practice lags behind. 37.3% of the respondents agrees they can get along with MD well, while 30.5% is neutral about this.

	N	Attendance "Inspiration Day"	Attendance hands-on training	Attendance both	Total
Non-users	82	8	2	11	21
Users	60	13	7	7	27
Total	142	21	9	18	48

Table 12: Attendance training of MD non-users vs. users

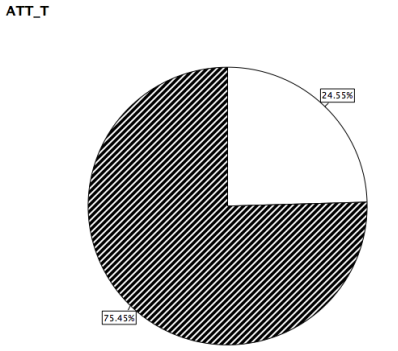
4.4.2 Training

33.8% of the respondents did attend a type of training. An overview of attendance with regard to MD users and non-users is provided in Table 12. In general, the "Inspiration Day" is referred to most often, followed by both of the training types. Besides, more users than non-users joined a training, respectively 45% and 25.6%. Concluded from this can be that those who did receive training do use MD more. Those who not attended the "Inspiration Day" mentioned not having enough time as main reason. The same applies for the hands-on training. Only a relative small group of the respondents (19.02%) did receive training specifically aimed at MD. Figure 11 and Figure 12 show the percentages of training attendance accompanied by the categorized reasons for not joining. Especially the center Child&Youth (15 of total 27) is overrepresented by the hands-on training attendees. While centers Elderly (15), GGzE Direct (13) and De Omslag (11) represent most of the total 83 respondents not joining this type of training. Compared to the top 3 centers making use of MD, this is remarkable. GGzE Direct functions as front door for the whole organization, explaining the finding.



Why didn't healthcare professionals attend the "Inspiration Day"?
1. No time (due to high workload/production appointments)
2. Don't know the inspiration day and didn't get an invitation
3. Wasn't present that day
4. Is yet to come (was cancelled)
5. Just employed by GGzE (don't know it)
6. Don't know it anymore
7. Already familiar with the platform

Figure 11: Attendance "Inspiration Day"



Why didn't healthcare professionals attend hands-on training?
1. No time
2. Didn't have hands on training
3. Is yet to come
4. Already familiar with the platform
5. Just employed by GGzE (don't know it)
6. It is too limited to be called a training

Figure 12: Attendance hands-on training

The average grade "Inspiration Day" training is 6.81 and hands-on training 6.83, depicted within Table 13. In overall, MD users give higher grades than non-users.

	Grading "Inspiration Day"					Grading hands-on training				
	N	Mean	Std. Dev.	Min.	Max.	N	Mean	Std. Dev.	Min.	Max.
Non-users	19	6.55	1.09	5	9	13	6.65	1.07	5	8
Users	20	7.05	1.64	1	9	14	7.00	1.11	4	8
Total	39	6.81	1.40	1	9	27	6.83	1.08	4	8

Table 13: Evaluation trainings of non-users vs. users

4.4 Qualitative outcome questionnaire

The results from the open questions in the questionnaire provide interesting findings, which can improve the current MD implementation process. Focusing on the platform's possibilities, implementation successes and providing examples from practice can optimize the trainings. For healthcare professionals it is important to address the target group's perspective, their client. In general, regular retraining and communicating the system's updates are necessary to retain its users. Within Table 14 the input for MD training improvements are categorized as most frequently mentioned.

134 respondents gave their answer with regard to what would make them to use MD more often. The results are presented in Table 15 with the nr. 1 remark: *"When I have a sufficient level of experience with MD and computers"*. Learning together, or even accompanied by an experienced user, is a preferred approach. Some healthcare professionals lack a basic level of skills to work with computers and MD. A therapist said: *"I would like to do more with eHealth, but I'm bit hesitant to work with computers, I'm glad such a research is performed."*

How can training regarding MD be improved?
1. Show MD's possibilities, more implementation successes & examples from practice (specific for every target group)
2. Regular retraining & practice more
3. Make it suitable for the current work processes
4. Most of the time was spend on 'How to log in'
5. Better material and better information campaign
6. Take care conditions are OK (properly working computers)
7. Search for opportunities to attend teams to MindDistrict
8. Too artificial; when clients wanted to work with it, no trainings were provided
9. Show how to link to USER

Table 14: Results for MD training improvements

What would make healthcare professionals use MD more often?
1. When I have sufficient experience with MD and computers (learn together with an experienced user)
2. When I have more time and training (MD and computer skills)
3. When I know what it is (awareness)
4. When client ('s partner/family) ask for it/use it/are positive about it (PC yes/no? Work with PC? Do diagnosis & MD match?)
5. When clients benefit from it
6. When it is efficient (client's independence, costs, time spent)
7. When I have a hand out: how to use it and overview of suitable modules (instead of looking for it)
8. When it adds something to or suits the current treatments
9. When I see the system benefits
10. When it suits my department (target group)
11. When it is implemented within the work processes
12. When it would be clear which modules are meant for who
13. When it is more user-friendly (nice interface), easy accessible and to use
14. When there are more specific modules (like psycho education) for target groups like 'truc', children, youngsters, children with parents, adults & 'crisis clients'
15. Better functionalities: upgrading the mail function, better search function (advanced), not to log in every time, send a message to multiple people at once
16. Separate option for experience expert (don't have to see the communication with therapists)
17. Make it mandatory
18. When there is a safer network
19. When it is applicable for group therapy (where clients can function as "buddy")
20. Adjust the platform for new developments and generations
21. When my boss would support me: time, registration possibility and no complaints about production
22. G-schemes
23. If I would automatically be linked to my client when this is done in USER
24. If the text in the platform will be automatically documented in the client's file

Table 15: Results for making use of MD more often

Quotes from respondents indicate their views and needs. These are presented next to describe the current perspectives and necessities regarding the MD platform. Some healthcare professionals didn't use MD yet and others just started to explore the platform. Reactions vary from *"I hope MindDistrict is a pleasant, logic addition to my work. Just like mail and whatsapp"* to "*The added value starts with safe messaging."* Others say: *"Not everyone thinks MindDistrict is the solution", "Nice that the platform is there, but it will never replace therapy"*, *"I don't use MD for a fixed percentage, but as addition, if applicable"* and *"Since I use the platform, I experience it is a pleasant and complementary way to communicate with clients."*

However, GGzE's healthcare professionals experienced are several practical issues. They mentioned clients can be supported with use of computers and MD training. Besides, healthcare professionals don't only interact with the client, but also with partner/parents/children. The MD platform should somehow include a possibility to interact with them, as they are involved with and important for client's rehabilitation. One of the healthcare professionals said: *"Currently, 1 of the parents or 1 of the clients can interact with MD"*. Those working with groups do feel the platform doesn't fit in their work processes. Additionally, there is a need for more modules aimed at young children (0-6 years) and their parents. Along with extra functionalities the MD platform can be made more attractive: *"The platform is one-sided: I prepare the modules and clients finish them. As therapist, I want to write an evaluation, but this isn't possible."* With regard to the system's performance there are some basic functions that can contribute to the system's ease of use: *"Can you make sure that new/unread mails remain bold? The mail function is currently very complex."* And supported by someone else: *"Since the last update, it isn't possible to see which client sent me a message. Before, this was bold. As this is not*

the case anymore, it takes extra time to search." Moreover, the retrieval system needs to be optimized. A list of modules is offered, which makes searching for one specifically difficult. By improving the search option, like selecting certain specifications (e.g. target group), the ease of use increases. At the same time, a concern is the network's safety. GGzE may address this by ensuring privacy conditions and communicate these. A common remark is better links to medical files and less logging in. Likewise, healthcare professionals are confused with the login data of their test and real-life account. Continuous upgrades are required and problems need to be addressed accurately to prevent resistance: *"Personally, I think that MindDistrict achieves a point of saturation. The platform should further develop, or we have to use other eHealth applications to increase the percentage."*

Need	MD use		Attendance hands-on training		Attendance Inspiration Day Training	
	Yes	No	Yes	No	Yes	No
Support/training MD	10	26	4	29	12	22
Time to learn	4	2	4	2	3	3

Table 16: Need for training and time compared to MD use and training attendance

In general, there is a main need for support and training: *"Support to learn new skills is important. Don't pass everything by mail and assume it will take-of. In my case, focus on education is required"* and *"I need practical support to overcome MindDistrict frustration".* By informing the healthcare professional regularly and with relevant functionalities, MD use can be boosted. *"Timing was bad for me, due to the increasing rules to meet all the demands. MindDistrict is one of them, despite the fact it is intended to obtain easier communication."* From Table 16 can be concluded that most respondents indicating a need for training didn't have it. Although more than 1/3 of those in need for extra support do make use of MD. However, some who did receive training are also in need for more as well as those already making use of MD. Proper instructions and continuous education is required to further stimulate MD use. Besides, training also convinces those who didn't pore upon yet. During treatment discussions within teams the possibilities of the MD platform and modules for their specific target group can be addressed, which is also perceived as a positive contribution. Also better implementation of the platform within the work processes stimulates usage. Accurate support for those facing problems with MD and enthusiastic implementation enhances further integration. As a whole, time is needed for those to get familiar with the platform, but also for those who already work with the platform. *"The platform is quit complex and limited time is available to learn how to work with it".* To conclude with, the MD platform has been evaluated as: *"100% positive development towards the future."*

5 Discussion

The research' response rate is 34.13%. With an approximate of 703 healthcare professionals at GGzE, 20% of those participated in this research. The sample size is characterized by mainly women, age of 44 years, educated at academic level and psychologists. The Centers Kind&Jeugd, Ouderen and GGzE Direct are the top three represented. The awareness level of MD is 80.3% and the reason if not is "*Don't know the platform*". As 66.2% has a MD account, there is quite a gap between those knowing the platform and actual having an account. Better organizational facilitations to provide accounts can be supportive. In general, in both answers of why they don't know the platform and why they don't have an account, was mentioned that they are just employed. This means accurate support for those can be a stimulus. Appropriate trainings can in some extent overcome the reason for not using the MD platform. 41.55% of the respondents make actual use of it. MD users have the same top three centers, only ordered differently. Interesting is that non-users have a lower average mean for tenure, while existing research proved otherwise (Venkatesh, V., Zhang, X. & Sykes, T., 2011).

Most respondents use MD several times a week, mainly the treatment environment and 96.6% says suitable modules are available. Nevertheless, more than half of the respondents make less than 6 months use of the platform and refer to MD for less than 10% of their work. This means that the implementation is still in an early phase and can be further enhanced to strive for GGzE's initiated goals.

In this study usefulness is higher valued than ease of use by healthcare professionals. Chau and Hu (2002) reported the same in a research about physician's telemedicine acceptance. In accordance with previous research computer experience is valuable and does positively influence all TAM variables directly and indirectly (Igbaria, M. & Livari, J., 1995). Nevertheless, the qualitative part indicated as well a need for computer training, which is an opportunity to facilitate.

The results indicate the importance of healthcare professionals' perceived threat to autonomy. They perceive the MD platform as decreasing their professional discretion over client care decisions. The antecedent of perceived usefulness is relevant to consider when examining the implementation process, also supported by previous findings (Walter, Z. & Lopez, M.S., 2008).

Existing literate aimed for research regarding the moderating effect of factors on the perceived threat to autonomy, like computer experience (Walter, Z. & Lopez, M.S., 2008). However, this study's results show that hands-on training and computer experience do both not act as moderators. They do not influence strength or direction of the relationship between perceived threat and usefulness. This might be explained by the need for an improved system and more evidence-based research in a later stage.

