How can online communication enhance older adults' social connectivity?

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Chapter 4.

What causes change: Adoption mechanisms shaping the effect of online communication on older laggards’ social connectivity

By: Eveline Hage, Marjolein A.G. van Offenbeek, and Albert Boonstra

Abstract

This study explores what causes change in older laggards’ social connectivity during online communication tool adoption. With this study, we aim to critically assess the common assumption that online communication is beneficial for older adults’ social connectivity. A review of this literature yields inconsistent findings. In addition, previous studies have shown that online communication tool adoption is challenging for a substantial group of older adults, i.e., the older laggards. A detailed review of these studies provides an extensive list of factors that influence older adults’ adoption. By themselves, these adoption factors do not explain how online communication tool adoption may change older laggards’ social connectivity. However, studying older laggards’ adoption as a process, rather than a decision or intent, does. Therefore, this study proposes an alternative process perspective on older laggards’ online communication tool adoption that can better explain subsequent changes in social connectivity. Through an interpretive multiple case study of ten older laggards who adopted online communication tools over a 22-month period, we identified three mechanisms that underlie their adoption process: knowledge development, value alignment, and emotional coping. Drawing on the social actor theory, we explore how these adoption mechanisms jointly shape the effect of online communication on older laggards’ social connectivity through five themes. This study contributes by: 1) enriching the older adult adoption literature by studying adoption as a process; 2) empirically validating the interplay between adoption mechanisms; and 3) exploring the adoption
process among a highly relevant, yet understudied, research population, i.e., older laggards.

4.1. Introduction

Inspired by its increasing popularity, researchers and policy makers have argued that online communication may have the potential of enhancing the social connectivity of a growing older population (Ambient Assisted Living Joint Program, 2012; Cody et al., 1999; Dillon, 2003; Erickson, 2011; Opalinski, 2001; Saunders, 2004; Sokoler & Svensson, 2007; Tsai & Chang, 2009; Waycott et al., 2013; White et al., 1999; White et al., 2002).

However, such expectations seem to be based on tenuous suppositions. The confusion relates to the common assumption that older adults’ social connectivity can benefit from online communication. In fact, the literature is deeply divided on the effect of online communication on older adults’ social connectivity (Dickinson & Gregor, 2006; Hage, Van Offenbeek, Boonstra, & Wortmann, Chapter 5 this thesis; Nef et al., 2013; Sum et al., 2008; Wagner et al., 2010a).

On one hand, scholars found that online communication and computer use increases older adults’ social connectivity (see table 4.1 for relevant references). Online communication was also found to reduce loneliness. For example, Shapira et al. (2007) and White et al. (2002) conducted controlled trials whereby the intervention group received computer training and technological support after a training period. Both studies found that loneliness within the intervention group reduced more compared with the control group.

However, in other studies, no effect of computer use and training on loneliness could be reported. For example, Woodward et al. (2011) conducted a controlled trial in which they explicitly controlled for the effect of computer training as opposed to use, and found no significant effect of computer use on loneliness. In line with Woodward et al., Xie (2007; 2008b) reported that computer training, rather than online interactions, increases social connectivity offline among course participants. Even negative effects of online communication have been reported. Hage et al. (Chapter 5 this the-
sis) collected panel data and found that email and Facebook use had a negative effect on the social connectivity of those users who had been less connected at the first measurement point.

