Digital Transformations in Care for Older People: Critical Perspectives

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Chapter 2

Healthcare and technology

The multi-level perspective: theories, models, and frameworks

Eveline J.M. Wouters

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Chapter 2

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The multi-level perspective: theories, models, and frameworks

Eveline J.M. Wouters

Introduction: complexity of technology implementation in care

The prevalence of chronic diseases in older people is relatively high. Many older persons have more than one chronic disease (multi-morbidity) and certain patterns of comorbidity exist (Weiss et al., 2007). Technology can support collaboration between care professionals, for example, by exchanging patient data or by supporting care processes. Also, it is seen as a 'solution' to keep healthcare affordable and of good quality. Much of the research of technology in relation to older adults is therefore conducted in the context of chronic healthcare. This is a complex context, but also one that teaches us much about the issues, barriers, and facilitators in the use of technology by older persons and the system they are involved in.

When talking about 'technology' in this chapter, healthcare digital technology involving several stakeholders is meant. For example, eHealth technology for people with heart failure, which necessitates the collaboration between several organisations and individuals. For example, primary care (home care nurses and general practitioners), secondary care (cardiologists and nurse specialists), healthcare professionals of the call centre that receives the data, technology providers, patients themselves who are monitored and need, for example, to measure their weight and blood pressure, and the informal network. Therefore, the implementation of technology within the domain of care for older persons with chronic health issues and well-being is complex. First, this is a consequence of the complexity of healthcare; processes in healthcare organisations are complex compared to other organisations because, on one hand, professionals in such organisations are responsible for persons in vulnerable situations, which implies complex legislation and ethical considerations (Anderson, 2007).

At the same time, these organisations need to be cost-effective (McPhail, 2016). The second reason for complexity is the technology. Implementation of technology in care is not the same as implementation of technology in general, as technology is not yet considered as being part of 'healthcare as usual' and may be in conflict with professional values (Nieboer et al., 2014). Third, in chronic

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healthcare, many stakeholders, including patients themselves, with very different perspectives, values, and interests are involved, and all stakeholders need to be aligned for the technology implementation to be successful (e.g. Greenhalgh et al., 2017). Therefore, understanding the perspectives of multiple stakeholders is a prerequisite for understanding the complexity of implementation in chronic healthcare for older persons.

In this chapter, existing theories, models, and frameworks that help to explain the implementation and actual adoption and use of technology in chronic healthcare, especially in the context of older persons, are described. First, it is important to understand what influences the individual use of technology. Therefore, in the second section, 'Individual Technology Acceptance and Use', human factors influencing technology acceptance and implementation in general are addressed. Because of its relevance to the context of the overall aim of this book, specific factors influencing the acceptance of technology in older people are considered in more detail. Not only people receiving healthcare but also those who provide care are important stakeholders, and thus, in the third section, 'Understanding Technology Implementation in Organisations' the role of professionals within healthcare organisations is described. As humans and human factors are part of a broader environment, theories will be positioned within more comprehensive and influential frameworks (fourth section 'Comprehensive Theories on the Adoption of Technology in Healthcare'). In the fifth section 'Understanding the Differences in Stakeholders' Perspective', a normative approach, addressing the nature of values, interests, and ideals of different stakeholders, helps to clarify the complexity of collaboration as a key factor of successful technology use. Finally, in the last section 'Discussion', the theories presented in this chapter are discussed to uncover the implications they have on the digital agency of older persons and their carers. The examples in this chapter are derived from practice narratives and empirical research.

Individual technology acceptance and use

There are several frameworks and models that have tried to explain what it takes to introduce and use technology. These models have different scientific roots, including psychological, sociological, organisational, normative, and even mathematical backgrounds. In this section, the focus will first be on individual human factors that help to understand what it takes to accept technology. Secondly, to these models the insights of other and more recent works on behavioural change are added, which further help to clarify the uptake and use of technology by individuals. Finally, in this section, technology use in older adults will be elaborated upon.

Technology Acceptance Model (TAM) and Unified Theory of Acceptance and Use of Technology (UTAUT)

Of the technology acceptance theories and models, the Technology Acceptance Model (TAM) is most often used. Most of these theories have been developed

from classical behavioural change models, after specifying them for the use and the intention to use technology. However, they have not specifically been developed for healthcare but for a general working environment purpose, especially in the case of the introduction of computers to offices in the 1980s (Salahshour Rad et al., 2018; Davis, 1989).