The main focus of this study was to assess the impact of training. 33.8% of the respondents did attend one of the trainings and both are average graded with a 6.8. The training attendance is slightly overrepresented by MD users, thus a minimal difference between attendance training of users vs.

non-users. Most of them referred to the “Inspiration Day” training. Nevertheless, findings reveal that this type of training has no effect on the healthcare professionals attitude towards MD. This training brings all stakeholders together and evaluates the future of healthcare, which is not related to MD. “*No time*” was indicated as the main reason for both not to attend. Despite that, this is one of the first things GGzE can facilitate. In general, more and continuous training is desirable. As the results reveal, specific MD training contributes to the ease of use and reduces the threat to autonomy of healthcare professionals. Furthermore, training has also an indirect effect on the perceived usefulness via ease of use and threat. Especially training and threat contribute to the image of job performance. To boost further implementation, specific training is an effective tool. Educational interventions overcome resistance and enhance the attitude towards the technology (Venkatesh, V., Zhang, X. & Sykes, T., 2011). Non-users have a need for training, although MD users are as well interested.

Literature documented that negative thoughts make healthcare professionals resistant to eHealth systems, which also influence the rest within the organization (Venkatesh, V., Zhang, X. & Sykes, T., 2011). In this study champions moderate the threat to autonomy, indicating a positive social atmosphere can overcome it. Key individuals are important to shape the perception of the platform. A positive perspective contributes to the diffusion of the technology, while a negative perspective highlights the risks and hampers it.

Of the other interventions researched, only technical support has a direct effect on the ease of use. This type of support is available and helpful, which is a necessary asset regarding the implementation. Also technical support has via the perceived ease of use an indirect positive impact on the perceived usefulness.

MD use positively influences the quality of care. The platform reduces errors made, which is a crucial benefit. Although more items were measured for initially the PQC construct, they are not merged into one factor of quality, due to the reliability. Technical quality of the care and time spent with client are important metrics related to the overall quality. Time spent with a client could be lowered caused by reduction in face-to-face meeting. Although the frequency of interaction is a positive development as communication and interpersonal interactions increase. Nevertheless, they should deserve further attention in future research.

The results of this research indicate that MD’s use does not contribute to the efficiency. Its origin can be found in the early stages of the current implementation. GGzE needs to change before efficiency comes to front. Healthcare professionals have to learn how the platform operates, need to redesign their work processes and are depended on their client’s willingness, which takes time before they will experience the efficiency benefits of it.

6 Conclusion

Within this chapter the main conclusions derived from the qualitative and quantitative data collection are presented. Answers to the research question and sub-questions are given. The contributions to

both academic and practice are addressed in light of the theoretical framework. Recommendations and limitations are illustrated and serve as a guide for future research. Although, the sample size is limited and conclusions need to be interpreted with caution.

Awareness is gained from literature merged with practical experience. This study pursues to contribute to the knowledge of healthcare professionals' adoption process. The goal of the research performed is to create additive knowledge in optimizing the implementation of a modular platform and deal with the challenges. Results attempt to answer the research question: *How can GGzE's management effectively stimulate adoption of the MD platform by GGzE healthcare professionals and what is the role of training/support in this process?*

First of all, in order to know where improvements can be made, current MD use is mapped. MindDistrict has been introduced to GGzE in 2011. All new clients at GGzE receive an MD account since 2014. Management's goal was to have 80% of the workload online by the end of 2015. However, the results indicate that 41.55% of the respondents make actual use of the MD platform. More than half of them use it less than 6 months and refer to the platform for less than 10% of their tasks. The overall experience with the MD platform is modest. This implies that there is an opportunity to enhance further implementation. Management should listen to their professionals who have to work with the platform and the platform should function properly.

Second, attempted is to answer the sub-questions regarding the definition of the healthcare professionals acceptance process and influential factors. The starting point is the individual technology acceptance process, which is defined as "how users come to accept and use a technology" (Davis, F.D., Bagozzi, R.P. & Warshaw, P., 1989). TAM suggests a number of aspects have impact on user's decision whether how and when they use the new technology. Particularly, perceived usefulness (PU) and perceived ease of use (PEOU) (Davis, 1989). The effectiveness depends as well on human and social factors that are not specified within this model. More specifically, healthcare professionals differ from other technology users and face several barriers (Chau, P.Y.K. & Hu, P.J., 2002b) (Bhattacherjee, A. & Hikmet, N., 2007) (Dünnebeil, S., Sunyaev, A. & Leimeister, J.M., 2013).

The developed framework shows that the TAM model does correspond to previous research and is applicable among mental healthcare professionals. Besides, some organizational tools positively influence the healthcare professionals acceptance process and can be tailored to the implementation process. Computer experience has a direct influence on all TAM variables, which makes it an important antecedent of the acceptance process. Also the perceived threat to autonomy is an essential antecedent for healthcare professionals' usefulness.

In order to enhance adoption and realize a more efficient healthcare system, organizational tools can and should positively influence the significant factors of the individual acceptance process. Within literature diverse barriers faced by healthcare professionals are described. Nevertheless, as technology applications within healthcare are still a growing area, the combination of required factors for successful implementation is examined. Effective implementation can be achieved by providing support, varying from trainings, time, platform optimization and compatibility, interoperability, social

norms and management commitment (Boonstra, A. & Broekhuis M., 2010) (Bhattacherjee, A. & Hikmet, N., 2007) (Lee, C.P. & Shim, J.P., 2007). Next to this, evidence-based results can convince healthcare professionals of the system's added value (Schade, C.P., Sullivan, F.M., De Lusigan, S. & Madeley, J., 2006).

Hands-on training can reduces the perceived threat to autonomy and increase the perceived usefulness of the MD platform indirectly. However, the qualitative part revealed that healthcare professionals skills with computers and MD could be improved. By providing more, better and specific training the organization can prepare and convince their healthcare professionals. Another effective organizational tool is technical support, which contributes to healthcare professional's perceived ease of use. Besides, champions and internal communication act as moderator on their belief that the MD platform increases job performance. To overcome resistance in adopting new technologies the presence of champions is supportive as it shapes the attitude and willingness of others. GGzE can focus on presenting the benefits to the client (with recommendations and procedures) and show the successes (contribution and standardization) to positively influence these types of leaders. Especially for new healthcare applications the outcomes, like effectiveness (including safety) and user satisfaction are important for service retention (Jackson, D.E. & McClean, S.I., 2012). The contribution to the quality of care by using a modular system is an important eHealth outcome. Satisfaction enhancement improves the mental healthcare process. In general, technology enhances access to information, which brings privacy as a main issue faced (Anderson, G.F., Frogner, B.K., Johns, R.A. & Reinhardt, U.E., 2006) (Boonstra, A. & Broekhuis M., 2010). GGzE's healthcare professionals indicated within the interviews that they and their clients are concerned with privacy. Transparency and accountability from GGzE and the vendor is required.

Education, training and supervision with regard to the innovation are required to increase successful cooperation of healthcare professionals and clients (Maheu, M.M., McMenamin, J.P., Pulier, M.L. & Posen, L., 2012). Nevertheless, it is challenging to balance fostering innovation while winning trust of the user (Fried et al, 2000). Therefore, management should provide guidelines to standardize the technology, which enables more effective and profitable services (Maheu, M.M., McMenamin, J.P., Pulier, M.L. & Posen, L., 2012).

6.1 Recommendations

There are some issues that deserve attention as they act as barriers for further MindDistrict adoption. Both, the qualitative and quantitative results, form the basis of several recommendations to improve eHealth system's implementation success. They serve as practical challenges and opportunities for future research.

GGzE can improve the process by providing in first place time to the healthcare professionals to get familiar with the MD platform. Furthermore, management can play a more prominent role in the process with the tools available to them. They should aim for clear responsibilities, realistic goals,

guidelines and support. A clear road map according to GGzE's vision provides direction for both management and healthcare professionals towards the goals. Opportunities are there with communication and training of the healthcare professionals, but as well all other personnel involved with MD. Close collaboration with the early adopters can be supportive in convincing the rest.

Continuous updates of the platform and evaluations can contribute to a positive development. Functional improvements, like upgrades and communication of new functions/modules, next to integration within the workflows, ease the use. All involved employees need to be complete and well-times informed via intranet, newsletters, magazines, MD initiators, champions and team consultations.

Also interoperability between MD and other existing systems enhances information exchange and overcomes healthcare professionals' resistance. Besides, their involvement during the implementation makes them more willing to change work practices (Kohli, R., Piontek, F., Ellington, T., VanOsdol, T., Shepard, M. & Brazel, G., 2001). Evaluation of modules by healthcare professionals and clients can be helpful in improving the service. For example, addition of a better search function within the platform makes it easier for therapists to search for a specific module. Such small functionalities need to be examined and processed in time, to prevent further resistance. During meetings and evaluations all input should be reported and converted to optimize the system and make it operate according to the needs. In that way, user participation can enhance successful implementation.

Those, who where not able to attend a training or are just employed by GGzE, need to be facilitated with proper instructions regarding MD. For new and experienced employees continuous support is necessary (Leonard, 2004). Support before, during and after the introduction of the platform is necessary to ensure on-going user adoption. As implementation success depends on the investments of training, which contributes to the productivity (Quinones, 1995) (Boothby, D., Dufour, A. & Tang, J., 2010), the advice is to provide more and comprehensive support. Examples from practice, specified for each target group and collaboration make the training more relevant. And by involving the users during the training insights are gained and myths challenged (McAndrew, S. & Samocuik, G.A., 2003). Also when the trainings are still not effective, access to knowledge is crucial for successful implementation (Venkatesh, V., Zhang, X. & Sykes, T., 2011). An info-graphic manual including the URL of the platform and all information can be helpful.

Furthermore, healthcare professionals indicated that when clients ask for MD, they are willing to use the platform. This highlights GGzE's support for clients, by providing trainings or with facilities on location, which indirectly stimulates as well their personnel.

To conclude with, privacy is a main concern next to security and authorities. GGzE needs to address these within their approach to overcome resistance of both the employees and clients.

6.2 Limitations and suggestions

This study has several limitations that should be considered regarding its results and are suggestions for future research within this relatively immature area. First, the limited sample size affects the statistical reliability of this research. The theoretical framework consisted of a large amount of variables compared to the number of respondents. This highlights the need for further research as use of eHealth services takes off. The relatively low number of respondents can involve self-selection bias, which means that healthcare professionals who are interested in the MD platform or technologies have been more likely to participate. Besides, the collected data represent a certain moment in time, resulting in correlating conclusions. The results are collected from healthcare professionals operating in the south of The Netherlands. The research' characteristics are of a different form regarding other types of professionals and organizations. Furthermore, the sample is overrepresented by females, which is on overall not the case in most previous research (Lee, C.P. & Shim, J.P., 2007) (Walter, Z. & Lopez, M.S., 2008) (Adler-Milstein, J. & Jha, A.K., 2012). The greatest part of participants didn't use MD yet and most of those using MD use it relatively short. The results are therefore limited to the early stages of the implementation process. Investigation of later stages would be appropriate to see how the effect of the construct perceived threat to autonomy and all other factors change. Also regarding examination of the efficiency, which is not significantly present in this study, should be relevant in later stages of implementation.

This brings the second point that the MD platform is in development, indicating more limited features than are potentially available to eHealth and its services. eHealth applications have varying features, thus generalization cannot be done regarding the technology. eHealth and the MD platform are a specific type of e-service. Both, front-end and back-end data exchange is enabled within the MD platform. However, the last one, sharing data easily, needs to be further developed before the benefits come to front. Besides, as technology develops faster than regulations, organizational determination is necessary. While depending on public investments, parallel processes reduce costs, efforts and time.