**Table 4.1. Summary of the literature on the effect of online communication on social connectivity**

<table>
<thead>
<tr>
<th>Social connectivity variable</th>
<th>Effect online communication (+/0/-)</th>
</tr>
</thead>
<tbody>
<tr>
<td>social empowerment</td>
<td>+ McMellon &amp; Schiffman, 2002</td>
</tr>
<tr>
<td>social connectivity</td>
<td>+ Cody et al., 1999</td>
</tr>
<tr>
<td>social capital</td>
<td>+ Erickson, 2011; Karahasanović et al., 2009</td>
</tr>
<tr>
<td>social support</td>
<td>+ Cody et al., 1999; Nahm &amp; Resnick, 2001; Ninrod, 2010; Opalinski, 2001; Wright, 2000</td>
</tr>
<tr>
<td>online and offline inclusion</td>
<td>+ Sayago &amp; Blat, 2010; Sayago et al., 2011</td>
</tr>
<tr>
<td>offline interaction</td>
<td>+ Xie, 2007</td>
</tr>
<tr>
<td>Loneliness</td>
<td>0 Chen &amp; Persson, 2002; Dickinson &amp; Gregor, 2006; Fokkema &amp; Knipscheer, 2007; Slegers, Boxtel, &amp; Jolles, 2008; Woodward et al., 2011</td>
</tr>
<tr>
<td></td>
<td>- Blažun, Saranto, &amp; Rissanen, 2012; Choi, Kong, &amp; Jung, 2012; Shapira et al., 2007; White et al., 2002</td>
</tr>
</tbody>
</table>

Scholars have argued that the type of online communication (Hage et al., Chapter 5 this thesis; Karimi & Neustaedter, 2011; Pfeil et al., 2009; Sum et al., 2008), type of social connectivity (Hage et al., Chapter 5 this thesis; Sum et al., 2008), and heterogeneity among users (Brandtzæg, 2012; Hage et al., Chapter 5 this thesis; Paul & Stegbauer, 2005; Vuori & Holmlund-Rytkönen, 2005) may account for some of the contradicting research findings. Based on these suggestions, we propose that a holistic analysis of the adoption process in which the adoption factors brought forward in the literature manifest themselves, may help to better understand the variations in the social connectivity outcome of online communication.

The adoption process of older adults is of particular interest as it has been reported repeatedly that age has a negative effect on the adoption of new Information and Communication Technologies (ICT), including online communication tools (Haight et
al., 2014; Johnson, 2012; Karahasanović et al., 2009; Smith, 2014; Zickuhr & Madden, 2012). This implies that a relatively large share of the older population consists of laggards (Rogers, 2003), and it seems unlikely that this pattern will change in the foreseeable future (Wandke et al., 2012; Charness & Boot, 2009; Hanson, 2009). The factors that influence older laggards’ adoption decisions and behavioral intent have been well studied (e.g., Braun, 2013; Chung et al., 2010; Maier et al., 2011; McCloskey, 2006; Morris, Venkatesh, & Ackerman, 2005; Pan & Jordan-Marsh, 2010). However, less is known about the way older laggards’ adoption process evolves and how the nature of this process influences changes in social connectivity. Thus, how changes in older laggards’ social connectivity result from online communication tool adoption remains unclear.

To reduce confusion and add to our understanding of what causes change, we ask how the adoption of online communication tools changes the social connectivity felt by older laggards. Online communication relates to interactive, synchronic, or asynchronic communication between individuals mediated through Internet-based platforms or tools, for example, via email and social networking sites such as Facebook. A combination of insights derived from the older adult adoption factors literature and literature that views ICT adoption as situated change informed our analysis of an interpretive multiple case study. During this multi-case study, we followed older laggards who adopted online communication tools over a period of 22 months. We find that three adoption mechanisms underlie the adoption process: knowledge development, value alignment, and emotional coping, and explore how these adoption mechanisms jointly shape the effect of online communication on older laggards’ social connectivity.

The longitudinal, interpretive exploration of adoption mechanisms and their interplay complement the current older adults’ adoption factors literature. In particular, viewing older laggards’ adoption as a situated change process allows looking beyond the adoption decision or behavioral intent (e.g., Braun, 2013; Chung et al., 2010; Maier et al., 2011; McCloskey, 2006; Morris et al., 2005; Pan & Jordan-Marsh, 2010). We empirically validate that the adoption mechanisms are interrelated (Thompson, 2012), and jointly shape the effect of online communication on social connectivity.
Finally, we study adoption mechanisms among older laggards in particular, a highly relevant, yet understudied, research population (Xie, 2008a).

