Digital Transformations in Care for Older People: Critical Perspectives

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Chapter 10

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Introduction

In recent years, eldercare work has been the subject of rapid and forceful technological rationalisation (e.g. Turjamaa et al., 2015; Rantanen et al., 2017; Peña-Casas et al., 2018; Rytkönen, 2018). In Finland and other welfare states, many home eldercare providers have introduced new enterprise resource planning systems, electronic patient recording (EPR) systems, and video-conferencing tools among many other technological innovations to improve their operational efficiency (see also Chapter 8). Simultaneously, a range of technological devices and applications have been introduced to care recipients' homes to support their independent living and lower the need for physical visits. At times, these assistive technologies are also called welfare technologies (e.g. Woll and Bratteteig, 2019). What this digital transformation means in terms of home care workers' agency and ability to perform their professional and digital skills is still a poorly covered area of research, yet new studies surface at an accelerating pace (Brown and Korczynski, 2017; Ertner, 2019; Kamp et al., 2019). A large proportion of these studies deal with devices aiming at improving independent living at home or technology-supported follow-up services for older people discharged from the hospital (Woll and Bratteteig, 2019).

In this chapter, we cast light on home care workers' use of different applications amidst the ongoing digital transformation of elderly care services in Finland (see also Chapter 7). We focus solely on home care workers who encounter a wider variety of digital devices and applications in their daily work than any other professional group in the eldercare sector (Karhinen et al., 2019; Oinas et al., 2021). First, we investigate how the use of different applications in home care work is interrelated and whether this information can be compressed to a few latent dimensions. Second, we analyse the direct and indirect effects of workers' perceived digital skills, interest in technology, and available technology support on the actual use of digital applications at work. To work towards these ends, we analyse the 2019 University of Jyväskylä survey study on eldercare work (N = 6,903), drawn from the members of four majors trade unions in Finland. More precisely, we focus on the sub-sample of home care workers (n = 1,398) that is

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almost entirely made up of women (97%) and public sector employees (90%). Structural equation modelling is used as a statistical analytical technique.

The rest of the chapter is organised along the following lines. We begin by introducing the theoretical underpinnings of the study. Thereafter, we overview studies about the digitalisation of home care work in Finland and elsewhere. The data and applied methods as well as the analytical model of the study are presented before the results. The results of our analyses are organised into two parts. First, we present the measurement model, showing how many latent dimensions of digital application use can be identified from the data. Second, we examine the structural part of the model to find out how technology support is related to the use of different digital applications at work and whether these effects are mediated by home care workers' interest in technology and digital skills. The chapter is concluded with a discussion of the findings and their relevance to the field of study. Some critical remarks on the role of technology support and digital skills in enhancing the use of digital technology in home care work are also presented.

Digital transformation, work tasks, and workers' skills

The ongoing digitalisation of various tasks of human-centred care work calls for learning new skills. Following Autor (2013), skills can be defined as the stock of capabilities that allow employees to perform different tasks. Skills that are required for different tasks can be pictured as a two-dimensional space. One of the axes represents the complexity of skills (simple-complex) and the other the specificity of skills (generic-specific). Learning new skills may require a significant amount of time and effort. Thus, in theory, it is more efficient for different workers to specialise in different tasks and acquire increased competence over time. In practice, home care workers' fully packed shifts and the ideals of comprehensive personalised care leave little to no space for an individual worker to specialise in care technologies and learn new technical skills.

There are various theoretical viewpoints that connect digital transformation with the skills of employees. In general, higher skills allow employees to more easily use and master modern digital technologies, thus enhancing their productivity (Fernández-Macías and Bisello, 2020). One of the most popular theoretical frameworks is the model of skills-biased technical change (SBTC). According to this theory, technological change increases the relative productivity of high-skilled labour and its relative demand. It is expected that digitalisation replaces labour in carrying out routine tasks but complements high-skill labour in performing non-routine and interactive tasks. As routine tasks are concentrated around the middle of the occupation and wage spectrums, the outcome is a relative increase of high-skilled jobs accompanied by a smaller rise of jobs requiring low-rewarded but hard-to-displace skills and a relative decrease of medium-skilled jobs (Goos and Manning, 2007; Green, 2012).

In contrast, the theory of routine-biased technical change (RBTC) argues that technological change is prone to replace labour in routine tasks. Arguably, routine tasks are more common in the middle of the skills continuum, while non-routine tasks are concentrated in both the high- and low-skill jobs. This leads to the polarising effect of contemporary technical change (Goos et al., 2014). However, recent comparative studies have found that job polarisation is not a pervasive phenomenon characterising all European economies in recent decades (Fernández-Macías and Hurley, 2017). Institutional factors and labour market policies, such as deregulation of employment contracts, are associated with a varying level of employment growth in routine and low-skill occupations between different countries (Fernández-Macías and Bisello, 2020).