Third, Interesting is to examine what other factors can act as moderator of the negative relation between the perceived threat to autonomy and usefulness. Healthcare professionals' characteristics can play a part. Decision-making involvement influences their willingness to change work processes, which enhances the platform's success. Furthermore, people with all kinds of backgrounds within the organization, thus not only healthcare professionals, play a role in patient care. Administrators and technical support people do have to work with MD and also influence adoption.

Researches into factors that determine healthcare professionals' intention is necessary to better understand their process. Differences in user characteristics, organizations and environments influence the various contexts. Evidence-based research is required to examine the effect on healthcare of such technological systems. The construct quality can be complemented with measurement of the error rate. In that way, a more objective assessment of the factor can be performed.

Fourth, actual platform use isn't measured but reported by the respondents. It would be interesting to analyse it as well from the data generated by the platform, which was unfortunately not yet possible. Next to classification per center, which would be relevant for GGzE regarding the time spend on modules, the number of users, the number of MD accounts, time contact between healthcare professionals and clients. In that way the process can be better analysed to assess the performance of the MD platform.

Fifth, the impact of training can be better examined when more is provided and attended. Hands-on training didn't follow a specific format and implementation differed per center and even team. GGzE can optimize it by providing guidelines, which enables better assessment.

Sixth, recommended is to make a visualization of the process, from client application to dismiss, to better understand the process and optimize it. Including the development, evaluation and optimization of modules. Healthcare professionals have to prepare the modules for clients, which is not always properly done causing a drop out and a main concern for CCP personnel. Insights into the actual drop out help understand the effectiveness of the eHealth tool. Besides, during the research it was unclear what is done with a client dossier after resignation. Both healthcare professionals and clients are not informed about it and there is a need to put clients in charge.

Seventh, a cost analysis is useful in assessing the financial health of the MD project. Partly caused by the time taken to implement it to its current stage. Decisions to be made next should consider the effects at what costs. For now, based on the results, extra people to provide trainings can be most effective with regard to MD implementation success.

Lastly, further research should integrate the client's perspective to examine the effect of the MD platform. Thinking of the functionalities, performance, quality, empowerment and support. Next to healthcare professionals, they are the users. And patients' interaction with personnel is crucial to encourage use and implement the technology successful (Kelley, H., Chiasson, M., Downey, A. & Pacaud, D., 2011). Although, a recent performed research on mental health care for older adults indicates that the organizational culture is more influential on their treatment than the client's characteristics and how they function (Veerbeek, 2015). Nevertheless, increasing client's understanding has long-term implications, as they can manage their treatment and post treatment themselves.

The healthcare industry is looking to improve healthcare delivery with support of technology. But healthcare professionals acceptance is required to make it succeed. The findings show that the perceived threat to autonomy has a negative effect on perceived usefulness. Manager should be aware of the healthcare professionals concerns. Creating strategies and promoting the platform's benefits can improve overall acceptance. By making use of MD successes, social influence and providing extra and continuous trainings the implementation and communication can be improved. These have an indirect effect on healthcare professionals' perception. GGzE has access to several tools that can be used effectively to influence the healthcare professionals' attitude towards MD.

Their acceptance is crucial to achieve the return on investments and increase the quality of care. Only in that way, the platform can improve healthcare.

Bibliography

Adler-Milstein, J. & Jha, A.K. (2012). Organizational Complements to Electronic Health Records in Ambulatory Physician Performance: The Role of Support Staff. *J Am Med Inform Assoc , 19*, 537-540.

Alasmary, M., Metwally, A.E. & Househ, M. (2014). The Association between Computer Literacy and Training on Clinical Productivity and User Satisfaction in Using the Electronic Medical Record in Saudi Arabia. *Education & Training , 38* (69), 1-13.

Alpay, L, Needham, G. & Murray, P. (2000). The Potential of Information Technology for Nurses in Primary Care: a Review of Issues and Trends. *Prim Health Care Res Dev , 1*, 5-13.

Anderson, G.F., Frogner, B.K., Johns, R.A. & Reinhardt, U.E. (2006). Health Care Spending and Use of Information Technology in OECD countries. *Health Affairs , 25* (3), 819-831.

Anderson, J.G. (2007). Social, Ethical and Legal Barriers to eHealth. *International Journal of Medical Informatics , 76*, 480-483.

Ash, J., Gorman, P., Lavelle, M., Payne, T., Massaro, T., Frantz, G. & Lyman, J. (2003). A Cross-site Qualitative Study of Physician Order Entry. *Journal of the American Medical Informatics Association , 10*, 188-200.

Baldwin, L., Clarke, M., Eldabi, T. & Jones R. (2002a). Telemedicine and its Role in Improving Communication in Healthcare. *Logistics Information Management , 15* (4), 309-319.

Bates, D. (2005). Physicians and Ambulatory Electronic Health Records. *Health Affairs , 24* (5), 1180-1189.

Berg, M. (2001). Implementing Information Systems in Health Care Organizations: Myths and Challenges. *International Journal of Medical Informatics , 64*, 143-156.

Berger, R. & Kichak, J. (2004). Computerized Physician Order Entry: Helpful or Harmful? *Journal of the American Medical Informatics Association , 11*, 100-103.

Bhattacherjee, A. & Hikmet, N. (2007). Physicians' Resistance toward Healthcare Infomration Technology: a Theoretical Model and Empirical Test. *European Journal of Information System , 16*, 725-737.

Bitner, M.J., Brown, S.W. & Meuter, M.L. (2000). Technology Infusion in Service Encounters. *Journal of the Academy of Marketing Science , 28* (1), 138-149.

Boonstra, A. & Broekhuis M. (2010). Barriers to the Acceptance of Electronic Medical Records by Physicians from Systematic Review to Taxonomy and Interventions. *BMC Health Services Research , 10* (231), 1-17.

Boothby, D., Dufour, A. & Tang, J. (2010). Technology Adoption, Training and Productivity Performance. *Research Policy , 39*, 650-661.

Bramble, J.D., Galt, K.A., Siracuse, M.V., Abbott, A.A., Drincic, A., Paschal, K.A. & Fuji, K.T. (2010). The Relationship between Physician Practice Characteristics and Physician Adoption of Electronic Health Records. *Health Care Management Review , 35* (1), 55-64.

Brown, S.A., Massat, A.P., Montoya-Weiss, M.M. & Burkman, J.R. (2002). Do I Really Have To? User Acceptance of Mandated Technology. *European Journal of Information Systems , 11* (2), 283-295.

Budman, S.H., Portnoy, D. & Villapiano, A.J. (2003). How To Get Technological Innovation used in Behavioral Health Care: Build It and They Still Might Not Come. *Psychotherapy: Theory, Research, Practice, Training , 40* (1/2), 45-54.

Burke, L. & Weill, B. (2005). *Information Technology for the Health Professions* (2nd edn. ed.). NJ: Pearson Prentice Hall.

Burt, C.W. & Sisk, J.E. (2005). Which Physicians and Practices are Using Electronic Medical Records? *Health Affairs , 24* (5), 1334-1343.

Carman, K.L., Dardess, P., Maurer, M., Sofaer, S., Adams, K., Bechtel, C. & Sweeney, J. (2013). Patient and Family Engagement: a Framework for Understanding the Elements and Developing Interventions and Policies. *Health Affairs , 32* (2), 223-231.

Chau, P.Y.K. & Hu, P.J. (2002b). Investigating Healthcare Professionals' Decisions to Accept Telemedicine Technology: an Empirical Test of Competing Theories. *Information & Management , 39*, 297-311.

Chen, L., Gillenson, M.I. & Sherell, D.I. (2002). Enticing Online Consumers: an Extended Technology Acceptance Perspetive. *Information and Management , 39*, 705-719.

Chiasson, M.W. & Davidson, E. (2005). Taking Industry Seriously in Information Systems Research. *MIS Quaterly , 29* (4), 591-605.

Chin, W. (1998). Issues and Opinion on Structural Equation Modeling. *MIS Quaterly , 22* (1), 7-16.

Chiu, T.M.L. & Eysenbach, G. (2010). Stages of Use: Consideration, Initiation, Utilization, and Outcomes of an Internet-Mediated Intervention. *BMC Medical Informatics and Decision Making , 10* (73), 1-11.

Christensen, H., Griffiths, K.M. & Evans, K. (2002). *e-Mental Health in Australia: Implications for the Internet and Related Technologies for Policy.* ISC Discussion Paper No. 3, Commonwealth Department of Health and Ageing, Canberra.

Cline, R.J.W. & Haynes, K.M. (2001). Comsumer Health Information Seeking on the Internet: the State of the Art. *Health Education Research & Practice , 16* (6), 671-692.

Dünnebeil, S., Sunyaev, A. & Leimeister, J.M. (2013). Modern Architecture of Value-Added Applications for German Healthcare Telematics. *Business & Information Systems Engineering , 1*, 3-16.

Dansky, K.L., Gamm, J., Vasey, & Barsukiewicz, C. (1999). Electronic Medical Records: are Physicians Ready? *Journal of Healthcare Management , 44*, 440-455.

Davis, F. (1989). Perceived usefulness, perceived ease of use, and user acceptance of information technology. *MIS Quaterly , 13* (3), 319-340.

Davis, F.D., Bagozzi, R.P. & Warshaw, P. (1989). Perceived Usefulness, Perceived Ease of Use, and User Acceptance of Information Technology: A Comparison of Two Theoretical Models. *Management Science , 35*, 982-1003.

Deluca, J.M. & Enmark, R. (2000). eHealth: the Changing Model of Healthcare. *Frontiers of Health Services Management , 17* (1), 3-15.

Devaraj, S., Skarma, S.K., Fausto, D.J., Viernes, S. & Kharrazi, H. (2014). Barriers and Facilitators to Clinical Decision Support Systems Adoption: a Systematic Review. *Journal of Business Administration Research , 3* (2), 36-53.

Duyck, P, Pynoo, B. Devolder, P. Voet, T., Adang, L. & Vercruysse, J. (2008). User Acceptance of a Picture Archiving and Communication System. Applying the Unified Theory of Acceptance and Use of Technology in a Radiological Setting. *Methods Inf Med , 47* (2), 149-156.

Eysenbach, G. (2001). What is e-health? *J Med Internet Res , 3* (2), e20.

Flanagan, J. (1954). The Critical Incident Technique. *Psychological Bulletin , 51* (4), 327-359.

Friedman, M.A., Schueth, A. & Bell, D.S. (2009). Interoperable Electronic Prescribing in the United States: a Progress Report. *Health Affairs , 28* (2), 393-403.

Fuller, R.M., Vician, C. & Brown, S.A. (2006). E-Learning and Individual Characteristics: The Role of Computer Anxiety and Communication Apprehension. *Journal of Computer Information Systems , 46* (4), 103-115.

Gagnon, M.P., Orruno, E., Asua, J.M.D., Abdeljelil, A.B. & Emparanza, J. (2012). Using a Modified Technology Acceptance Model to Evaluate Healthcare Professionals' Adoption of a New Telemonitoring System. *Telemedicine and eHealth , 18* (1), 54-59.

Gallivan, M.J., Spliter, V.K. & Koufaris, M. (2005). Does Information Technology Training Really Matter? A Social Information Processing Analysis of Coworkers' Influence on IT Usage in the Workplace. *Journal of Management Information Systems , 22* (1), 153-192.

Gega, L., Marks, I. & Mataic-Cols, D. (2004). Computer-aided CBT self-help for Anxiety and Despression Disorders: Experience of a London Clinic and Future Directions. *Journal of Clinical Psychology , 60*, 147-157.

Germanakos, P, Georgiadis, D., Buzzi, M., Buzzi, M.C. & Fenili, C. (2011). Enhancing Collaboration in ASD-Centric Treatment Environments: A Proposed Architecture. *Information Quality in e-Health* (pp. 225-244). Graz: Springer.