The chapter is organized as follows. In the theoretical section, we provide a detailed literature review of factors that affect older laggards’ online communication tool adoption. We suggest that conceptualizing adoption as a situated change process may help to better understand the mechanisms underlying these factors, and how the resulting adoption process may influence changes in social connectivity. Social actor theory (Lamb & Kling, 2003) is introduced as a framework to systematically assess changes in older laggards’ social connectivity over time. Next, in the method section, we elaborate on the design of the interpretive multiple case study conducted. The results section describes how their initial non-adoption of online communication tools made older laggards feel socially excluded. Next, it reveals three adoption mechanisms, knowledge development, value alignment, and emotional coping, that underlie older laggards’ adoption process. We explore how these three adoption mechanisms interact to fuel online communication-induced changes in social connectivity for older laggards through five themes: “connecting with distant friends,” “voyeurism,” “joining in,” “discovering own abilities,” and “connecting to society.” The themes show how the interplay between the three adoption mechanisms shapes changes in social connectivity. In the discussion, we reflect on the theoretical relevance of the three intertwined adoption mechanisms, and discuss policy implications.

4.2. Theoretical background

Below, we review the adoption factor literature that focuses on older adults, which has identified a wide range of factors that influence older adults’ adoption of online communication tools. We follow recent calls (Ng, 2007; Sayago & Blat, 2010; Sayago et al., 2011) to conceptualize older laggards as social actors, rather than users (Lamb & Kling, 2003), and study their adoption as a situated change process embedded within a wider social context (Orlikowski, 1996; 2000).

4.2.1. Factors explaining older adults’ adoption of online communication tools

The prevalence of lagged adoption patterns among older adults suggests that older adults are relatively more often laggards who consider adoption differently from oth-
er adoption categories (Chen & Persson, 2002; Rogers, 2003). To understand why, scholars have identified a wide range of factors that enable or constrain older adults’ adoption of ICT in general, and online communication tools in specific. Based on a review of this literature (see Appendix E), we identified six domains into which adoption factors can be categorized: knowledge, normative perceptions, emotions, physical and cognitive limitations, social factors, and technological and economic factors.

Knowledge is “a justified personal belief that increases an individual’s capacity to take effective action” (Alavi & Leidner, 1999, p. 5). The knowledge domain comprises factors related to learning (Chou et al., 2013; Pfeil et al., 2009; Xie, Watkins, Golbeck, & Huang, 2012) and perceptions of learning ability (e.g., self-efficacy: Chung et al., 2010; Lüders & Brandtzæg, forthcoming; Pfeil et al., 2009). Normative perceptions signify “espoused beliefs identifying what is important to a particular [social] group” (Leidner & Kayworth, 2006, p. 359) regarding the nature of ICT and its use (e.g., privacy risk: Erickson, 2011; Gibson et al., 2010; Karahasanović et al., 2009; Lehtinen, Näsänen, & Sarvas, 2009; Lüders & Brandtzæg, forthcoming; Xie et al., 2012). Emotions concern “a complex state of excitement or perturbation, marked by strong feeling, and usually an impulse toward a definitive form of behavior” (Drever, 1952, pp. 80-81) triggered by (the thought of) ICT use (e.g., computer anxiety: Chung et al., 2010; Karahasanović et al., 2009; Xie et al., 2012). Physical and cognitive limitations involve the particular changes in aging bodies and minds often identified to negatively affect ICT adoption (Czaja et al., 2006; Wolfson, Cavanagh, & Kraiger, 2014). Social factors refer to factors such as training (Barnard, Bradley, Hodgson, & Lloyd, 2013; Irizarry & Downing, 1997; Jay & Willis, 1992; Kang et al., 2010; Lee, et al., 2011; Lee & Coughlin, forthcoming; Pan & Jordan-Marsh, 2010; Saunders, 2004; Xie, 2007), social support (Chou et al., 2010; Heart & Kalderon, 2013; Hill, Beynon-Davies, & Williams, 2008; Karahasanović et al., 2009; Lam & Lee, 2006; Lee & Coughlin, forthcoming; Paul & Stegbauer, 2005), social pressure (Saunders, 2004; Hakkarainen, 2012; Maier et al., 2011; Pan and Jordan-Marsh, 2010), stigma (Kang et al., 2010; Sokoler & Svensson, 2007), and marital status (Heart & Kalderon, 2013; Irizarry & Downing, 1997). Finally, technological and economic factors include, for example, general design (Chou et al., 2013; Gibson et al., 2010; Lehtinen et al., 2009; Nervik, Dahl, & Kofod-Petersen, 2011; Norval, 2012; Tsai & Chang, 2009), user friendliness (Karahasanović et al., 2009; Lehtinen et al., 2009; Maier et al., 2011),
and perceived usefulness (Braun, 2013; Chung et al., 2010; McCloskey, 2006). All these factors can influence older adults’ adoption decisions.