Based on these theoretical standpoints, different classifications of job tasks have been presented. For example, Goos et al. (2010) classify job tasks to (a) abstract, (b) routine, and (c) service tasks. The last is defined as tasks that involve social interaction with clients and thus corresponds more closely to eldercare work. In this typology, service tasks typically belong to the non-cognitive or low-skilled and non-routine quadrant and therefore would increase in number as a result of digitalisation.

As these theoretical approaches have their origin in economics, they focus on the substitution of human workers by machines. However, this unidirectional viewpoint can be misleading (Fernández-Macías and Bisello, 2020) as it overlooks the role of human agency. This is especially evident with regard to home care work where employees are expected to act individually and make deliberate decisions that serve their clients' varied and often changing care needs.

Combining key elements from previous literature, Fernández-Macías and Bisello (2017, 2020) derive a taxonomy of work tasks by identifying two conceptually different axes: the content of work tasks and the methods and tools used at work. Based on this taxonomy, eldercare work can be characterised in terms of the work content and its relation to technology by physical (e.g. lifting people), intellectual (e.g. recoding patient data, filling reports), and social tasks (e.g. caring for others). The work tasks requiring physical strength have been most significantly reduced by technological change throughout history. With regard to eldercare work, personal lift devices or exoskeletons are one of the more recent developments where physical human labour is substituted or assisted by technology (see e.g. Turja et al., 2019). In the domain of intellectual tasks, computer programs and applications are used to complement or replace human labour in information processing of codified client data (Hämäläinen and Hirvonen, 2020; McLoughlin et al., 2017). However, processing of uncodified information is difficult to automate without fully functional artificial intelligence (AI). The nature of eldercare work and its relation to modern digital technology becomes most evident when analysing the social aspect of care work task dimensions. While social tasks are difficult or even impossible to substitute with technology, a range of digital applications is already applied in eldercare work to complement in-person human interaction (e.g. video- and audio-transmitted care service). Despite often detected negative associations between physical and intellectual tasks, there is a significant association between physical dexterity and technical literacy for some types of jobs, such as health professionals (Bisello et al., 2019). There are some empirical accounts shedding light on care workers' digital skills and technology attitudes in general, yet virtually none focusing on home care workers in particular. A recent study by De Leeuw et al. (2020) focused on information and communication technology (ICT) experiences among a sample of nurses who considered themselves as 'laggards' in digital skills in both their private and work life. Consequently, they experienced a low sense of self-efficacy and self-confidence with ICT. The late adopters often felt that they were not given enough time to learn on-the-job. Insufficient ICT support was felt to be one of the main barriers to using health information technology (HIT) in their work. In addition, De Leeuuw et al. showed that the lack of digital skills and a negative attitude towards ICT often led to the avoidance of HIT use. They also found that the competence of HIT use at work was linked to interest in learning about technology, which in turn was related to the use of digital devices in personal life.

Other studies also point to the fact that a low level of adoption of digital technology in healthcare work is related to the lack of digital training and organisational support, computer anxiety, and self-efficacy (Assis-Hassid et al., 2019; Eley et al., 2008; Gagnon et al., 2012; Strudwick, 2015). Self-efficacy refers to an individual's belief in their ability to perform certain tasks. In organisational research and organisational psychology, support has been found to be an antecedent of self-efficacy. This is because support can have a positive effect on a person's sense of being able to deal with certain problems and tasks on their own, which increases their motivation (see Caesens and Stinglhamber, 2014; Kurtessis et al., 2017; Caesens et al., 2016). Latikka, Turja, and Oksman (2019) found that it was only technology-specific self-efficacy, not self-efficacy in general, that was associated with care workers' willingness to accept care robots. Elsewhere, Turja et al. (2020) also highlighted the role of co-workers whose positive attitude towards robot technology increased other nurses' readiness to use the same technology. All in all, while the above-presented findings concern nurses and care workers in general, we assume that they hold for the specific group of home care workers in the eldercare sector as well. However, Rantanen et al. (2020) found that it was very difficult to change home care workers' attitudes towards robots to more positive even with an extensive project.