GGz. (2014, 10 17). Gx Workgroup Implementation Results Therapists Survey.

GGzE. (2013). *Long-term Policy GGzE 2013-2016.* GGzE. Eindhoven: Grafiprint.

Greenhalgh, T., Pott, H., Wong, G., Bark, P. & Swinglehurst, D. (2009). Tensions and Paradoxes in Electronic Patient Record Research: a Systematic Literature Review using the Meta-Narrative Method. *Milbank Q , 87* (4), 729-788.

Gulmans, J., Vollenbroek-Hutten, M.M.R., van Gemert-Pijnen, L.J.E.W.C. & van Harten, W.H. (2011). Determinants of use and non-use of a web-based communication system in cerebral palsy care: evaluating the association between professionals system use and their a priori expectancies and background. *BMC Medical Informatics & Decision Making , 11* (43), 1-8.

Hadwich, K., Georgi, D., Tuzovic, S., Büttner, J. & Bruhn, M. (2010). Perceived Quality of eHealth Services. *International Journal of Pharmaceutical and Healthcare Marketing , 4* (2), 112-136.

Halamka, J., Aranow, M., Ascenzo, C., Bates, D.W., et all. (2006). ePrescribing Collaboration in Massachusetts: Early Experiences from Regional Prescribing Projects. *Journal of the American Medical Informatics Association , 13* (3), 239-244.

Hoencamp, E. & Haffmans, P.M.J. (2008). *Psycho-Education in the Mental Health and Addition: Theory and Practice.* Assen: Van Gorcum.

Hu, P.J.H., Chau, P.Y.K. & Sheng, O.R.L. (2002). Adoption of Telemedicine Technology by Health Care Organizations: An Exploratory Study. *Journal of Organizational Computing and Electronic Commerce , 12* (3), 197-221.

Hussey, P.S., de Vries, H. & McGlynn, E.A. (2009). A Systematic Review of Health Care Efficiency Measures. *Health Services Research , 44* (3), 784-805.

Ifinedo, P. (2012). Technology Acceptance by Health Professionals in Canada: an Analysis with a Modified UTAUT Model. *45th Hawaii International Conference on System Sciences* (pp. 2937-2946). IEEE Computer Society.

Igbaria, M. & Livari, J. (1995). The Effects of Self-Efficacy on Computer Usage. *International Journal of Management Science , 23* (6), 587-605.

Igbaria, M. (1993). User Acceptance of Microcomputer Technology: an Empirical Test. *Omega 21 , 1*, 73-90.

Jackson, D.E. & McClean, S.I. (2012). Trends in Telemedicine Assessment Indicate Neglect of Key Criteria for Predicting Success. *Journal of Health Organization and Management , 26* (4), 508-523.

Jai Ganesch, A. (2004). eHealth - Drivers, Applications, Challenges ahead and Strategies: a Conceptual Framework. *Indian Journal of Medical Informatics* (1), 39-47.

Jha et al. (2009). Use of Eletronic Health Records in U.S. Hospitals. *The New England Journal of Medicine* (360), 1628-1638.

Kalckreuth, S., Trefflich, F. & Rummel-Klugel, C. (2014). Mental Health Related Internet Use Among Psychiatric Patients: A Cross-Sectional Analysis1. *BMC Psychiatry , 14* (368), 1-11.

Kaplan, B. & Shaw, N.T. (2004). Future Directions in Evaluation Research: People, Organizational, and Social Issues. *Methods of Information in Medicine , 43* (3), 215-231.

Kellerman, A.L. & Jones, S.S. (2013). What it Will Take to Achieve the As-Yet-Unfulfilled Promises of Health Information Technology. *Health Affairs , 1*, 63-68.

Kelley, H., Chiasson, M., Downey, A. & Pacaud, D. (2011). The Clinical Impact of eHealth on the Self-Management of Diabetes: A Double Adoption Perspective. *Journal of the Association for Information Systems , 12*, 208-234.

Kerwin, K.E. & Madison, J. (2002). The Role of the Internet in Improving Healthcare Quality. *Journal of Healthcare Managemetn , 47* (4), 225-236.

Kijsanayotin, B, Pannarunothai, S. & Speedie, S.M. (2009). Factors Influencing Health Information Technology Adoption in Thailand's Community Health Centers: Applying the UTAUT Model. *International Journal of Medical Informatics , 78*, 404-416.

Kohli, R., Piontek, F., Ellington, T., VanOsdol, T., Shepard, M. & Brazel, G. (2001). Managing Customer Relationships Through E-business Decision Support Applications: a Case of Hospital-physician Collaboration. *Decision Support Systems , 32* (2), 171-187.

Lapointe, L. & Rivard, S. (2005). A Multilevel Model of Resistance to Information Technology Implementation. *MIS Quaterly , 29* (3), 461-492.

Lee, C.P. & Shim, J.P. (2007). An Exploratory Study of Radio Frequency Identification (RFID) Adoption in the Healthcare Industry. *European Journal of Information Systems , 16*, 712-724.

Lee, Y, Kozar, K.A. & Larsen, K.R.T. (2003). The Technology Acceptance Model: Past, Present, and Future. *Communications of the AIS , 12* (50), 752-780.

Lengermann, J.J. (1971). Supposed and Actual Differences in Professional Autonomy Among CPAs as Related to Type of Work Organization and Size of Firm. *The Accounting Review , 46* (4), 665-675.

Leonard, K. (2004). Critical Succes Factors Relating to Healthcare's Adoption of New Technolgy: a Guide to Increaing the Likelihood of Succesfull Implmentation. *Electronic Healthcare , 2* (4), 72-81.

Lerer, L & Rowell, N. (2000). The eHealth Consumer. The Healthcare 2020 Platform, Paris.

Liddell, A. (2007). Technology in the NHS: Transforming the patient's experience of care.

Lin, C, Lin, I.C. & Roan, J. (2012). Barriers to Physicians' Adoption of Healthcare Information Technology: An Empirical Study on Multiple Hospitals. *J Med Syst , 36*, 1965-1977.

Lowenhaupt, M. (2004). Removing Barriers to Technology . *The Physician Executive , 30* (2), 12-14.

Lyons, S.S., Tripp-Reimer, T., Sorofman, B.A., DeWitt, J.E. Bootsmiller, B.J., Vaughn, T.E. & Doebbeling, B.N. (2005). Information Technology for Clinical Guideline Implementation: Perceptions of Multidisciplinary Stakeholders. *Journal of the American Medical Informatics Association , 12* (1), 64-71.

Maheu, M.M., McMenamin, J.P., Pulier, M.L. & Posen, L. (2012). Future of Telepsychology, Telehealth, and Various Technologies in Psychological Research and Practice. *Professional Psychology: Research and Practice , 43* (6), 613-621.

Maheu, M.M., Pulier, M.L., Wilhelm, F.H., McMenamin, J.P. & Brown-Conolly, N.E. (2004). *The Mental Health Professional and the New Technologies: a Handbook for Practice Today.* Mahwah, NJ: Erlbaum.

Mallen, C.D., Wynne-Jones, G. & Dunn, K.M. (2011). Sickness Certification for Mental Health Problems: an Analysis of a General Practice Consultation Database. *Primary Health Care Research & Development , 12* (2), 179-182.

McAndrew, S. & Samocuik, G.A. (2003). Reflecting Together: Developing a New Strategy for Continuous User Involvement in Mental Helath Nurse Education. *Journal of Psychiatric and Mental Health Nursing , 10*, 616-621.

McGinn, C.A., Grenier, S., Duplantie, J., Shaw, N., Sicotte, C., Mathieu, L., Leduc, Y., Legare, F. & Gagnon, M.P. (2011). Comparison of User Groups' Perspectives of Barriers and Facilitators to Implementing Electronic Health Records: a Systematic Review. *BMC Medicine , 9* (46), 1-10.

Meyers, P.W., Sivakumar, K. & Nakata, C. (1999). Implementation of Industrial Process Innovations: Factors, EFfects, and Marketing Implications. *Journal of Product Innovation Management , 16* (3), 295-311.

Mitchell, K.J. & Welss, M. (2007). Problematic Internet Experiences: Primary or Secondary Presenting Problems in Persons Seeking Mental Health Care? *Social Science & Medicine , 65*, 1136-1141.

Musiat, P., Goldstone, P. & Tarrier, N. (2014). Understanding the Acceptability of e-mental Health - Attitudes and Expectations Towards Computerised Self-Help Treatments for Mental Health Problems. *BMC Psychiatry , 14* (109).

Neufeld, D.J., Dong, L. & Higgins, C. (2007). Charismatic Leadership and User Acceptance of Information Technology. *European Journal of Information Systems , 16*, 494-510.

Ng, H.S., Sim, M.L., Tan, C.M. & Wong, C.C. (2006). Wireless Technologies for Telemedicine. *BT Technology Journal , 24* (2), 130-137.

OECD. (2010). *Improving Health Sector Efficiency. The Role of Information and Communication Technologies.* Retrieved 5 20, 2015, from OECD Health Policy Studies: http://www.oecd.org/els/health-systems/improvinghealthsectorefficiency.htm

Parasuraman, A. (2000). Technology Readiness Index (TRI): A Multiple-Item Scale to Measure Readiness to Embrace New Technologies. *Journal of Service Research , 2*, 307-320.

Protti, D. (2015). *Missed Connections: The Adoption of Information Technology in Canadian Healthcare.* Institut C.D. Howe Institue.

Quinones, M. (1995). Pretraining Context Effects: Training Assignment as Feedback. *Journal of Applied Psychology , 80* (2), 226-238.

Ringle, Christian M. & Wende, Sven Will Alexander . (2005). *SmartPLS 2.0.M3*. Retrieved from Hamburg: SmartPLS: http://www.smartpls.com

Rogers, E. (1995). *Diffusion of Innovations* (4th edn. ed.). New York: The Free Press.

Schade, C.P., Sullivan, F.M., De Lusigan, S. & Madeley, J. (2006). e-Prescribing, Efficiency, Quality: Lessons from the Computerization of UK family practice. *J Am Med Inform Assoc. , 13* (5), 470-475.

Schon, D. (1963). Champions for Radical New Innovations. *Harvard Business Review , 41* (2), 77-86.

Scott, J.T., Rundall, T.G., Vogt, T.M. & Hsu, J. (2005). Kaiser Permanante's Experience of Implementing an Electronic Medical Record: a Qualitative Study. *British Medical Journal , 331* (7528), 1313-1316.

Scott, W. (2001). *Institutions and Organizations* (2nd ed.). Thousands Oaks, CA: Sage Publications.

Sharma, R. & Yetton, P. (2007). The Contingent Effects of Training, Technical Complexity, and Task Interdependence on Successful Information Systems Implementation. *MIS Quaterly , 31* (2), 219-238.

Smith, S.E., Drake, L.E., Harris, J.B., Watson, K. & Pohlner, P.G. (2011). Clinical Informatics: a Workforce Priority for 21st Century Healthcare. *Australian Health Review* (35), 130-135.

Van Aken, J., Berends, H. & Van De Bij, H. (2007). *Problem Solving in Organizations: A Methodological Handbook for Business Students.* Cambridge: University Press.

Van Offenbeek, M., Boonstra, A. & Seo, D. (2013). Towards Integrating Acceptance and Resistance Research: Evidence from a Telecare Case Study. *European Journal of Information Systems , 22*, 434-454.

Veerbeek, M. (2015). *Accessibility and Effectiveness of Mental Helath Care for Older Adults.* Retrieved 6 6, 2015, from Psycho trauma: https://psychotraumanet.org/sites/default/files/documents/Veerbeek-Accessibility%20and%20effectiveness%20of%20mental%20health%20care%20for%20older%20adults_0.pdf

Venkatesh, V. & Davis, F.D. (1996). A Model of The Antecedents of Perceived Ease of Use: Development and Test. *Decision Sciences , 27* (3), 451-481.