The TAM originated from the psychological theory of reasoned action (Fishbein, 1980), the theory of planned behaviour (Ajzen, 1991), and the combination of the theory of planned behaviour and social learning theory (Bandura, 1989). It has evolved to become a key model in understanding individual human behaviour towards the acceptance or rejection of technology. The core concept of the TAM is that the ease of use and the perceived usefulness of the technology influence the attitude and the behavioural intention towards using technology, which will eventually lead to actual use (Davis, 1989). The two core variables of TAM (ease of use and perceived usefulness) have been shown to explain 40% of the intention to use technology in an individual within several situations, including healthcare (Holden and Karsh, 2010), and intention in turn has been shown to predict the actual use of technology (Turner et al., 2010).

The UTAUT (Unified Theory of Acceptance and Use of Technology) uses the same key variables as the TAM and includes social influence and facilitating conditions which themselves are influenced by several factors. These influencing conditions are gender, experience in use, voluntariness of use, and age. The performance expectancy (compare usefulness in the TAM) and the effort expectancy (compare ease of use in the TAM), together with social influence and facilitating conditions, predict behavioural intention (Venkatesh et al., 2003). Performance expectancy in turn is influenced by gender and age, whereas effort expectancy is also influenced by experience. Social influence is described to be the degree to which a person perceives that others, who are important to them, believe he or she should use the new system. Social influence is hypothesised to be moderated by gender, age, and experience, as well as the extent to which the use of the system is voluntary. Facilitating conditions refer to the extent an individual believes that an organisational and technical infrastructure is present to support the use of the system, in turn moderated by age and experience (Venkatesh et al., 2003). Together, by adding these two additional variables and four moderating factors, the UTAUT was able to explain up to 70% of the intention to use technology (Venkatesh et al., 2003).

However, TAM and UTAUT can only be applied to individuals and not complex systems of stakeholders, and age and gender are not considered in specific contexts such as healthcare. Also, the influence of time is important to consider. It was found that technology acceptance in individuals may change over time or change after actual experience with use (Bouwhuis et al., 2012). This was taken into account in a further development of UTAUT (UTAUT2), in which the intention to use the technology is also influenced by habit (the passage of time from the initial use of the technology), by hedonic motivation (i.e. the degree to which the technology is perceived enjoyable), and by its price (the trade-off between the perceived benefits of the technology and monetary costs) (Venkatesh et al., 2012).

In a comprehensive literature review, Marangunić et al. showed the modifications and improvements of the TAM that have been made since its appearance a quarter of a century ago, as well as the research fields that could improve its predictive value even more. The fields they suggest for future research address the moderating role of individual variables, the incorporation of additional variables to the model, the investigation of actual usage, and specifically the relationships between actual usage and objective outcome measures as well as the target group of older adults (Marangunić and Granić, 2015). The same conclusion was made in the literature review by Rahimi et al., who studied the TAM in relation to the implementation of healthcare information systems. In this review, most of the included articles reported extensions of the original TAM when applying it, adapted to specific contexts, and it was concluded that no optimal TAM version is available for use in healthcare to date (Rahimi et al., 2018).

To illustrate the presented models of technology acceptance, the introduction of a medicine dispenser is described from the individual perspective of an older adult and her informal carer, as well as from the perspective of a healthcare provider (homecare nurse). For older adults who have been prescribed several medications to be taken at various times throughout the day, it may be challenging to remember to take their medication at the correct time or in the correct manner. A medication dispenser signals when certain medication is needed and provides a warning signal to the (in)formal carer if something goes wrong. This is considered very useful by both the older persons and their family carers, as this means less medication failures and better health. It is also easy to use, as recharging of the medication dispenser is provided for by the healthcare organisation. On the other hand, the homecare nurse needs to refill the medication dispenser on a regular basis. Also, the package system in which the medication is delivered for use in the medication dispenser (which varies depending on the availability by the companies that provide it) causes errors and alarms. So, for her, the homecare nurse, this technology is not easy to use, although she considers the idea of patients taking their medication in the correct manner useful (narrative, not published).