Home care in the context of eldercare service provision

In Finland, eldercare services have been undergoing a structural change for a couple of decades. Municipalities are responsible for organising social welfare and healthcare. It was in the 1990s when many municipalities combined *home nursing* and *home help* services into a package of *home care services*, supplemented with other support services such as meal, cleaning, and laundry services (Henriksson and Wrede, 2008; Rytkönen, 2018, p. 45). The 'Act on Supporting the Functional Capacity of the Older Population and on Social and Health Services for Older Persons' (980/2012), enforced in July 2013, can be regarded as one milestone of this long-term structural change (Noro and Alastalo, 2014). It set guidelines for municipalities to make considerable changes in the organisation of care services; municipalities were instructed to organise long-term care for old people in their home or home-like environment. This structural change was fuelled by possible cost-savings achieved from providing home care instead of institutional eldercare, and the idea of home being the best place to age (Ageing in Place policy). Earlier studies had also criticised institutional care for its high cost and for being particularly taxing workplaces for care workers (Noro and Alastalo, 2014).

Consequently, home care became the dominant mode of eldercare provision in Finland. It also became more and more medicalised, meaning an increase in the relative weight of nursing over home help and care tasks in the daily work of home care staff (e.g. Wrede and Henrikson, 2008). In their study on documented electric care plans, Turjamaa et al. (2015) provided concrete support for this: a large majority of planned home care tasks relate to the administration of drugs and other pharmacy services. Assisting with clients' self-care (e.g. eating, intimate hygiene) and in their daily activities was less frequently mentioned in care plans.

This above-described structural shift in the service provision system, in conjunction with an ageing population, has had tangible effects on the amount of work and home care workers' well-being. A recent longitudinal comparative study from the Nordic countries shows that the number of clients per a home worker's shift has increased significantly during all shifts (day, evening, night, weekends) between the years 2005 and 2015 in Finland (Kröger et al., 2018). The same study indicates that the level of trust between home care workers and their superiors declined during the same period. In comparison with the other Nordic countries, sick leave was the most common and the workers were the most critical towards the quality of provided care in Finland (Kröger et al., 2018). According to Vehko et al. (2018), personnel in home care in Finland also experience more stress, stress-related symptoms, and express more turnover intentions than institutional care workers.

Compared to many other countries, the level of trade union organisation among wage and salary earners is still comparatively high in Finland. According to the Ministry of Finance's report, organisation rate was 59.4% at the end of 2017, excluding those members who are not covered in the actual supervision of interest. However, the organisation rate of employees was still higher five years earlier (64.5%), which indicates new employees' lower interest in unions (Ahtiainen, 2019). Professional associations and trade unions in the social welfare and healthcare sector report considerably higher figures, even up to 90% (Suomen Lähihoitajat ry; Tehy). Compared to other Nordic countries, Finnish eldercare workers are typically more educated and are more often employed in a full-time position (Kröger et al., 2018).

One third of all employees in the eldercare sector are home care workers, almost all female, and a vast majority of them are public sector workers employed by municipalities (Kehusmaa, 2018). A range of professional titles is applied to home care work. The majority of employees have a secondary-level education (home-helpers, practical nurses) and some lower-tertiary education (registered nurses). Home care work is often organised in teams, although home visits are typically performed by individual home care workers (Suominen and Henriksson, 2008). The team may serve as a source of professional and technology support, but colleagues are immediately available in person if/when problems at work occur.

Digitalisation of home care work

On the one hand, new digital technology and applications are seen as a vehicle to, improve the efficiency of home care work (e.g. Brown and Korczynski, 2010; Hayes and Moore, 2017), and on the other hand, they are also seen to support independent living at home (e.g. Genet et al., 2012). Compared to the other sectors of service work, in home care work, digitalisation is a rather new phenomenon that concerns mainly the organisation of working time and tasks (see also Chapter 6). To date, the very essence of care work has escaped the pervasive transformative effects of digitalisation (Peña-Casas, Ghailani and Coster, 2018). To our best knowledge, no systematic analysis has been carried out on the current technological landscape of home care work and the factors predicting and facilitating the use of new digital applications in home care for older people.

The Finnish Institute for Health and Welfare (THL) provides statistical information about the digitalisation of health and welfare work on a general level. According to Hammar et al. (2018), the technical solutions supporting the independent living of elderly people increased both in home care and in 24/7 care facilities between 2015 and 2018. During the same period, the use of remote and virtual care solutions also became more common in care work. In eldercare, two thirds of public sector and one third of private sector actors reported doing at least 80% of documentation work on electronic client record systems (Kuusisto-Niemi et al., 2018). Some studies reporting the level of home care workers' skills and their attitudes towards new digital technology and applications also exist. According to Rantanen et al. (2017), home care workers are confident about their ability to learn the use of new technologies, such as robots. In contrast, they think that their colleagues have a more negative attitude towards technology (Rantanen et al., 2017). The reports of major trade unions also show that, in general, home care workers have a positive view of new technology. For example, home care workers see great potential in enterprise resource planning systems, although the systems do not currently perform as expected (SuPer).