Studies that identify adoption factors among older populations provide insight into older adults’ perspectives on ICT adoption, and can help to explain lagged adoption patterns in older populations. However, by perceiving adoption as a “thing,” i.e., a decision or intent, rather than a “process,” the adoption factor literature provides a partial view on older laggards’ adoption. This partial view can be enriched by adding a process perspective as a complementary part of the puzzle (Van de Ven & Poole, 2005). In particular, with respect to the impact of online communication tool adoption on older laggards’ social connectivity, a process perspective seems to be better equipped to assess what causes specific changes in social connectivity over time.

4.2.2. Knowledge gap: what causes change?

Few studies provide empirical analyses of the interrelationships between older adults’ adoption factors and how they jointly shape the adoption process (Ng, 2007; Sayago et al., 2011; White et al., 2002). Even fewer have focused on older laggards. The interrelationships between older adults’ adoption factors are usually studied in adaptations of the Technology Acceptance Model (TAM), Unified Theory of Acceptance and Use of Technology (UTAUT), and Model of Adoption of Technology in Households (MATH) (Braun, 2013; Chung et al., 2010; Maier et al., 2011; Morris et al., 2005; Pan & Jordan-Marsh, 2010). However, these models measure behavioral intent or adoption decisions as outcome measures, and thus, do not consider the subsequent adoption process. Only Morris et al. (2005) included short-term, continued, and sustained use, whereby each subsequent adoption stage is only influenced by the previous one. Some recent qualitative studies do look for connections between older adults’ adoption factors and their adoption process. For example, Renaud and Biljon (2008) and Barnard et al. (2013) included learning phases in their TAM-based models of ICT acceptance. Other studies analyzed the effect of learning on motivation to learn (Ng, 2007) and ICT perceptions (Xie et al., 2012). Hill et al. (2008) linked adoption factors among processes of adoption, use, and access leading to Internet engagement. Together, these studies highlight the importance of learning and experimentation for ICT acceptance, motivation, and engagement. However, these outcome measures are rather one-dimensional outcomes: either your accept ICT or not, either
you are motivated or engaged or not. It would be interesting to study ICT adoption in more detail because it is well known that people adopt online communication tools in a variety of ways, thus leading to a wide variety of user types (Brandtzæg, 2012; Karimi & Neustaedter, 2011). An in-depth study would allow for a better understanding of why older laggards appropriate ICT in diverse ways. We note this as a knowledge gap: the mechanisms that shape older laggards’ adoption process are unclear, i.e., we do not know what causes change.

Moreover, to the best of our knowledge, none of the studies considered linkages between the adoption process and changes in older laggards’ social connectivity. Such linkages could be relevant because the literature shows that distinct types of social media use correlate differently to social capital outcomes (Brandtzæg, 2012). We identify this as a second knowledge gap: the way in which adoption shapes specific changes in older laggards’ social connectivity is unknown, i.e., we do not know what changes.