Other general models used

Although TAM and UTAUT are used most often and dominate the field of technology acceptance in individuals, there are other models and theories that can be useful for understanding individual human behaviour in the process of using a new technology. What the theories referred to here have in common is that they include motivation as a core concept in the understanding of acceptance and actual use, whereas in TAM's later development of UTAUT, motivation is an additional factor, and ease of use and perceived usefulness are still the core concepts. However, the models introduced in this section also focus more on the beginning phase of the use of new technology and the sometimes sudden opportunity or trigger that induces the actual use. These theories are based on theories of behavioural change and are not specifically developed for technology

use, contrary to TAM and its successors. The Motivation-Opportunity-Abilities (MOA) and the Capability, Opportunity, Motivation, and Behaviour (COM-B) will be presented here as well-known examples.

The Motivation-Opportunity-Abilities (MOA) model, introduced by Olander and Thogersen (Olander and Thogersen, 1995), concerns behavioural change based on motivation, bearing the elements of theory of planned behaviour by Ajzen and Fishbein (Ajzen, 1991). Comparable, and currently widely applied in the context of care, is the COM-B (Figure 2.1) (Michie et al., 2011b). This model, which forms the heart of the Behavioural Change Wheel, is now often used in behaviour change interventions. It recognises that behaviour involves the interaction between capability, opportunity, and motivation. Capability is the physical and psychological ability of a person to show the behaviour (in our context, the use of technology) and includes both knowledge and skills. Motivation comprises both the reflective part (conscious behaviour) and the automatic (habitual) part of motivation. Finally, opportunity refers to the physical and social circumstances lying outside a person that enable or trigger the behaviour (Michie et al., 2011b), such as having Wi-Fi available. Notably, the model coined by Fogg (FBM: Fogg Behavioural Model), which was developed in the context of design and explains how to design in a persuasive manner, also comprises the components of MOA and COM-B. These are motivation, ability, and a certain trigger (comparable to 'opportunity' in the COM-B and MOA models) (Fogg, 2009). The COM-B model further indicates potential reciprocal influence between the three core components in the system. Both capability and opportunity can improve motivation, but actual behaviour also affects the capability to, for example, use technology, improve motivation, and facilitate opportunities (Michie et al., 2011b).

To illustrate the core concept of MOA/COM-B, the use of online consultation is described. Online consultation is still the least preferred option of all healthcare

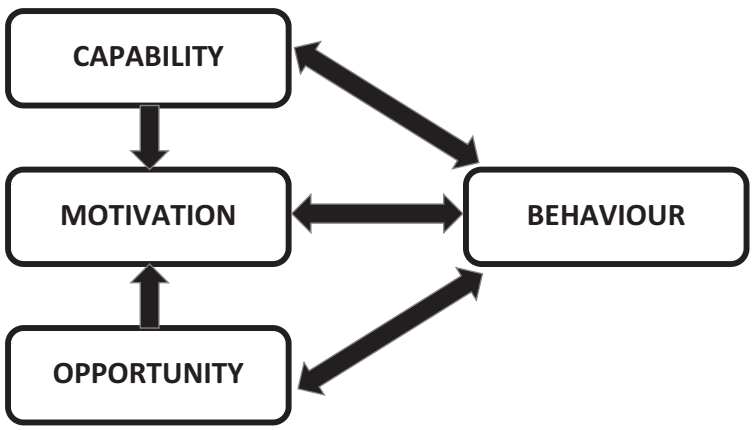

Figure 2.1 The COM-B model (derived from Michie et al., 2011b, Figure 1, p. 4/11).

consultations. During the COVID-19 pandemic, especially during the first lockdown period, physical consultation, for example, by physiotherapists, was impossible. For that reason, more patients and physiotherapists used online alternatives. The lockdown can be perceived as the opportunity to still have therapy and to use online alternatives. Motivation increased by the more frequent use of online therapy (more habitual use both by patients and by physiotherapists), which led to more use of online therapy (Tenforde et al., 2020).