Data and methods

To answer our research questions, we analysed a large survey of data set using Structural Equation Models (SEM). After presenting the data, methods, and the empirical model, we move to the results section, which first reports the findings about the use of various digital applications in home care work and then identifies the associations between key predictors and application use.

Data

Our analysis is based on the 2019 University of Jyväskylä survey on eldercare work, which is a new survey on the working conditions and digitalisation of eldercare work collected by the Centre of Excellence in Research on Ageing and Care (www.jyu.fi/agecare) at the University of Jyväskylä. The aim of the survey was to collect information on the working conditions and use of technology among eldercare workers in Finland.

The survey data (n = 6,903) was collected from members of four trade unions (SuPer, Tehy, JHL, and Talentia) in April 2019. The target group was workers engaged in daily care work and nursing and other employees who participate in producing, developing, or managing services for older people. The number of individuals in the target group varies in each trade union.[1] Therefore, the sampling was implemented differently for each trade union. The sample sizes for the survey were large in order to obtain the maximum number of responses from different trade unions and professionals in different vocations. Furthermore, our aim was to recruit a sufficient number of panel respondents for follow-up surveys. There is some over-coverage in the samples, which means the survey was sent to persons in trade union registers who did not belong to the target group. This lowered the response rate. Of the 6,903 responses to the survey, those who were outside the target group or refused to answer for other reasons (528) were omitted, resulting in the final sample size of 6,375 responses. Of these, 5,291 filled in at least 80% of the questionnaire.

The data was collected with an online survey using the 1ka (https://www.1ka.si/d/en) application. The survey was administered in Finnish and Swedish. The trade unions provided comprehensive feedback and development suggestions for formulating the questionnaire. The online version of the survey was drafted during February–March 2019. The online questionnaire was tested with a small test respondent group (N = 14) in March 2019. The final questionnaire contained 62 questions and 12 pages. Answering the survey took approximately 20 minutes. Invitations to respond to the survey were sent by the trade unions to the members selected in the samples on 3 April 2019, and the responses were requested to be submitted by 18 April. A reminder message was sent on 15 April, and the survey was closed on 21 April. We restrict our analysis to the sub-sample of home care workers (n = 1,398), which is almost entirely made up of women (97%) and public sector employees (90%).

Methods

We employed Structural Equation Models (SEM) to estimate the direct and indirect effects of available technology support, digital skills, and interest in technology on the actual use of various digital applications at work. First, we propose a measurement model for digital application use. In the next phase, we test our hypothetical model which describes relationships between technology support, technology interests, digital skills, and use of digital applications. In modelling, we focus on structure testing and indirect effect analysis. In all statistical analyses, we used the Mplus program.

For estimation, we used the WLSMV estimator (weighted least squares means and variance adjusted) as all indicator variables of application use are based on a dichotomous scale (yes/no). In measurement and structural models, we used standardised coefficients which provide a uniform scale for effects and are thus suitable for our analytical purposes. With the WSMLV estimator, the direct effect of endogenous variables can be interpreted as a normal regression coefficient (standardised in our case). The WLSMV estimator tries to estimate continuous latent properties behind the binary variables. This applies to all variables except exogenous variables (technology support in this study) (for further reading, see Muthén and Muthén 2017; Hoyle, 2015).

Empirical model

First, we investigate how the use of different applications in home care work is interrelated and whether we can compress the information to a few latent (not directly observable) dimensions. In the next phase, we investigate the relationships between organisational technology support, technology interest, and digital skills, as well as their connections to the use of diverse types of applications.

Based on preliminary exploratory modelling and expert consultation, we grouped applications into four categories: (a) communication via social media; (b) communication via official routes; (c) patient and personal information systems use; and (d) time and ERP (enterprise resource planning) systems use. The first group contains informal use of social media platforms and instant messaging applications (e.g. WhatsApp) for the completion of work tasks. The second group focuses on the systems and applications which are part of the organisation's formal technological infrastructure and facilitate professional communication (email, remote connections applications, and electronic workspaces). The third group involves systems and applications relating to the management of patient data or the identification of employees (electronic ID cards and patient ID/well-being monitoring systems). The fourth group of applications facilitates the management of human resources (time management and ERP systems).