To address these two knowledge gaps, we argue that a better understanding of how older laggards’ adoption of online communication tool shapes their social connectivity can be gained by enriching the variable-based studies of older adults’ adoption factors with an interpretive study of adoption as a situated change process (Orlikowski, 1996; 2000). We conceptualize older laggards as social actors (Lamb & Kling, 2003). Such theoretical stance highlights the situated nature of both older laggards’ online communication tool adoption and their social connectivity, whereby a situated change process allows for richer understanding of the mechanisms that shape the adoption process, i.e., what causes change, and the social actor construct allows a systematic assessment of changes in older laggards’ social connectivity, i.e., what changes.

**What causes change.** To analyze what causes change, we embrace a situated change perspective on ICT adoption, and view older laggards’ adoption of online communication tool as a change process that consists of recurrent, socially meaningful actions embedded in a wider socio-technical context (Orlikowski, 1996; 2000). From this perspective, we search for the mechanisms that underlie the adoption process through which adoption factors manifest themselves. Such adoption mechanisms have thus far received insufficient research attention. Hough and Kobylanski
(2009) considered the themes defined by Trocchia and Janda (2000) as adoption mechanisms for technology engagement among older adults: reference group affiliation, technology schema, resistance to change, nature of social relationships, perception of reality, and physical dexterity. Trocchia and Janda (2000) used these themes to explain (non) adoption among older adults. In addition, we argue that adoption mechanisms may explain diverse adoption patterns among older laggards, as explored in this study.

**What changes.** In addition to searching for adoption mechanisms, we analyze how older laggards’ social connectivity changes over time. To systematically assess changes in social connectivity, we conceptualize older laggards as social actors (Lamb & Kling, 2003). Such conceptualization of older laggards resonates well with the view of the adoption as situated change process (Ng, 2007; Sayago et al., 2011; White et al., 2002). This is fuelled by the fact that ICT, including online communication tools, are becoming increasingly pervasive in our daily lives (boyd & Ellison, 2008; Gackenbach, 2006; Howard & Jones, 2003; Joinson McKenna, Postmess, & Reips, 2007; Wellman & Haythornthwaite, 2002; Yoo, 2010) and the distinction between ICT and non-ICT is becoming blurred (Griffiths & Light, 2008; Iivari, Isomäki, & Pekkola, 2010). These blurred distinctions have caused ICT to blend with social practices (Walsh, Kefi, & Baskerville, 2010). This fuelled a call to problematize the socio-technical context in which ICT is adopted (Jones & Karsten, 2008; Lamb & Kling, 2003; Pozzebon, Diniz, & Jayo, 2009), especially when research interest is related to social wellbeing (Pozzebon et al., 2009). Simple user/non-user dichotomies are insufficient to address the socio-technical context (Selwyn et al., 2003). Lamb and Kling (2003), therefore, argued to abandon the one-dimensional notion of “users,” and replace it with “social actors.”

According to Lamb & Kling (2003), the social actor comprises of four dimensions. First, “affiliations” refer to the personal relationships in which individuals (or groups) engage. Second, “interactions” are concerned with the information, resources, and exchange media that individuals mobilize to engage with others. Third, “identities” refer to avowed presentations of the self and ascribed profiles. Finally, “environments” relate to the stabilized, regulated, and institutionalized practices, associations, and locations that circumscribe individual and collective action. The merit of the social actor theory is that it allows us to conceptualize older laggards’
adopting online communication tools as multidimensional social actors, rather than as simple “users.” It underlines the potential for ICT-based change in a social setting (Lamb, 2006; Lamb & Kling, 2003).

In this theoretical section, we suggest that those factors that underlie older laggards’ online communication tool adoption need to be analyzed as part of an adoption process (Van de Ven & Poole, 2005). We conceptualize adoption as a situated change process (Orlikowski, 1996; 2000) through which social actors (Lamb & Kling, 2003) engage with online communication tools. Moreover, we suggest an interpretive study of mechanisms that underlie the adoption process in which the adoption factors manifest themselves. We elaborate on our methods before turning to an empirical exploration of the adoption mechanisms that shape the changes in older laggards’ social connectivity.