Technology acceptance in older adults

Technology is often mentioned as a possible 'solution' to conquer the imbalance between the scarcity of resources in healthcare and the increasing need for healthcare as a result of demographic changes. As a result, most of the technologies developed for older persons have been developed in the context of healthcare. TAM and its successors have not addressed older adults until recently (Marangunić and Granić, 2015); however, for supportive technology to be successful, acceptance by older persons is obligatory. In the literature review of Peek et al. (2014), the acceptance of technology in older adults was found to consist of 27 factors, together forming six themes. The pre-implementation acceptance of technology by older adults was influenced by (1) concerns such as high costs, low ease of use (compare TAM/UTAUT), and stigmatisation; (2) benefits regarding the technology, such as perceived usefulness (compare TAM/UTAUT) and reduced burden on informal caregivers; (3) need for the technology, for example, as influenced by subjective health status; (4) alternatives, such as help by a partner; (5) social influence (compare UTAUT); and (6) personal characteristics of the older person, such as the desire to age in place and their cultural background (Peek et al., 2014) (Figure 2.2).

Most of the studies that have been performed address the attitudes of older adults towards technology before the actual use has begun, even though it has been shown that the views of older adults regarding technology change between pre- and post-implementation, with negative attitudes in the pre-implementation phase becoming positive in the post-implementation stage (Tsertsidis et al., 2019). Therefore, in order to better understand the actual usage of technology by older persons and the changes in that usage, a longitudinal research approach and a theory that is able to account for both changes across time and the dynamical interrelations between factors are needed. Dynamical systems theory (DST) originates from mathematics but can also be used in other fields such as psychology (Gelfand and Engelhart, 2012). Using this theory in a prospective longitudinal qualitative field study, Peek et al. followed the use of technology of older persons across time (Peek et al., 2019).

Their frequency of technology use could be described with a core system of six interrelating factors: emotional attachment, need compatibility, cues to use, proficiency to use, input of resources, and support (Figure 2.3). Disruptive factors can change this core system in time, depending on the core system and the

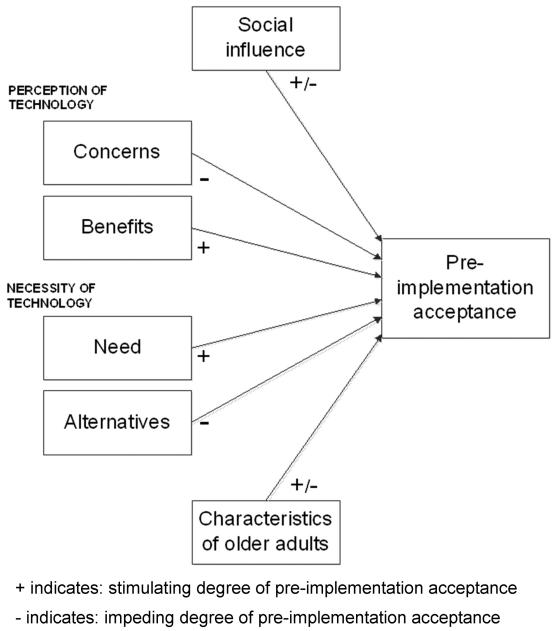

Figure 2.2 Model of pre-implementation acceptance (Peek et al., 2014, Figure 2, p. 241). + indicates stimulating degree of pre-implementation acceptance. – indicates impeding degree of pre-implementation acceptance.

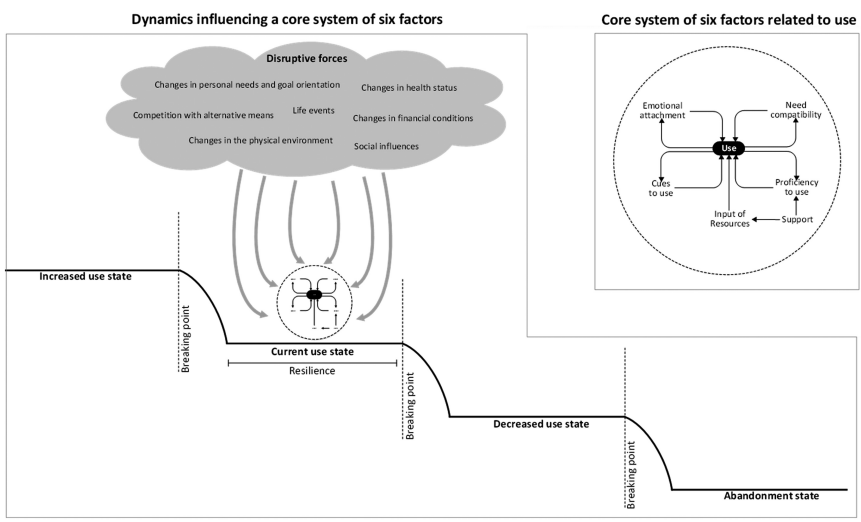

Figure 2.3 Dynamics In Technology Use by Seniors (the DITUS framework) (Peek et al., 2019, Figure 7, p. 10).

force of disruptive factors. Among others, these disruptive factors are changes in personal needs, changes in the physical environment, and life events. Together, this was called the Dynamics In Technology Use by Seniors (DITUS) framework (Figure 2.3).