Figure 10.1 depicts the hypothesised structural relations between technology support, interest in technology, digital skills, and use of different applications. We assume that digital skills and interest in technology directly predict application usage, while technology support is only indirectly related to usage through skills and interest. This assumption is based on the premise that organisational technology support influences the actions of individual employees through a person's subjective attributes, such as skills or interests.

Based on the earlier cited studies about the link between self-efficacy and support, we assume that support is an antecedent of interest (through the motivating mechanism of support). Furthermore, we assume a largely self-explanatory

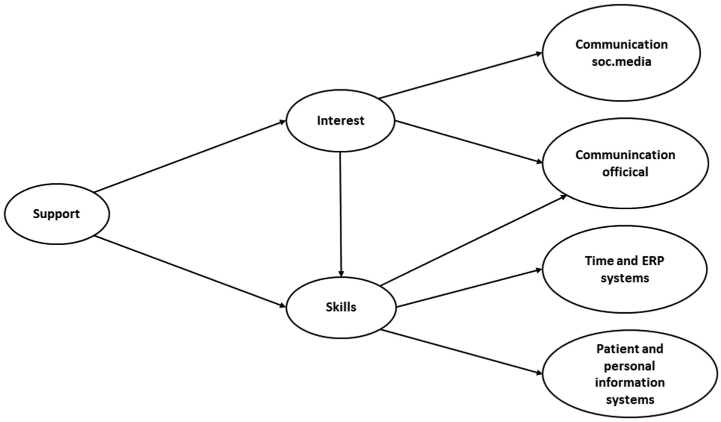

Figure 10.1 Hypothesised relations between main independent and dependent constructs.

link between support and skills; the support of technology use at work can only increase skills. We also test the hypothesis that interest in technology is related to digital skills. People interested in technology are typically more familiar with technology and possess skills to use it better (see Cai et al., 2018).

Our hypotheses about the connections of skills and interest with the uses of various application groups are premised on the differences in the voluntariness of their use and the required level of digital skills. Due to the lack of previous research, the assumed hypotheses were defined with the help of an expert panel, including a former nurse, an eldercare worker, and researchers specialised in work and care studies. Firstly, we assume that skills predict communication through official routes, the use of patient and personal information systems, and the use of time and ERP systems, as the use of all these applications require specific skills. When it comes to informal communication through social media, we do not expect skills to have a clear influence. Secondly, we expect an interest in technology to predict the use of both informal and official communication channels. The use of these applications in home care work holds more freedom in terms of use or is voluntary (social media). By contrast, the use of patient and personal information systems as well as time and ERP systems are a mandatory part of home care work. Therefore, it is unlikely that personal interest in technology would predict their usage.

Results

We begin our analysis by examining how many dimensions of digital application use at work can be identified based on the survey data. According to our hypothesis, application use can be measured with four latent factors: (a) communication via social media; (b) communication via official routes; (c) patient and personal information systems; and (d) time and ERP systems. As in practice there are interconnections between these latent factors, we allow them to correlate with each other (e.g. interconnections between systems and shared device platforms). The descriptive statistics of indictor and explanatory variables are presented in Tables 10.1 and 10.2, respectively .

Table 10.1 Descriptive statistics of measures of application use at work

Do you use the following digital applications or tools in your work?	*Mean[1]*	*Variance*	*Scale*	*N[2]*
Patient and personal information systems				
Customer performance and well-being assessment systems (RAI)	0.71	0.208	0 / 1	1,349
Electronic identification or certificate cards	0.55	0.248	0 / 1	1,349
Patient and customer information systems (Effica, Pegasos)	0.94	0.058	0 / 1	1,349
Time and ERP systems				
ERP systems (Hilkka, E-hoiva, Fastroy)	0.50	0.250	0 / 1	1,349
Working time systems (Titania)	0.36	0.231	0 / 1	1,349
Communication official				
Electronic workspaces and platforms (Intranet, Office365)	0.39	0.238	0 / 1	1,349
Remote connections (Skype etc.)	0.25	0.188	0 / 1	1,349
Email	0.94	0.053	0 / 1	1,349
Communication social media				
Instant messaging (WhatsApp etc.)	0.24	0.182	0 / 1	1,349
Social media	0.03	0.032	0 / 1	1,349

1. With dichotomous variables, mean gives a proportion how much have been answered as one. Proportion of zero answers can be calculated from equation 1-p.
2. Maximum (*N*) in data = 1,398. Missing values 3.5% in each variable.