Venkatesh, V. & Morris, M.G. (2000). Why Don't Men Ever Stop to Ask for Directions? Gender, Social Influence, and Their Role in Technology Acceptance and Usage Behavior. *MIS Quaterly , 24* (1), 115-139.

Venkatesh, V., Morris, M.G. & M.G. (2007). Dead or Alive? The Evoluation, Trajectory, and Future of Technology Adoption Research. *Journal of AIS , 8* (4), 267-286.

Venkatesh, V., Morris, M.G., Davis, G.B. & Davis, F.D. (2003). User Acceptance of Information Technology: Toward a Unified View. *MIS Quaterly , 27* (3), 425-478.

Venkatesh, V., Speier, C. & Morris, M.G. (2002). User Acceptance Enablers in Individual Decision Making About Technology: Toward an Integrated Model. *Decision Sciences , 33* (2), 297-316.

Venkatesh, V., Zhang, X. & Sykes, T. (2011). "Doctors do too little Technology": a Longitudinal Field Study of an Electronic Healthcare System Implementation. *Information Systems Research , 22* (3), 523-546.

Von Hippel, E. (2005). *Democratizing Innovation.* The MIT Press.

Walter, Z. & Lopez, M.S. (2008). Physician Acceptance of Information Technologies: Role of Perceived Threat to Professional Autonomy. *Decision Support Systems , 46*, 206-215.

Weinder, J.P., Yes, S. & Blumenthal, D. (2013). The Impact of Health Information Technology and eHealth on the Future Demand for Physician Services. *Health Affairs , 32* (11), 1998-2004.

Weiner, B.J., Amick, H. & Lee, S.D. (2008). Conceptualization and Measurement of Organizational Readiness for Change. *Medical Care Research and Review , 65* (4), 379-436.

Wenger, E., White, N. & Smith, J.D. (2010). *Digital habitats: Stewarding Technology for Communities.* Portland, OR: CPsquare.

Wiley-Patton, S. (2002). A Test of the Extended Technology Acceptance Model for Understanding the Internet Adoption Behavior of Physicians. *Communication and Information Sciences* , 180.

Yarbrough, A.K. & Smith, T.B. (2007). Technology Acceptance among Physicians. *Medical Care Research and Review , 64* (6), 650-672.

Yeager, V.A., Menachemi, N. & Brooks, R.G. (2010). EHR Adoption Among Doctors who Treat the Elderly. *Journal of Evaluation in Clinical Practice , 16*, 1103-1107.

Appendices

Appendix A: Keywords used for literature review

Initial list of keywords:

- Technology adoption
- Healthcare
- eHealth
- Employees
- Training
- Effectiveness

These keywords served as starting point in the three search engines. The iterative process classified the results by using more or less keywords. A final manageable amount of articles were examined on their value. Additional articles, gained by the snowballing technique, led to more insights into the topic.

Search string	ABI Inform # of articles	Web of Science # of articles	Scopus # of articles
"Technology adoption"	521839	20440	33311
"Technology adoption" AND "healthcare"	74357	762	1385
"Technology adoption" AND "eHealth"	1786	63	144
"Technology adoption" AND "employees"	163378	437	647
"Technology adoption" AND "training"	114922	1056	1531
"Technology adoption" AND "healthcare" AND "eHealth"	1398	20	64
"Technology adoption" AND "healthcare" AND "employees"	32850	10	21
"Technology adoption" AND "eHealth" AND "employees"	656	0	0
"Technology adoption" AND "healthcare" AND "training"	24343	79	97
"Technology adoption" AND "eHealth" AND "training"	534	9	12
"Technology adoption" AND "employees" AND "training"	69337	71	113
"Technology adoption" AND "service" AND "employees"	147553	100	162
"Technology adoption" AND "healthcare" AND "service" AND "employees"	31451	6	12
"Technology adoption" AND "healthcare" AND "eHealth" AND "employees"	518	0	0
"Technology adoption" AND "healthcare" AND "eHealth" AND "training"	431	2	5
"Technology adoption" AND "healthcare" AND "effectiveness"	19912	89	174
"Technology adoption" AND "healthcare" AND "employees" AND "effectiveness	14107	0	5
"Technology adoption" AND "healthcare" AND "eHealth" AND effectiveness"	386	4	11

Table 17: Search strings and results literature study

Appendix B: Quality ranking resources

Author(s)	Year	Journal	What is it about?	Impact factor	ABS ranking[1]
Kohli et al	2001	Decision Support Systems	Managing customer relationships through e-business decision support applications: a case of hospital-physician collaboration	2.313	3
Chau, P.Y.K. & Hu, P.J.H.	2002	Information & Management	Investigating healthcare professional's decisions to accept telemedicine technology	1.865	4
Budman et al	2003	Psychotherapy: Theory, Research, Practice, Training	How to get technological innovation used in behavioral health care	3.01	-
Scott et al	2005	British Medical Journal	Experience of implementing an electronic medical record	17.445	-
Bates	2005	Health Affairs	Physicians and ambulatory electronic health records. Main barriers are not technical, but reimbursements & lack of interoperability.	4.321	-
Burt & Sisk	2005	Health Affairs	Which physicians and practices make use of Electronic Medical Records	4.321	-
Gallivan et al	2005	Journal of Management Information Systems	Does information technology training really matters?	1.93	4
Anderson et al	2006	Health Affairs	Healthcare spending and use of information technology in OECD countries	4.321	-
Schade et al	2006	Med Inform Assoc.	e-Prescribing, efficiency, quality	3.504	-
Halamka et al	2006	Journal of the American Medical Informatics Association	Early experiences from regional prescribing projects	3.504	
Anderson, J.G.	2007	International Journal of Medical Informatics	Social, ethical, and legal barriers to eHealth	2.004	-
Lee, C.P. & Shim, J.P.	2007	European Journal of Information Systems	Explorative study of underlying factors and motivations concerning the RFID adoption in the healthcare industry	1.654	3
Neufeld et al	2007	European Journal of Information Systems	Charismatic leadership and user acceptance of information technology	1.654	3
Bhattacherjee & Hlkmet	2007	European Journal of Information Systems	Physicians' resistance toward healthcare information technology	1.654	3
Yarbrough & Smith	2007	Medical Care Research and Review	Technology acceptance among physicians	2.600	-
Randeree	2007	Journal of Medical Systems	Exploring physicians adoption of EMRs	2.213	-
Walter & Lopez	2008	Decision Support Systems	Physician acceptance of information technologies: role of perceived threat to professional autonomy	2.313	3
Duyck et al	2008	Methods of Information in Medicine	User acceptance of a picture archiving and communication system	2.248	-
Kijsanayotin et al	2009	International Journal of Medical Informatics	Factors influencing health information technology adoption in Thailand's community health centers: applying the UTAUT model	2.004	-
Jha et al	2009	The New England Journal of Medicine	Use of electronic health records in U.S. hospitals	55.873	-
Friedman et al	2009	Health Affairs	Interoperable electronic prescribing in the U.S.	4.321	-
Torda et al	2010	Health Affairs	Needs of small practices and the barriers they face regarding EHR	4.321	-
Boothby et al	2010	Research Policy	Technology adoption, training and productivity performance	3.117	4
Boonstra & Broekhuis	2010	BMC Health Services Research	Barriers to the acceptance of Electronic Medical Records by physicians to taxonomy and interventions	1.659	-
Bramble et al	2010	Health Care Management Review	The relation between physician practice characteristics and physicians adoption of EHRs	1.606	2
Torda et al	2010	Health Affairs	Easing the adoption and use of Electronic Health Records in small practices	4.321	-
Yeager et al	2010	Journal of Evaluation in Clinical Practice	EHR adoption among doctors who treat the elderly	1.084	-
Smith et al	2011	Australian Health Review	Identification of factors influencing the development of health and clinical informatics workforce to support eHealth initiatives	1	-
Kelley et al	2011	Journal of the Association for Information Systems	Two perspectives on the clinical impact of eHealth on the self-management of diabetes	1.25	-
McGinn et al	2011	BMC Medicine	Comparison of user groups' perspectives of barriers and facilitators to implementing electronic health records	7.25	-
Venkatesh, Zhang & Sykes	2011	Information Systems Research	Understanding the factors that drive the use of such systems and the consequences of using electronic	1.654	4

			healthcare systems		
Gulmans et al	2011	BMC Medical Informatics & Decision Making	Determinants of use and non-use of a web-based communication system in cerebral palsy care: evaluating the association between professionals' system use and their a prior expectancies and background	1.83	-
Maheu et al	2012	Professional Psychology: Research and Practice	The changing way of communication and information processes due to advanced technologies that brings challenges for professional psychology	1.234	-
Adler-Milstein & Jha	2012	J Am Med Inform Assoc	Exploration why some ambulatory physicians gain from EHR use and others not. Highly skilled, autonomous support staff is associated with higher performance among physicians with EHRs.	3.932	-
Forducey et al	2012	Psychological Services	The self-care management requirements using telehealth technologies tailored to the special needs of individuals with severe functional disabilities	1.377	-
Takian et al	2012	BMC Health Services Research	Implementation and adoption of EHR systems	1.659	-
Kortteisto et al	2012	BMC Health Services Research	Clinical decision support must be useful, functional is not enough: a qualitative study of compute-based clinical decision support in primary care	1.659	-
Gagnon et al	2012	Telemedicine and eHealth	Using a modified technology acceptance model to evaluate healthcare professionals' adoption of a new telemonitoring system	1.668	-
Van Offenbeek et al	2013	European Journal of Information Systems	Integrating acceptance and resistance in a telecare implementation project	1.654	3
Dünnebeil et al	2013	Business & Information Systems Engineering	The potential of applications that improve the healthcare system	1.095	2
Weiner et al	2013	Health Affairs	Demand for specialists can be reduced and physicians can deliver care more easily with health IT	4.321	-
Kellerman & Jones	2013	Health Affairs	What it will take to achieve the as yet unfulfilled promises of health information technology	4.321	-
Alasmary et al	2014	Journal of Medical Systems	Investigating computer literacy, training on clinical productivity and satisfaction of a implemented EMR system	2.213	-
Devaraj et al	2014	Journal of Business Administration Research	Barriers and facilitators to clinical decision support systems adoption	3.072	-

Table 18: Overview of working papers

[1]ABS ranking:

1. Recognized standard
2. Well-regarded journal
3. Highly regarded journal
4. Top journal

The criteria impact factor and ABS ranking assure the literature review' level of quality.

Appendix C: Guides for semi-structured interviews

Appendix C.1 Set-up interview therapist

Item	Question
Personal details	What is your function?
	In what way are you involved with MD?
Use	Do you use MD? Why not? What options do you use? To what extent do you incorporate MD in your daily work? What is a positive/negative experience you have the system's use? What were the consequences?
Modules	Are there, and if which, modules specifically developed for your center? How are they developed? Who were involved? When is/are the module(s) introduced within the center?
System	What is a positive/negative experience you have with the system and therapy? When? What were the consequences? Who was involved?
Client	What is a positive/negative experience you have with clients and the system? What were the consequences?
Training	Did you get training regarding MD? What kind of training? When? Compulsory? Attendees?
	What is a positive/negative experience you have with the training? What were the consequences? Who was involved?
Support	What is a positive/negative experience you have with support/leadership?
Implementation	What is a positive/negative experience you have with the implementation process? When? What were the consequences? Who was involved?
Personal view	What would stimulate you to use MD more? / What do you think that is necessary to stimulate further MD use?
Additions?	Is there any things else I should know?