To illustrate the importance of dynamics in the understanding of the use of technology by older adults, the influence of disease is used. Because of physical or other health constraints, the habitual use of technology is disrupted for a shorter or longer period. In time, need compatibility, usage cues, and emotional attachment tend to decline as well, ultimately leading to stopping use altogether. This was also seen in some of the participants of the longitudinal study of older adults (Peek et al., 2019).

All models described in this section use the perspective of one individual at a time. In practice, the use of technology by older persons involves many different users and interested parties at the same time. Therefore, the next section considers the acceptance of technology of individual participants within the context of the organisation and, by doing so, focuses on the actual work done or effort that needs to be made to implement technology in the care organisation: Normalisation Process Theory (NPT).

Understanding technology implementation in organisations

Empirical research shows that successful implementation of technology within the setting of chronic healthcare is not easy. Most healthcare professionals' primary motivation to work in care settings is based on (physical) proximity. Also, technology is often not considered 'care as usual' as it might disturb the care process (Nieboer et al., 2014).

Normalisation Process Theory (NPT) is a sociological theory that describes the mechanisms that underlie the embedding and integration of technological innovations within an organisation, especially within healthcare contexts. The focus of NPT is on the actual work that is needed and performed by participants (e.g. healthcare professionals) to implement an intervention (e.g. an eHealth application), including social and organisational change, aiming for it to become routinely embedded in already existing practices (May et al., 2009). NPT thus identifies factors that improve or form barriers for the routine incorporation of a complex innovation (May and Finch, 2009). The theory comprises four constructs: coherence (also called 'sense-making'); cognitive participation (the extent of participants' understanding and engagement in the innovation); collective action (the actual work done by participants to make it possible for the innovation to happen); and reflexive monitoring (the formal and informal evaluation of the benefits and costs of the innovation). These constructs are embedded in dynamic relationships with each other and within the wider context of the intervention, such as the organisational context, structures, social norms, group processes, and conventions (Murray et al., 2010). In the next section, these wider contexts are described in more detail.

Coherence implies that the various professionals and other persons in the care for a group of patients have to make sense of the proposed intervention. Coherence means that all participants need to understand how the new way of working differs from the old one. Also, all participants (nurses, family, persons working in different parts of the organisation) need to make sense of and support the collective aim of the intervention, but they should also understand what this new way of working means for them individually. And finally, there is a process of internalisation of the new practice: each individual will need to develop personal values related to the new practice. As for cognitive participation, this is the work that participants do to build and sustain a community of practice around a new technology. In order to initiate the process and to get participants involved, there is work that needs to be done. Key figures need to be engaged, and participants need to be kept interested in the long run to fit the new technology into the routines of working together. Collective action is the actual operational work with the new technology. It comprises interactional workability between people working together. Also, people need to rely on other employees. It means that responsibilities are shared or shift between professionals. Sufficient managerial support is also very important (Nieboer et al., 2014), as well as technical support, such as training and a good help desk (May et al., 2015). Finally, sufficient evaluation (reflexive monitoring) is important and often forgotten in order to successfully maintain or perhaps adapt to the new way of working.

NPT is illustrated by the practice example of 'living circles', a sensor technology that can be applied in nursing homes. For persons suffering from dementia, sensors are installed on doors to permit or inhibit access to other places or environments outside their own ward. Together, both family members and nurses need to understand and embrace the idea of more freedom for their residents/family member (coherence). As for cognitive participation, for example, nurses no longer have 24/7 physical control over their patients but need to rely on their smartphone alerts and notifications to monitor the location of the residents. The nurses will also have to depend on colleagues in other wards as well as other employees, not all of whom are necessarily nurses themselves. Also, when working with 'living circles', nurses will need to promptly follow up on alarms they receive on their smart device, generated by residents who are in the wrong place. They need to act in a flexible manner. In the case of living circles, nurses, residents, other employees, family, the helpdesk, and many others need to act together to recognise situations that need follow-up (collective action).