Table 10.2 Descriptive statistics of measures of technology support, interest in technology, and digital skills

Explanatory variables	*Mean[1]*	*Variance*	*Scale*	*N[2]*
Do you receive support in the use of information technology, information systems, devices, or applications related to your work?	0.515	0.250	0 = not enough/1 = enough	1,312
How interested are you in technology and its development?	0.21	0.165	0 = not or somewhat interested/1 = very interested	1,307
Which description of these do you think best describes you and your digital skills in your work?	0.78	0.173	0 = poor/1 = moderate or good	1,336

1. With dichotomous variables, mean gives a proportion how much have been answered as one. Proportion of zero answers can be calculated from equation 1-p.
2. Maximum (*N*) in data = 1,398. Missing values 4.4–6.5% in variables.

Our proposed model of four latent constructs shows acceptable fit to the data. Both communalities and factor loadings are adequate. In Figure 10.2, we present the four dimensions identified based on data. Social media communication factors described use of various social media applications, which are largely used in informal communication among employees. Official communication factors, in turn, included three types of applications. These applications are intended for more formal communication purposes than social media platforms. The time and ERP systems factor refers to applications and wider technological systems which are used for human recourse planning and monitoring work. The patient and personal information systems factor concerns information handling processes related to employees or customers and related applications.

We found clear positive associations between these four latent dimensions, as shown in Figure 10.2. The official communication factor correlates with all other factors. In case of patient and personal information systems and time and ERP systems, this can be because the use of these systems requires, for example, an organisation's email addresses. The correlation between official and social media communication factors can be explained by the fact that home care workers use, for example, instant messaging applications as complementary to official means of communication. The patient and personal information systems and the time and ERP systems dimensions also correlate. Behind this is probably the fact that different work tasks may require the use of several applications simultaneously.

Next, we tested our hypothetical model (Figure 10.1) to predict and explain latent factors of application use with digital skills, interest in technology, and organisational technology support. The hypothetical model gains support from data.[2] Adding covariates did not change factor loadings essentially compared to measurement model. The results of this analysis are presented in Figure 10.3. The

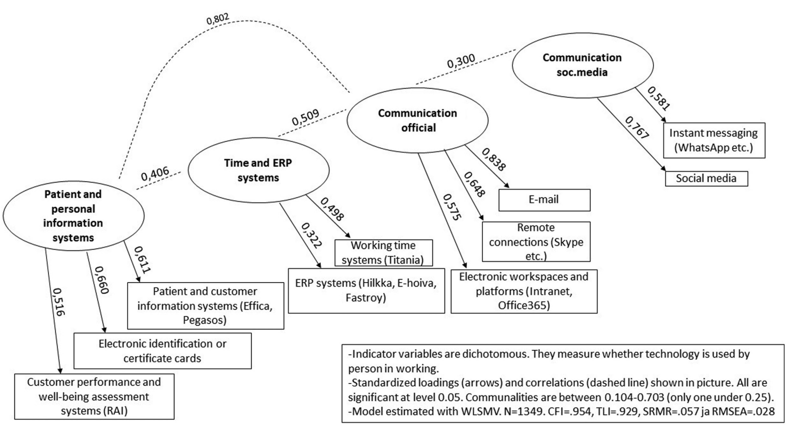

Figure 10.2 Measurement model with four latent constructs of use of digital applications at work.