4.3. Method

To explore how adopting online communication tools sparks changes in older laggards’ social connectivity, we conducted an interpretive, ethnographic multiple case study that was participatory in nature (Myers, 1999; Van Maanen, 1979). We investigated ten cases of older laggards who decided to participate in a course on the use of tablet computers (“tablet course”). We followed the adoption and social change processes of each of these older laggards over a period of 22 months using multiple, fine grained data collection and analysis methods. Explorative results are generalizable in the sense that the empirical data fuels the development of new theory (as suggested by Lee & Baskerville, 2003). Yin (2014) called this level 2, or analytical generalizability, as opposed to statistical generalizability. This form of generalizability has become well established among interpretative researchers in the computer-mediated communication field (see for example, Lee & Baskerville, 2003; Klein & Myers, 1999; Walsham, 1995). Below, we describe and reflect on the research context, data collection and coding, and the analysis.

4.3.1. Research context

In Spring and Autumn 2012, a tablet course was offered by a local ICT project in a small village community (with less than 600 inhabitants) in the north of the Netherlands, where the Internet penetration rate was approximately 96%. The course was
specifically targeted at older adults without computer experience (i.e., “laggards” in the terms of Rogers, 2003). The course was developed and taught by a younger village inhabitant. The project provided an Android tablet for each case, i.e., for each participant. The participants could continue to use their tablet at home after the course ended. Potential participants were approached through the village newspaper and mouth-to-mouth advertising. The first such tablet course ran from April to July 2012 and had six participants. The second course, that started in October and ended in December 2012, included four participants. Each tablet course consisted of eight two-hour sessions (see Appendix F for a complete timeline).

A comparison with population averages shows that the nine tablet course participants who completed our survey are a good reflection of the local non-adopter population (Table 4.2). The participating two males and eight females were between 62 and 75 years old. This age range is below the non-adopters average, but above the average age of adopters. The participants’ educational level and health status are approximately equal. One had attended higher education, whereas the others had completed basic-level schooling (3), followed practical training (1), or completed a secondary vocational education program (3). Moreover, these participants were more frequently living alone, a factor generally considered to constrain ICT adoption (Heart & Kalderon, 2013; Irizarry & Downing, 1997). Six had lost their partner, one person was single, and three were married. The participants had not used a computer or tablet prior to their participation in the tablet course.

The Android tablet provided by the local project was an “Asus Eee Pad Transformer,” and included a keyboard that could be connected or disconnected at will. In practice, the participants preferred the keyboard to the tablet’s touchscreen. Various applications were installed, such as a weather forecast, local and national news, and one to watch national television programs, games, Facebook, and email. After the tablet course ended, the participants were allowed to take their tablets home. A local computer technician helped the participants request and install an Internet connection.

In broad terms, the tablet course consisted of theoretical and practical parts. In the theoretical part, the participants learned the different computer types (e.g., “conventional” personal computer, laptop, tablet, and smartphone), the concept of the Internet, applications, and online communication. In the practical part, the participants
practiced with their tablets. The participants shared a joint Facebook account to practice their skills and explore the social medium. Later, four participants created personal Facebook accounts, whereas the others continued to use the shared account throughout the data collection period. In terms of email, the participants were supported in setting up a personal account in one of the sessions. It transpired that the online communication tools (namely Facebook and email) were among the most popular and most frequently used applications, and the only online communication tools used (see Appendix G). Consequently, we focus on these tools for the remainder of the chapter.