In Chapter 9, a study on the implementation of Paro, the seal robot in a nursing home, is described. Several aspects of NPT can be recognised in this study.

Comprehensive theories on the adoption of technology in healthcare

After addressing the individual behavioural aspects of technology adoption and the organisational dynamics represented by the different stakeholders, I will position these models within a bigger picture.

One of the earliest descriptions of the uptake of innovations is Rogers' classical work, first published in 1962, describing the diffusion of innovations within communities as a natural, non-stimulated process that happens by itself (Rogers, 2003). In this theory, the successful uptake of an innovation within a community is a process that is communicated among the participants in a social system during a certain period of time. Rogers described four important elements that influence the wider uptake of an innovation. That is the innovation itself, the communication channels, the time, and the social system in which it is introduced.

In his work (Rogers, 2003, p. 279 onwards), Rogers defined four categories of 'adopters'. Together they follow a bell-shaped curve in time. The innovators, who initiate the new idea, are persons who dare to take risks and form only a small part of the population. The group that follows are called early adopters, characterised as having leadership qualities and are more integrated in the local system compared to the innovators. The early majority are their followers, adopting the innovation before the average member of the social system. The late majority are more critical people, who, together with the early majority, make up about two thirds of the population. The laggards are the traditional persons and are the last ones to adopt the innovation. Both Damschroder (Damschroder et al., 2009) and colleagues' work and Greenhalgh et al.'s (Greenhalgh and Abimbola, 2019; Greenhalgh et al., 2017) framework are based upon this model. Greenhalgh explained it as thus: the difference between diffusion and implementation is that diffusion is 'letting it happen', whereas implementation is 'making it happen' (Greenhalgh et al., 2004).

The Consolidated Framework of Implementation Research (CFIR) by Damschroder et al. (Damschroder et al., 2009) is an overarching framework that comprises five domains and 39 determinants that together explain organisational and external factors that influence implementation in practice. It has been successfully used in the implementation research (Keith et al., 2017). These five domains include the following. First, the characteristics of the intervention or innovation itself, with, among others, costs, ease of adaptability, the perceived advantages by stakeholders, and the complexity of the innovation, such as a new technology (CFIR, 2020). Second, the outer setting, comprising factors such as incentives, policy, peer pressure, and patient needs. Third, the inner setting, such as the climate or culture of an organisation and the implementation climate, with the learning climate and communication of goals as examples. In this category, elements of NPT can be recognised. Fourthly, the characteristics of individuals, such as the stage of change, self-efficacy, and other personal characteristics. In this category, the theories and models that were described in the second section of this chapter can be recognised. Finally, in the fifth category, the process (of implementation) itself is described, with determinants such as planning, opinion leaders (Rogers' early adopters), and champions (Rogers' innovators).

Currently, the most comprehensive framework is the non-adoption or abandonment of technology by individuals and difficulties achieving Scale-up, Spread, and Sustainability (NASSS) framework, developed by Greenhalgh and colleagues

(Greenhalgh et al., 2017; Greenhalgh and Abimbola, 2019). In this framework, a system of clustered factors is introduced. In the centre of the model, the condition or illness and the technology (e.g. dementia and living circles), which together with the primary users (persons with dementia) or adopter system (professional staff, patients, and informal carers and family) and the care organisation(s), determine the value of the technology that is to be used. In the NASSS framework, the wider system (such as policy, politics, finance, and legal issues) and the time element are also included: the interaction and mutual adaptation among all these domains over time. The advantage of the NASSS framework over the other wider frameworks is comparable to that of the DITUS framework, which explains the dynamics of individual acceptance of technology by older adults. Also, the NASSS framework, compared to other static frameworks, not only frames determinants into categories but also includes the dynamics and influence of time. Moreover, it also explicitly mentions technology itself in the core of the framework.