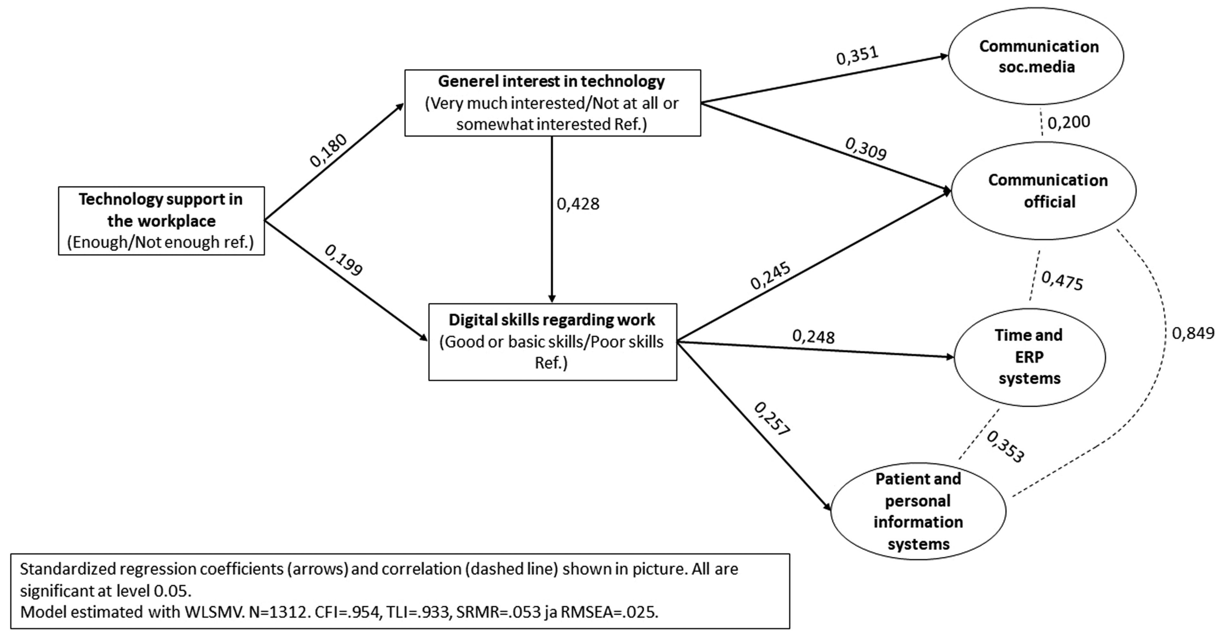

Figure 10.3 Results from a structural model predicting the relationships between technology support, interest in technology, digital skills, and application use at work.

direct effect of technology support, interest in technology, and digital skills can be interpreted in the same way as dummy variables in standard linear regression. Likewise, indirect effects are interpreted as usually.

We also estimated an additional model with direct effects of organisational technology support on the four latent factors of application use and allowed digital skills to influence the use of social media in communication. However, this model did not fit the data better than the original one and all estimated new connections were non-significant.

The association of digital skills and interest in technology with application use is twofold. Interest in technology is strongly related to communication applications (both official and social media), while digital skills are related to all other applications except for social media. This result is in line with the assumption that there is more room for personal decision-making with regard to communication applications as compared to more official application channels. Official communication is the only factor which is predicted by both digital skills and interest in technology. It is characteristic of official communication applications that they are at least partially mandatory at work, and their use requires some training and skills. Furthermore, we found an association between interest in technology and digital skills, as expected. Interest in technology has a positive relationship with digital skills; the more interested the people are in technology, the better the digital skills they have.

Lastly, we examined the indirect effects of technology support and technology interest on application use in order to gain a more detailed view of estimated relations. The path-specific indirect effects are presented in Table 10.3.

Two kinds of indirect effects were estimated in the model. The first group of effects models how technology support is indirectly related to application use. The second group of indirect effects models how technology interest predicts the use of applications via digital skills. As for technology support, there are three possible

Table 10.3 Indirect effects of technology support (TS) and technology interest (TI)

Path-specific indirect effects	*Coefficient*	*P-value*
TS to communication social media (via technology interest)	0,.063	0.001
TS to communication official (via technology interest)	0.056	0.002
TS to communication official (via skills)	0.049	0.007
TS to communication official (via technology interest – skills)	0.019	0.005
TS to time and ERP systems (via skills)	0.049	0.012
TS to time and ERP systems (via technology interest – skills)	0.019	0.019
TS to patient and personal information systems (via skills)	0.051	0.001
TS to patient and personal information systems (via technology interest – skills)	0.020	0.002
TI to communication official (via skills)	0.105	0.001
TI to time and ERP systems (via skills)	0.106	0.006
TI to patient and personal information systems (via skills)	0.110	0.000
TS to skills via technology interest	0.077	0000

Table 10.4 Total indirect effects of technology support on dimensions of application use

	Coefficient	*P-value*
Communication social media	0.063	0.001
Communication official	0.123	0.000
Time and ERP systems	0.068	0.007
Patient and personal information systems	0.071	0.000

paths. Technology support can affect application use either via digital skills or interest in technology or simultaneously via both. There is also an indirect path from technology support to digital skills via interest in technology. All estimated direct relations and indirect paths were statistically significant, although the latter were rather small. Nevertheless, these indirect effects provide an opportunity to study the role of technology support in application use in a more detailed manner.

As technology support only indirectly affects application use, total indirect effects (i.e. the sum of indirect effects) provide an estimate of the role of the aid for different latent dimensions of application use. These are presented in Table 10.4. Expectedly, total indirect effects are statistically significant. Thus, personal interest in technology and digital skills are important predictors of application use at work, and organisational technology support affects application use via these two factors.

Discussion

In this chapter, we explored the role of interest in technology, digital skills, and organisational technology support on using digital applications at work among home care workers in Finland. Our first aim was to investigate the use of different applications and their relationships. Second, we explored the direct and indirect effects of perceived digital skills, interest in technology, and available technology support on the actual use of digital applications at work.