Appendix C.2 Set-up interview ICT & CCP

Item	Question
Personal details	What is your function?
	In what way are you involved with MD?
System	What is a positive/negative experience you have with the system? When? What were the consequences? Who was involved?
Client	What is a positive/negative experience you have with clients and the system? What were the consequences?
Employees	What is a positive/negative experience you have with the employees (therapists) and the system? What were the consequences?
Training	Did you get training regarding MD? What kind of training? When?
	What is a positive/negative experience you have with the training? What were the consequences? Who was involved?
Support	What is a positive/negative experience you have with support/leadership?
Implementation	What is a positive/negative experience you have with the implementation process? When? What were the consequences? Who was involved?
Personal view	What do you think that is necessary to stimulate further MD use?
Additions?	Is there any things else I should know?

Appendix C.3 Set-up interview manager

Item	Question
Personal details	What is your function?
	In what way are you involved with MD?
System	What is a positive/negative experience you have with the system? When? What were the consequences? Who was involved?
Client	What is a positive/negative experience you have with clients and the system? What were the consequences?
Employees	What is a positive/negative experience you have with the employees (therapists) and the system? What were the consequences?
Training	Did you get training regarding MD? What kind of training? When?
	What is a positive/negative experience you have with the training? What were the consequences? Who was involved?
Implementation	What is a positive/negative experience you have with the implementation process? When? What were the consequences? Who was involved?
Personal view	What would stimulate you to use MD more? / What do you think that is necessary to stimulate further MD use?
Additions?	Is there any things else I should know?

Appendix D: Overview of studies on healthcare professional's technology acceptance

Study	Type of study	Type of technology	Level	N	Country	T
Chau & Hu (2002b)	Questionnaire	Telemedicine	Hospital	408	China	T
Bhattacherjee & Hikmet (2007)	Field survey	Physician order entry system	Hospital	131	U.S.	T
Lee & Shim (2007)	Exploratory	RFID adoption	Hospital	126	U.S.	T
Neufeld (2007)	Survey	IT	Manufacturing companies	209	Canada	U
Randeree (2007)	Multi-case analysis	EMRs	Physician practices	3	U.S.	F
Walter & Lopez (2008)	Survey	Clinical decision support system, electronic medical record	Physician	129 & 203	U.S.	T
Boothby et al (2010)	Survey	Various	Firms	2108	Canada	M
Bramble et al (2010)	Survey	EHRs	Office-based physicians	955	Nebraska and South Dakota	C
Venkatesh et al (2011)	Longitudinal study	IT (eHealth) system	Hospital	1120	U.S.	S
Gulmans et al (2011)	Questionnaire	Web-based communication system	Three cerebral palsy care settings	120	NL	F
Adler-Milstein & Jha (2012)	Survey	EHRs	Ambulatory physicians	200	U.S.	F
Kortteisto (2012)	Qualitative (Focus groups, questionnaire and spontaneous feedback)	Computer-based clinical decision support (eCDS)	Primary health care organization	48	Finland	T
Gagnon (2012)	Questionnaire	Telemonitoring system	Tertiary hospital	234	Canada	T
Van Offenbeek (2013)	Case study	Telecare	Homecare	30	NL	S
Dünnbeil et al (2013)	Survey	Telematics	National healthcare physicians	117	Germany	S
Alasmary et al (2014)	Questionnaire	EMR	Health center	112	Saudi Arabia	L

Appendix E: Identified factors influencing healthcare professional's eHealth adoption

Barrier	Specific	Significance	Other sources
System	**Perceived usefulness**	*When the healthcare provider believes the systems enhances the job performance, adoption will occur easier* (Duyck et al, 2008)	Chau & Hu (2002)
	Relative advantage	*Physicians that make use of electronic prescribing view it as time saving compared to those who don't make use of it* (Schade et al, 2006)	
	Compatibility	*Compatibility of the new IS with the work styles of healthcare professionals, increases their usage* (Chau, P.Y.K. & Hu, P.J., 2002b) *Perceived incompatibility with work processes of physicians* (Bhattacherjee & Hikmet, 2007)	(Ifinedo, 2012)
	Customizability	*The function of the innovation should be aligned with the work goals within healthcare* (Budman et al, 2003) *One of the reasons physicians don't adopt to an EMR system is that it doesn't meet their special needs to meet their requirements* (Boonstra & Broekhuis, 2010)	Scott et al (2005); Bergmo & Johannessen (2006)
Financial		*Financial barriers to adopt EMR system vary from start-up costs, on-going costs, ROI uncertainty and lack of financial resources* (Boonstra & Broekhuis, 2010)	Schade et al (2006); Torda et al (2010)
Technical	**Technical training and support**	*Training and education eases the transition to an electronic system* (Anderson et al, 2006) *Health IT is predicted by facilitating conditions* (Kijsanayotin et al, 2009) *Physicians are reluctant to use EMRs when they don't perceive proper technical training and support* (Boonstra & Broekhuis, 2010)	Halamka et al (2006); Anderson (2007); Gagnon et al (2012); Maheu et al (2012)
	Reliability	*Physicians are concerned with loss of information due to technical defects of the EMR system* (Boonstra & Broekhuis, 2010)	
	Interoperability	*Creation of standards and communication between parties enhances adoption of e-prescribing* (Friedman et al, 2003) *Lack of interoperability among various systems contributes to resistance* (Anderson et al, 2006) *A new system has to interconnect with other systems to generate benefits. However, this interoperability and standardization is an obstacle for adoption* (Boonstra & Broekhuis, 2010)	Halamka et al (2006); Anderson (2007); McGinn et al (2011); Dünnebeil et al (2013)
	Devices	*The use of new IT/IS systems requires hardware, which lacks in some cases* (Boonstra & Broekhuis, 2010)	
Time	**To learn the system**	*Users don't have the time to learn technologies effectively* (Bergmo & Johannessen, 2006) *Physician's resistance to adopt HIT due to time spent to training* (Anderson et al, 2006) *Physicians need to spent time and effort learning to use the new system* (Boonstra & Broekhuis, 2010)	Anderson (2007)
	To enter data	*To use EMRs several studies indicated time to enter the date is a problem for physicians* (Boonstra & Broekhuis, 2010)	McGinn et al (2011)
Health care provider characteristics	**Computer skills**	*Physicians may lack ICT skills* (Lerer, L & Rowell, N., 2000) *Resistance of physicians stems from insufficient technical knowledge and skills* (Boonstra & Broekhuis, 2010) *EMR users with high computer literacy skills are more satisfied with using the EMR than users with low computer literacy skills* (Alasmary et al, 2014)	Halamka et al (2006); Anderson (2007)
	Age	*Especially younger physicians adopt EHRs and have access to*	

		internal health IT support (Bramble et al, 2010)	
	Role/function	*Difference between physicians, other healthcare professionals and employees involved in the healthcare process* (Maheu et al, 2004)	
	Physicians threat to autonomy	*Physicians enjoy control and privileges who are sensitive for IT threats* (Walter & Lopez, 2008)	McGinn et al (2011)
	Beliefs	*Resistance behaviour is a result of the threatening expected conditions* (Bhattacherjee & Hikmet (2007)	
Social	**Quality**	*Physicians indicate their interest in e-prescribing to avoid errors and improve the quality of their work* (Friedman et al, 2003) *Vendor's quality of EMR systems is crucial for the acceptance of it* (Boonstra & Broekhuis, 2010)	
	Client's relationship	*The use of EMR does disturb the communication between physician and client* (Boonstra & Broekhuis, 2010)	Dansky et al (1999)
	Social norm	*Support from colleagues (other healthcare professionals and administrative staff) influences physicians' attitude* (Boonstra & Broekhuis, 2010) *Doctors' resistance towards an e-healthcare system also negatively influences others that deal with the system, like specialized doctors and administrative personnel* (Venkatesh, V., Zhang, X. & Sykes, T., 2011). *Physicians who work with EHRs and with highly skilled, autonomous staff are more likely to be top performing than those without such staff* (Adler-Milstein & Jha, 2012)	
Legal	**Privacy**	*Creation of standards for coding and electronic transmission to enhance adoption* (Anderson et al, 2006) *Telemedicine use depends on safe communication between IT systems and infrastructure* (Bergmo & Johannessen, 2006) *Computerized systems may have a negative effect on patient privacy* (Jha et al 2009) *There is a lack of clear security standards in the use of EMRs* (Boonstra & Broekhuis, 2010)	Anderson (2007); Friedman et al (2009)
Organizational	**Size**	*Larger medical practices do shows higher EMR adoption rates than smaller practices* (Burt et al, 2005) *Smaller practices do have more difficulties with the financial resources than larger practices* (Boonstra & Broekhuis, 2010)	
	Type	*Physicians who are employed by or contracted to a medical practice are more likely to use EMRs than those who own their own practices* (Burt et al, 2005)	
	Type of client	*Doctors who treat high volume of elderly patients are less likely to adopt a EHR system* (Yeager et al, 2010)	Devaraj et al (2014)
Change process	**Organizational culture**	*Adaptation of work processes and change of organizational culture is needed to enhance adoption of EMR systems* (Randeree, 2007)	Kellerman & Jones (2013)
	Management commitment and support	*Leaders guide the employees into the direction of using innovative technologies* (Budman et al, 2003) *Identifying early adopters and use them to convince colleagues of potential* (Anderson et al, 2006) *Champions can help overcome possible resistance in adopting new technologies and is the most important factor influencing adoption in the healthcare industry* (Lee & Shim, 2007) *Charismatic leadership positively influences the perceptions of users regarding large-scale IT implementation* (Neufeld, 2007) *Management support in usage of the EMR system and their believes in the system do influence the physicians' rate of adoption* (Boonstra & Broekhuis, 2010)	Lee & Shim (2007); Neufeld (2007); Venkatesh et al (2011); Forducey et al (2012)
	End-user involvement	*One of the most critical interventions to support successful implementation of IS innovations is end-user training*	Kohli et al (2001); (Ifinedo, 2012)

(Gallivan, M.J., Spliter, V.K. & Koufaris, M., 2005)