The relevance of the frameworks and models presented in this section are illustrated, for example, in the challenges encountered in implementing eHealth in the care for Chronic Obstructive Pulmonary Disease (COPD) patients. In a case study in Greece, apart from the challenges related to the adoption by patients and carers (which is similar across countries), also local policy, organisational issues, and financial barriers (in this study related to the current economic crisis in Greece) are mentioned as influential factors for successful implementation. This illustrates that solutions to tackle these challenges may require very different approaches in different contexts (Gaveikaite et al., 2020).

Understanding the differences in stakeholders' perspective: a normative approach

Up until this point, it was established that technology implementation in healthcare is complex and should be understood by both individual behavioural change, which is explained mainly by theories and models from psychology (second section), and dynamic organisational change in working together between stakeholders from the field of sociology (third section), as well as understanding the wider context (fourth section). In summary, the complexity of eHealth implementation in healthcare can be understood to a large extent through the involvement of many different stakeholders (Nilsen et al., 2020). Especially the collaboration between often new and not earlier involved stakeholders offers many challenges and can be seen as the major theme of (un)successful implementation. Therefore, in this last section, a more in-depth reflection of stakeholder collaboration is given, in which a normative approach is used. The goal of applying this approach is to further understand the importance of the (often quite different) perspectives of the various stakeholders responsible for technology implementation within the networks.

The triple I model, coined by Verkerk (2014), has been developed to understand what drives professional practices. The model, first developed for the practice of engineers, was found to be applicable for several practices, including care

as well as user (patient) practices (Verkerk et al., 2017; Holtkamp et al., 2019). The core concepts of the model are as follows: (1) Identity or Intrinsic value, which relates to individual and collective, profession-related values; (2) Interests, related to the professional group, which may involve legislation or professional codes; and (3) Ideals of practices, which are bound in time (in healthcare these ideals include 'supporting self-management', 'lean working', 'Planetree principles' [Gearon, 2002] etc.). The intrinsic value of the patient (user) practice is, for example, to have optimal health and fewer symptoms resulting from the disease. The main interest of a patient might be, for example, to be able to get back to work or to be able to support his/her family financially. The ideal is to regain autonomy and be able to self-manage one's life and condition. The values for an involved nurse might relate to human dignity. A nurse's interest is to work following legislation principles and the professional code; ideals that are currently important within the practice of nursing support self-management and improve the quality of the life of patients. The values of a medical specialist might include having high competence in treating illness, while the professional interest could, for example, involve following the professional code of conduct or financial reimbursement. The ideals of a medical specialist might have to do with better patient outcomes. The values of the provider of the eHealth platform could revolve around delivering the best product on the market, and their interest could lie in a good business case and financial security, while their ideal could be the further development of the application and the use of validated artificial intelligence algorithms in the application.

These are just a few of the possible triple I's of involved stakeholders, directly working with the platform. Apart from these, there are parties involved at some distance, such as policymakers and insurance companies, who also influence the process of implementation. Identity (intrinsic values), interests, and ideals often differ, are often implicit, and need to be explicated and aligned for successful collaboration.

Discussion

The complexity of the use of technology in healthcare can be studied at several levels. At the individual level, in which behavioural change models and theories dominate, most of these theories are static in nature, whereas, especially in older adults, the use of technology needs a dynamical approach, taking into account interrelated factors and disruptions that occur over time and change acceptance and use. The system-level approach, especially at the level of healthcare organisations, takes into account relationships between professionals within the organisation. Each group of stakeholders within these organisations can be studied in itself. As was shown, apart from the individual and organisational levels, there is a wider level with many boundary factors not directly influenced by individual stakeholders themselves, which also influences the actual use of digital technology. In Figure 2.4, these levels are visualised.

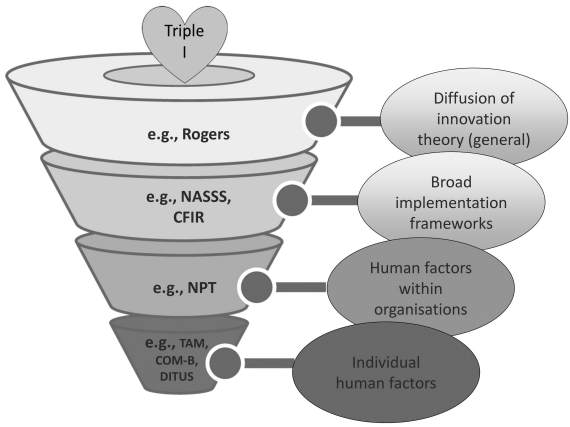

Figure 2.4 A summary of the frameworks, theories, and models attempting to explain technology implementation in care.