Regarding the first objective, we found that official communication tools such as email and programmes such as patient and personal information systems were widely in use among home care workers. In contrast, for example, social media platforms, instant messengers, and video-conferencing tools were notably less common. Furthermore, we found that the use of various applications can be compressed into four latent dimensions which indicate (a) communication via social media; (b) communication via official routes; (c) patient and personal information systems; and (d) time and ERP systems.

As to the second research question, our results showed that organisational technology support does not have a direct connection to the use of digital applications. However, technology support did have an indirect effect on application use via digital skills and interest in technology, which in turn were differently associated with different latent dimensions of application use. Digital skills predicted the use of patient and personal information systems, time and ERP systems, and official communication routes. Using these applications in an organisational environment (e.g. electronic workspaces and platforms in official communication) requires some skills. By contrast, the use of social media was not related to digital skills, possibly because of its easy-to-use nature. Interest in technology, in turn, predicted the use of both official and social media communication applications. These findings are in line with the observations of De Leeuw and colleagues (2020) and their small-scale study. Notably, that organisational technology support is an important determinant of the actual use of technology in care work. Similarly, their finding that a lack of digital skills and a negative attitude towards ICT may lead to the avoidance of using ICT is supported by our findings. Similarly, according to a recent quasi-experimental study (Rantanen et al., 2020), home care workers' attitudes towards care robots became slightly more positive after participating in a project focusing on care robots (see also Chapter 9). Our results show further insight into the mechanisms by which these factors operate, that is, how technology support works by enhancing digital skills, but also by increasing interest in technology, which in turn promotes the use of various other technologies.

All things considered, eldercare work offers a particular case to the study and understanding of the relationship between technological development and the creative destruction of jobs. On the one hand, technological advancement may alter the nature of care work by decreasing physical strain in certain activities such as lifting and moving people. This should lead to a lower level of physical strain in these occupations. However, the largest part of care work concerns caring and interacting with other people, which can only be assisted by technologies and applications that are not able to replace human-specific work tasks. This, in turn, may increase the already high level of mental strain of eldercare workers as they struggle to cope with newly introduced digital technologies (see also Chapters 6 and 7). In addition, care work also includes various reporting tasks, which are heavily influenced by technological development via the introduction of new applications to the work. This development has potential to further increase care workers' mental strain. These negative results of digitalisation of care work may be especially acute for older care workers, who face the change in the requirements of the work tasks more directly.

Nevertheless, there is also true potential in new digital technology to improve the working conditions of eldercare workers in the long run. Whether this potential is successfully released or not is largely contingent on the way these new digital technologies and applications are introduced and how well they fit the current work tasks. For example, the management and organisation of work play a crucial role in this digital transformation at the workplace level. Similarly, the ethical questions related to the processing of patients' health data and the questions related to information security may worry care workers and hinder their willingness to use any new digital applications the employer has decided to introduce. The results of this study and above reflections can be taken into account at the organisational level when planning the deployment of digital applications in home care work. For example, by strengthening digital skills alone, the use of only certain applications can be promoted. On the other hand, if improving communication is the only goal in the organisation, strengthening interest and combining the use of social media in the operating culture is a good strategy if the digital skills of the employees are already at an adequate level.

As already mentioned, the model presented in this study is preliminary and further development and testing are needed in the future. With regard to the model, at least three lines of development for further research can be raised. The first relates to the target group of the study. The model has been studied in the field of home care. In the future, the applicability of this model in other contexts, such as in service housing or institutional care, should be studied. The second line has to do with the structure of the model. The model proposed is but one of many possible models. Adding new predictors to the model or estimating alternative relationships would allow it to be further developed. The third line of development concerns the additional testing of the model. For example, more detailed testing of various effects and relationships would be desirable. For example, we did not test the differences between coefficients. We believe that following these three guidelines will lead to a better and more comprehensive picture of the use of digital applications in the context of social welfare and healthcare services for older people in the future.

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Notes

1 For SuPer, the survey was sent using random sampling to every other member of the target group of 38,000. The final sample size was 18,106 respondents with valid email addresses. For Tehy, sampling consisted of two different samples: (1) those among the target group of the survey based on employer information (responses 1,760, sample 7,859) and (2) random sampling by including every third member in the member register (responses 666, sample 9,600). The sample size was ultimately 17,459. For JHL, the survey was sent to every other member of the target group of 11,000. The final sample size was 4,768 respondents with valid email addresses. For Talentia, the members in the potential target group were defined using their titles and education level (8,390), all of which were sent the survey. Due to missing or an inactive email addresses, the final sample size was 7,521 respondents.

2 Fit indices are good, which means that our hypothesised model fits the data well.

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