Appendix F: Identified factors from all interviews

Ease of use	Convenience	*"The system is easy to use"*
	The process needs to be managed manually in order to use MindDistrict	*"When clients do apply, everything has to be checked manually. That's one of the*
	The intake process isn't efficient as the main file can only be used by one person a time	*"The Excel file we use to screen all new clients can only be used by one person a t write everything down on paper and add this later in the client's dossier and link*
Usefulness		*"The system should fit the job characteristics."*
	Lack of social support functionality	*"In some cases social support is desired, which requires involvement of family and*
	The system is more efficient	*"The system gives the opportunity to coach not only on location"*
	Many opportunities in MindDistrict are available, although they need to be optimized to fit the target group	*"MindDistrict provides many options. However, a lot needs to be adjusted to mak*
	System doesn't fit the target group. Group therapy isn't possible with use of MindDistrict.	*"We are waiting until extra functions are available in the platform."*
	The platform has to suit the clients' treatment	*"Clients who are already familiar with GGzE, as they had therapy before, don't re apply via MindDistrict."*
Quality	More insights are gained regarding the treatment, as clients' data are stored	*"The system provides more insights into the client's progress (due to the graphs i the face-to-face meetings."*
Privacy	Privacy is a key concern regarding online treatments	*"It is unclear what happens when an account is deactivated, whether dossier dest*
		"Social support is desired, but they should not be able to see all information of th
		"The client is suspicious about their privacy"
Costs	Extra functions to optimize the system do involve costs	*"The extra feature video conferencing within the MD platform should be worth it currently lacking system support."*
Type of employee	Employees' characteristics do influence the attitude towards the platform and usage	*"Psychologists do react more positively about the benefits of the MD platform th*
		"There are several groups of employees: those who are pro-active, these who do doing it, and those who think it should be arranged properly before they consider
		"Recently, a psychiatrist started to use MindDistrict. This is the last bastion."
Type of client	Clients vary in interest, age, their mental possibilities and whether they are already in therapy or start,	*"Each type of client requires specific care."*
		"Some clients don't want to communicate via the Internet"
		"Each new client receives automatically a MindDistrict account. While a short int receive therapy. However, the therapist should introduce this."
Computer experience	Personal computer experience determines the level of skills required to cope with the system	*"Not all employees do have the knowledge and skills to work with computers and*
		"Many clients do show resistance towards MindDistrict. This is caused by their co in questionnaires."
		"I think it will be a challenge for therapists to cope with administrative and techn
Team	Self-managing teams should indicate what they want and how	*"The teams should themselves initiate their needs and how they want to integrat*
Time	Therapists do face high level of workload	*"Due to the high work load there is often no time to learn the platform and start in the workflow."*
		"Employees already have to do so many things and they also have to indulge in th
		"Psychiatrists do have a lot of work. Therefore, they are worried the platform brir
Professional autonomy	Health care providers are used to their independency and responsibilities	*"Health care providers want to stay in control and keep their responsibilities. It to treatment."*
		"Professionals are the hardest ones to manage. I read lots of booklets about it an do. What you can do is challenging them to think about it. Mostly, that works qui
Interoperability	The system User and MindDistrict have to connect to make data exchange possible	*"There is a time interval of 15 minutes up to 30 minutes before User and MindDis available in MindDistrict."*
	The systems don't connect in some cases	*"Sometimes I can't open the dossier in MindDistrict via User, as there is already a and separate dossiers where created in MindDistirict."*
Implementation process	Timing of implementation does impact acceptance	*"All barriers need to be taken away simultaneously. That's quite difficult."*
	A clear road map is lacking	*"When the timing is wrong, the system doesn't fit into the work processes. And if chance."*
		"I'm wondering whether how the process is transferred and whether it is secured. therapists and uncertainties from the organization."
Responsibilities	Instructions and responsibilities are not clear	*"Who is responsible for the system? It is not clear, although required. An overview how to work with the platform"*
Leadership	Guidance is required to steer the employees	*"A dictator is required to determine what we do and how we do it."*
Support		*"More capacity is requested to support the platform's implementation among the*
	Support is needed to steer therapists and clients	*"Many therapists approached me for questions. In the past even clients asked me service desk should be contacted."*
Management	There is a gap between eHealth initiatives and practicalities on the work floor	*"The board and people who provide direction within the organization are 10 step*
Social influence	Use by colleagues stimulates acceptance of others	*"To promote MindDistrict acceptance we started to use the platform, which stimu*
Training	Continuous training is required to educate employees about the system to make them competent and stimulate adoption	*"Employees don't have the time to learn the platform. Besides, there is too much*
		"Small steps give therapists the feeling they are competent. When they think they
		"A single kick-off presentation, like the inspiration day, is insufficient in the long r training."
		"Sometimes, CCP of the centre hasn't been trained yet. Although therapists of the
	Education is required to communicate and inform healthcare providers	*"Sometimes a healthcare provider has heard of the MindDistrict platform and wa which has to be done first. Then they need training and instructions on how to wo*
		"I experience healthcare providers are not well informed about what they should link MindDistrict, while they ask us to connect them."
Communication	Documentation, deadlines and responsible persons should be clear	*"Information gets lost as it isn't documented, not the right people are involved ar*
	Hands-on mentality is supportive	*"The benefits of the MD platform are not clearly communicated to the therapists.*
		"Active participation on the work floor seems to be most effective in supporting t
	As therapists are not properly informed and introduced to the platform and the possibilities, they have no idea of what it is	*"Prejudices do play a critical role as well, varying from less face-to-face contact to*
	Translation towards practice	*"Due to ignorance, therapists don't have any idea what the platform is and what up."*

	The whole process should be defined and communicated to enhance adoption	*"The platform has to be presented in a realistic manner, excluding English terms within the organization on how to use it. There aren't that much people who can "First of all, the process should be clearly communicated. If a centre wants to sta trainings should educate the employees, up and running."*
System	Functionalities	*"The MD tools do not work correctly, while expectations are created and system "Currently, accounts are automatically deactivated, which should be adjusted to "There is no disclaimer included in the platform or in the terms and conditions of "Regarding the social support function, it should be clear to those involved how t engage as related client their deductible excess is charged)" "Clients do face the same front page of the MD platform as therapists do. As this clients, as they don't understand parts of it (e.g. what is CCP?)" "It would be interesting to include an evaluation of customer satisfaction within "Not all modules should be available in the store, as children do not have to get a "Experienced is that within Outlook it isn't mentioned which therapists should pro linked to the same client" "Besides, if one of those looks at the clients' status within User, the task for the re "When clients have to wait before they can join a program or group, the MindDis*
	Supportive as client's can immediately start	*Besides, it is helpful in groups. Healthcare providers prefer this."*
	The system's response time is slow	*"The system is slow. Sometimes I can get a cup of coffee just while linking the the "It takes time to link User and MindDistrict."*
	Clients' partners need their own email address	*"If the client's partner is also in therapy, he/she has to have an unique email addr "The MindDistrict platform only provides a message you can't log in. But doesn't*
	Errors within the system aren't defined	*"If the system lacks certain options, I contact the customer service of MindDistrict "From the client's perspective the process needs to be automated. So far, the plat*
	Communication	*"Not all modules should be available for a specific centre. For example, the centre*
	The platform should guide the client through the treatment with use of a filter per center	
Work processes	Changing work processes of healthcare providers	*"Expected is that therapists will not communicate properly which care the clients right treatment within User. If it is not right documented, we cannot finish the do*
Organizational vision	Vision should promote the benefits of the system and provide direction within the organization	*"Policy should guide the implementation process of the platform and not impose eHealth. So, targets are unrealistic. This implies the vision on decreasing costs, w advantages of the system are forgotten."*
	A new vision to steer the work processes	*"There is no clear direction provided in what product we choose, where to go, wh "Our work method will change soon. The aim is to provide care from the Planetre*
Vendor	Each step required to optimize the product depends on the vendor	*"There is still the question how to deal with the development of the MD platform MD). Everything depends on the company MD and the features they offer. It wou*
	No transparency from the vendor about the system regarding safety and privacy issues	*expertise regarding technical issues addressed from the organizational perspecti "The vendor MindDistrict is not transparent regarding the system and what they*
	The stage of functionality wishes that need to be implemented is not clear	*personal dossier and storage. That worries me." "There is a central meeting of Gx where system wishes are prioritized. Unfortunat*
Implementation process	Continuity of the implementation process is required to make it succeed	*"There is still a long road to go. I think it is very important to continue, otherwise to make them enthusiastic and not be hindered by its limitations."*
Realistic	Step-by-step implementation	*"Small steps need to be taken. Then there will be progression in product use."*
Evaluation	Modules need to be evaluated after a certain time to make adjustments and see what can be changed to enhance usage	*"The module "Grip op je emotie" has been live for half a year now. The five sessio clients drop out."*
	An evaluation meeting is valuable to steer the process	*"The Core Group Online Treatment meeting is very helpful in sharing knowledge do and how far they are in the process. For MindDistrict this is better arranged th*
Development	To suit the target group, the content of the modules is developed in collaboration with the users	*"All modules are developed in co-creation, which indicates involvement of therap*
Education	Traditional education doesn't educate young therapists regarding eHealth	*"Education on schools is still very traditional. This worries me, as education shoul*
Client's perspective	Client's attitude influences therapist's attitude	*"Providing the client's perspective is even more effective to convince employees t*
Devices	When employees want to start using the platform, failing devices hinders them	*"Not properly functioning devices is also a barrier. This drives you insane."*
	A computer is necessary to make use of the platform	*"ROM can be filled in while using your mobile phone. MindDistrict contains video device. Clients do need to use a computer. Nevertheless, they lack skills, don't ha*

Appendix G: Overview of constructs and their items

Construct	Measurement instrument	Source, technology & factor (factor specification)
Perceived usefulness (PU)	1. Using the MD platform can improve my patient care 2. Using the MD platform cannot enhance my effectiveness in patient care 3. Using the MD platform can make my patient care easier 4. I would find the MD platform not useful for my patient care	Chau & Hu (2002) – telemedicine technology
Perceived ease of use (PEOU)	1. Learning to operate the MD platform would not be easy for me 2. I would find it easy to get the MD platform to do what I need it to do 3. It is not easy for me to become skilful in using the MD platform 4. I would find the MD platform easy to use	Chau & Hu (2002) – telemedicine technology
Behavioural intention (BI)	1. I intend to use the MD platform for patient care as often as needed 2. Whenever possible, I intend not to use the MD platform for patient care 3. To the extent possible, I would use the MD platform in my patient care frequently	Chau & Hu (2002) – telemedicine technology
Perceived threat (PT)	1. Using MD may decrease my professional discretion over patient care decisions 2. Using the MD platform may increase monitoring of my diagnostic and therapeutic decisions by non-providers 3. I would find the MD platform advantageous for the medical profession as a whole	Walter & Lopez (2008) –clinical decision systems and EMR's systems
Type of client (TC)	1. Most clients I treat are mentally able to use M	Based on qualitative research – F1 (mental possibilities client)
	2. Available modules do fit my type of clients 3. There are enough suitable MD modules available for the clients I treat 4. Most modules don't suit my clients and their issues	Based on qualitative research – F2 (availability modules)
	5. Most clients get adequate training for using MD 6. MD training for my clients is excellent 7. The organization informs and educates clients regarding MD well 8. MD support available for clients isn't sufficient enough for my type of clients and their issues	Based on qualitative research – F3 (organizational support clients)
Perceived Quality of Care (PQC)	1. Customer perceived technical quality of care is high 2. Clients are satisfied with the communication 3. Clients are satisfied with the interpersonal interactions 4. Clients think time spent with them is enough 5. Mistakes made in my work are few	Venkatesh, Zhang & Sykes (2011) – electronic healthcare system
Perceived efficiency (PE)	1. We treat clients very efficiently 2. Our treatments routines and processes are fast and efficient 3. Clients perceive our take-in as efficient 4. Clients think we are not efficient but bureaucratic	Based on qualitative research – F1 (processes)
	5. We empower clients 6. We stimulate clients' independence 7. Client participation/activation in treatments is high	Based on qualitative research – F2 (client empowerment)
Change management support (CMS)	1. There are clear guidelines for implementing and using MD 2. Organizational goals for MD are realistic 3. Responsibilities for MD are clear 4. Management implemented MD well	Based on qualitative research – F1 (implementation roadmap)
	5. Technical support is available whenever I need it 6. The technical support people understand my problems well 7. The problems with MD I reported/faced were/are solved promptly	Venkatesh, Zhang & Sykes (2011) – electronic healthcare system – F2 (technical support)
	8. The MD platform has no strong advocates in the organization 9. There are one or more people in the organization really championing the MD platform 10. Nobody in the organization has taken the lead in pushing for the intention to use the MD platform	Lee & Shim (2007) – RFID system - F3 (Presence of champions)
	11. There is enough time to learn to use MD 12. Due to the high workload, I don't have the time to learn MD 13. The organization offers extra hours to learn and get familiar with the MD platform	Based on qualitative research – F4 (Time)
Communication (C)	1. Internal communication regarding MD stresses the benefits of using MD for better healthcare quality 2. Internal communication emphasizes how MD empowers the client 3. During the launch of MD I saw several messages stressing how MD's use	Based on qualitative research – F1 (Internal communication)

	of ICT could help make our healthcare service more efficient 4. Communication regarding MD stresses how it helps to better organize and manage client care	
	5. Top management supported the adoption of MD 6. Top management actively supported the implementation of MD 7. Top management has been very committed in making MD succeed	Based on qualitative research – F2 (Top management support)
Training Inspirationday (TI)	1. Overall, I was very satisfied with the inspiration training 2. The inspiration training was very good 3. The inspiration training really motivated and inspired me 4. The inspiration training focused on my target/client group 5. The inspiration day was given at the right time	Based on qualitative research
Training (T)	1. Overall, I was very satisfied with the training ("knoppentraining") 2. The training ("knoppentraining") provided comprehensive coverage of the system and how I could use it in my job 3. The training ("knoppentraining") materials were comprehensive 4. The MD training was excellent	Venkatesh, Zhang & Sykes (2011) – electronic healthcare system
	5. The training ("knoppentraining") focused on my target/client group 6. The training ("knoppentraining") was given at the right time 7. The training ("knoppentraining") wasn't sufficient 8. More and continuous training is desirable	Based on qualitative research
Computer experience (CE)	1. I have the basic skills of using a computer 2. I use technology on a daily basis 3. I find advanced technology easy to use 4. Computer skills are not required to complete the daily tasks that are related to my work 5. I'm exposed to the use of technology in everyday life	Alasmary et al (2014) – EMR

Appendix H: Questionnaire

Dear …,

Hereby I would like to invite you to a questionnaire of the platform MindDistrict (MD). The goal of this research is to identify (potential) user's perspective and willingness to work with it.