Digital agency, the ability to control and adapt to a digital world, is a key prerequisite of the digital society. The models and theories presented here are able to display a better awareness of what influences the digital agency of older persons and healthcare professionals. One aspect of digital agency is related to the direct ability to use technology. The TAM and its successors show that this means that the technology should be easy to use (Venkatesh et al., 2003, 2012). As shown, digitalisation in care contexts implies not only the digital agency of carers but also the digital agency of patients. Therefore, in the context of this book, written especially to address the care for older persons, the ability of older persons to use technology is crucial. As shown, with older persons it is important to take into account the many life events, including declining health, that influence their capability to use technology over time. This is explained in detail in the DITUS model (Peek et al., 2019). It implies that recurrent re-evaluation of the capability of older persons to use the intended healthcare technologies is needed. Apart from capability, motivation to use technology also influences the actual use, both in care professionals and in older persons (Michie et al., 2011a). The actual use of and getting used to technology in healthcare, which has increased as a result of the lockdown during the COVID-19 pandemic, in turn, enhances the capability to use technology. In other words, specific triggers, such as the pandemic, may accelerate this aspect of digital agency (Fogg, 2009).

But digital agency is far more than the ability and motivation to use technology. Adapting to the digital world also affects the way care professionals and patients work together. It implies that their roles and responsibilities change and shift and that they are dependent on many others in order to take or receive care. The NPT sheds light on these necessary changes within care organisations. Not only the actual capability, but, more importantly, a collective value proposition

and profound consciousness of care process changes are required. This, and the collective action that follows, is the basis of digital transformation (May et al., 2001, 2007).

In the actual digital world, in care situations, apart from the individual and organisational levels, there is a wider level which shows that many other factors favourably but also unfavourably influence the actual scaling of technology. Models and frameworks such as CFIR (Damschroder and Lowery, 2013) and NASSS (Greenhalgh and Abimbola, 2019) bring these factors to the fore. Looking more closely at these levels of technology acceptance and use and also taking into account this wider context, the common denominator of implementation of healthcare technology and digital agency is not the technology itself. It heavily depends on the support of other persons and the collaboration between stakeholders. Understanding the differences between stakeholders' practices helps to better capture the implementation challenges of complex technology. In using care technology, all stakeholders need to be included. Moreover, they depend on each other to create a new situation and to change processes and responsibilities. The mutual effort put into the understanding of different perspectives and sharing common values is crucial.

The essence of digital agency can therefore be largely understood by the interdependency of many different stakeholders in complex situations. In NPT, this collaboration is highlighted within care organisations as the work to be done, whereas in triple I, this is further understood from a normative approach, explaining the core of collaboration in professional practices with intrinsic values or identity, interests, and ideals as the core drivers of each practice. Interdisciplinary collaboration, such as in the use of digital technology in healthcare, is defined as the relationships between providers, patients, and their families as well as care professionals in shared decision-making, mutual coordination, and cooperation (Orchard et al., 2012). It is beyond the scope of this chapter to fully describe the characteristics, facilitators, and barriers of successful interdisciplinary cooperation. For example, Morley and Cashell have performed a concise literature overview (Morley and Cashell, 2017). They provide nine definitions of collaboration from literature, in which words such as trust, different backgrounds, diverse mandates, complexity, shared values, understanding, and collective action are included. They and other studies conclude that providing physical and structural opportunities, a psychologically supportive environment, and an appropriate education and training (in knowledge, skills and attitude) all contribute to interdisciplinary cooperation (Rosen et al., 2018; Morley and Cashell, 2017). Training and education should therefore be directed not only towards digital skills and understanding facilitators and barriers of the use of technology by older persons but also towards interdisciplinary collaboration (Bridges et al., 2011).

It can be concluded that theories of technology adoption in the context of care for older persons have developed from what is merely an individual usability approach to a richer understanding of deeper personal motivations and values as well as to a wider awareness of stakeholders and organisations. These theories all

help to cast light on the digital agency of older persons and care workers and challenge us to approach digital transformation in the care for older persons both in a wider context and with a deeper understanding of interdisciplinary collaboration.

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