The following link will take you to the questionnaire:
https://nl.surveymonkey.com/r/YYRFYCT

I ask approximately 10-15 minutes of your time to complete this questionnaire. You are free to participate in this study. However, your contribution can make this research a success for the organization and my graduation. The completed questionnaires are anonymous and will be treated confidentially. The final report only contains general findings and individual scores are not disclosed. The recommendations that follow from the results serve as input for further implementation of MD.

If you have any questions and/or comments, please contact me.

Thanks in advance for your cooperation!

With kind regards,
Sanne van Wingen
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MindDistrict

These questions are about MindDistrict and use of it. Check the applicable box and write down the reason.

Question	Answer
1. Are you familiar with the treatment platform MindDistrict?	□ Yes □ No, because……

Question	Answer
2. Do you have a MindDistrict account?	□ Yes □ No, because……

Question	Answer
3. Do you make use of MindDistrict?	□ Yes □ No, because……

MD use

These questions are about the actual use of MindDistrict. Check the applicable box and write down the reason.

Question	Answer
4. How often do you use MD per week?	□ Less than 1x per week □ Approximately 1x per week □ 2 or 3 times a week □ Several times a week □ Every day □ Several times a day
5. Which functions of MD do you use?	□ Messaging □ Welcome modules □ Treatment/expert modules □ Diaries □ Other (pelase specify) _____
6. Are there modules available that suit your work(activities)?	□ Yes □ No, because _____

To what extent do you agree with the following statement?		**totally disagree**				**totally agree**
7.	I can get along well with MD	1	2	3	4	5

Question	Answer
8. Which environment(s) of MD do you use?	□ The training environment □ The treatment environment □ The e-learning environment

Question	Answer
9. Within what type of treatment do you use MD?	□ One on one □ Groups □ Both
10. How long have you been using MD in the treatment?	□ <6 months □ 6-12 months □ >12 months
11. For which part of the work do you use MD?	□ <10% □ 10-25% □ 26-50% □ 51-75% □ 76-99% □ 100%

Perceived usefulness

These questions are about the perceived usefulness of MD. Check the applicable box.

To what extent do you agree with the following statement?		**totally disagree**				**totally agree**
12.	*Using the MD platform cannot improve my patient care*	1	2	3	4	5
13.	*Using the MD platform cannot enhance my effectiveness in patient care*	1	2	3	4	5
14.	*Using the MD platform can make my patients care easier*	1	2	3	4	5
15.	*I would find the MD platform not useful for my patient care*	1	2	3	4	5

Perceived ease of use

These questions are about the perceived ease of use of MD. Check the applicable box.

To what extent do you agree with the following statement?		**totally disagree**				**totally agree**
16.	*Learning to operate the MD platform would not be easy for me*	1	2	3	4	5
17.	*I would find it easy to get the MD platform to do what I need it to do*	1	2	3	4	5
18.	*It is not easy for me to become skilful in using the MD platform*	1	2	3	4	5
19.	*I would find the MD platform easy to use*	1	2	3	4	5

Intention

These questions are about the intention to use MD. Check the applicable box.

	To what extent do you agree with the following statement?	**totally disagree**				**totally agree**
20.	*I intent to use the MD platform for patient care as often as needed*	1	2	3	4	5
21.	*Whenever possible, I intend not to use the MD platform for patient care*	1	2	3	4	5
22.	*To the extent possible, I would use the MD platform in my patient care frequently*	1	2	3	4	5

Autonomy

These questions are about the autonomy regarding MD. Check the applicable box.

	To what extent do you agree with the following statement?	**totally disagree**				**totally agree**
23.	*Using MD may decrease my professional discretion over patient care decisions*	1	2	3	4	5
24.	*Using the MD platform can decrease my control over each step of the patient care process*	1	2	3	4	5
25.	*Using the MD platform may increase monitoring of my diagnostic and therapeutic decisions by non-providers, like managers*	1	2	3	4	5
26.	*I would find the MD platform advantageous for the medical profession as a whole*	1	2	3	4	5

Client

These questions are about the client and MD. Check the applicable box.

	The majority of my clients …	**totally disagree**				**totally agree**
27.	*… didn't have therapy yet*	1	2	3	4	5
28.	*… is mentally able to use MD*	1	2	3	4	5
29.	*… do influence the way I work*	1	2	3	4	5
30.	*… is online (uses email, Facebook, etc.)*	1	2	3	4	5
31.	*… don't want to use MD due to financial reasons*	1	2	3	4	5
32.	*… don't find MD suitable due to ICT issues*	1	2	3	4	5
33.	*… assume I work with MD*	1	2	3	4	5
34.	*… prefer to use MD*	1	2	3	4	5

Perceived quality of care

These questions are about the perceived quality of care regarding MD. Check the applicable box.

	To what extent do you agree with the following statement?	**totally disagree**				**totally agree**
35.	*MD use positively influences the technical quality, like administration*	1	2	3	4	5
36.	*MD use positively influences communication with clients*	1	2	3	4	5
37.	*MD use positively influences the interpersonal interactions with clients*	1	2	3	4	5
38.	*MD use positively influences attention paid to the client*	1	2	3	4	5
39.	*MD use decreases the number of mistakes made in my work*	1	2	3	4	5

Perceived efficiency

These questions are about the perceived efficiency of MD. Check the applicable box.

	To what extent do you agree with the following statement?	**totally disagree**				**totally agree**
40.	*MD makes the treatment of clients more efficient*	1	2	3	4	5
41.	*The treatment takes less time due to MD use*	1	2	3	4	5
42.	*In the beginning it takes more time to use MD during the treatment, but eventually it makes the treatment more efficient*	1	2	3	4	5
43.	*Using MD contributes to the client's health*	1	2	3	4	5

Support

These questions are about the available support with regard to the implementation of MD. Check the applicable box.

	To what extent do you agree with the following statement?	**totally disagree**				**totally agree**
44.	*There are clear guidelines provided*	1	2	3	4	5
45.	*Organizational goals are realistic*	1	2	3	4	5
46.	*Responsibilities are clear*	1	2	3	4	5
46.	*Extra time to learn MD is available*	1	2	3	4	5
48.	*The benefits of the system are highlighted*	1	2	3	4	5
49.	*Support is available whenever I need it*	1	2	3	4	5
50.	*My problems are understood*	1	2	3	4	5
51.	*The problems I faced are resolved*	1	2	3	4	5

Presence of champions

These questions are about the presence of champions regarding MD. Check the applicable box.

To what extent do you agree with the following statement?		**totally disagree**				**totally agree**
52.	*The MD platform has no strong advocates in the organization*	1	2	3	4	5
53.	*There are one or more people in the organization who are enthusiastically pushing for the MD platform*	1	2	3	4	5
54.	*Nobody has taken the lead in pushing for the intention to use the MD platform*	1	2	3	4	5

Trainings

These questions are about trainings provided regarding MD.

Question	**Answer**
55. Did you attend an inspiration day?	□ Yes □ No, because ……

To what extent do you agree with the following statement?		***totally disagree***				***totally agree***
56.	*Overall, I was satisfied with the inspiration day*	1	2	3	4	5
57.	*The inspiration day focused on my target group*	1	2	3	4	5
58.	*The inspiration day was given at the right time*	1	2	3	4	5

Question	**Answer**
59. If you could give a grade to the inspiration day, what would it be on a scale of 1 to 10? (1 is very bad, 10 is very good)	_____

Questions	**Answer**
60. Did you receive hands-on training?	□ Yes □ No, because ……

To what extent do you agree with the following statement?		***totally disagree***				***totally agree***
61.	*Overall, I was satisfied with the training*	1	2	3	4	5
62.	*The training provided comprehensive coverage of the system and how I could use it in my job*	1	2	3	4	5
63.	*The training materials were comprehensive*	1	2	3	4	5
64.	*The training focused on my target group*	1	2	3	4	5
65.	*The training was given at the right time*	1	2	3	4	5
66.	*I've had enough training to start using the system*	1	2	3	4	5

Question	**Answer**
67. If you could give a grade to the hands-on training, what would it be on a scale of 1 to 10? (1 is very bad, 10 is very good)	_____

Question	**Answer**
68. How can the training be improved?	_____

Personal details

These questions are about your computer and technology experience, and use of it during your work. Check the applicable box or write down your answer.

Question	**Answer**		
69. What is your gender?	□ Woman □ Man		
70. What is your age?	_____ years		
71. What is your highest level of education?	□ Vocational □ University of applied science □ Academic education □ PhD □ Other (please specify) _____		
72. How long have you worked in mental healthcare?	_____ years		
73. How long have you worked for GGzE?	_____ years		
74. In which centre do you work?	**Division Youth- en Adult psychiatry**	**Division Adult- en Elderly psychiatry**	**De Woenselse Poort**
	○ GGzE ACT	○ GGzE Centrum Elderly psychiatry	○ De Omslag
	○ GGzE Centrum Autism	○ GGzE Centrum Psychose	○ De Ponder
	○ GGzE Centrum Bipolar	○ GGzE De Boei	○ Keer
	○ GGzE Centrum Child- en Youth psychiatry	○ GGzE FACT	○ KIB
	○ GGzE Centrum Personality	○ GGzE Medical Centrum (incl. DGV)	○ Long-Care
	○ GGzE Centrum Spoedeisende Psychiatry	○ GGzE Promenzo	○ Opname
	○ GGzE Direct		○ Transmuraal Team
	○ GGzE Idiomes		○ Volte
	○ GGzE TRTC		○ Waagkant
			○ Safety
	○ ICT		
	○ Communication		

	○ Research & Development ○ HRM ○ Finance
75. What is your function?	□ Psychiatrist □ Psychologist □ (Social psychiatric) nurse □ Specialist nurse □ Social worker □ Therapist (creative-, system-, verbal-, etc.) □ Experience expert □ Other (please specify)_____

Computer experience

These questions are about your computer and technology experience, and use of it during your work. Check the applicable box.

To what extent do you agree with the following statement?		**totally disagree**				**totally agree**
76.	I have the basic skills of using a computer	1	2	3	4	5
77.	I use technology on a daily basis	1	2	3	4	5
78.	I find technology easy to use	1	2	3	4	5
79.	Computer skills are not required to complete the daily tasks that are related to my work	1	2	3	4	5
80.	I'm exposed to the use of technologies in everyday life	1	2	3	4	5

What would make you to use MindDistrict more?

Do you have additional remarks/comments?

Thank you for your cooperation!