Table 4.2. Cases compared to population averages (2012 survey data, response 70%)

<table>
<thead>
<tr>
<th>Age</th>
<th>Cases (n=9)</th>
<th>Population average</th>
<th>Non-adopters (n=91)</th>
<th>Adopters (n=146)</th>
</tr>
</thead>
<tbody>
<tr>
<td>64-69</td>
<td>33%</td>
<td>13%</td>
<td>57%</td>
<td></td>
</tr>
<tr>
<td>70-74</td>
<td>44%</td>
<td>24%</td>
<td>26%</td>
<td></td>
</tr>
<tr>
<td>75-79</td>
<td>22%</td>
<td>33%</td>
<td>12%</td>
<td></td>
</tr>
<tr>
<td>80+</td>
<td>0%</td>
<td>29%</td>
<td>6%</td>
<td></td>
</tr>
<tr>
<td>Education</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Low</td>
<td>56%</td>
<td>62%</td>
<td>32%</td>
<td></td>
</tr>
<tr>
<td>Middle</td>
<td>33%</td>
<td>34%</td>
<td>44%</td>
<td></td>
</tr>
<tr>
<td>High</td>
<td>11%</td>
<td>5%</td>
<td>24%</td>
<td></td>
</tr>
<tr>
<td>Living alone</td>
<td>67%</td>
<td>37%</td>
<td>23%</td>
<td></td>
</tr>
<tr>
<td>Health</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Poor</td>
<td>0%</td>
<td>7%</td>
<td>1%</td>
<td></td>
</tr>
<tr>
<td>Fair</td>
<td>22%</td>
<td>36%</td>
<td>12%</td>
<td></td>
</tr>
<tr>
<td>Good</td>
<td>44%</td>
<td>39%</td>
<td>38%</td>
<td></td>
</tr>
<tr>
<td>Very good</td>
<td>33%</td>
<td>12%</td>
<td>28%</td>
<td></td>
</tr>
<tr>
<td>Excellent</td>
<td>0%</td>
<td>7%</td>
<td>22%</td>
<td></td>
</tr>
</tbody>
</table>

4.3.2. Data collection

Data were collected between April 2012 and January 2014 (see Appendix F). During this period, the relationship between the participants and one of this chapter’s authors, EH, was participatory in nature. This participatory nature was not only reflected in the ethnographic style of data collection, based on participant observations and interview rounds, but also in the two feedback sessions in which the participants were encouraged to reflect on the preliminary research findings. Data collection started with participant observations, where EH identified as a researcher (during
16 of the 17 tablet course sessions). During these meetings, EH adopted the role of teaching assistant and interacted with the participants as they asked for help or showed something they had found on the web. One month after the first course concluded, each of the six participants was interviewed (these interviews are coded A1-F1, where A-F are specific participant codes, and “1” indicates the timing of the interview), and they were interviewed a second time four months later (interview codes: A2-F2). Three participants from the second group were interviewed before they started the tablet course (interview codes: G0, J0, K0, with one participant (H) declining), and all four were interviewed one month after they finished the course (interview codes: G1-K1). An interview guide was developed based on an initial literature review (Hage, Roo, Van Offenbeek, & Boonstra, 2013, included as Chapter 1 in this thesis), and research notes made during participant observations throughout the tablet course. The interview guide loosely directed the course of the interview and the topics discussed. However, the participants were given the opportunity to address topics not included in the interview guide. In all cases, informed consent was sought to record the interview and use the data for scientific purposes. During follow-up interviews, the previously gathered data were used to ask specific questions regarding adoption and problems related to the online communication tools, and further, to double-check the findings derived from the coded interviews. The taped interviews lasted between 0.5 and 2.5 hours, and were conducted in the participants’ homes. All interviews were transcribed and translated from Dutch to English.

In addition to the participant observations and interviews, the participants were asked to complete tablet-use diaries over a period of six months. In this way, we were able to gather daily self-reported data on the time spent using the tablet (in minutes), the applications used (an open question), and positive or negative experiences with the tablet (again, an open question). Time spent on the tablet was used to provide an indication of use frequency in terms of days, as well as the average time spent on the tablet on those days when the tablet was actually used. The daily summary of applications used indicated the days on which online communication tools (i.e., Facebook and email). Finally, after the first and second drafts of this chapter were completed, preliminary results were fed back to the participants and the local teacher of the tablet course in

10 The original Dutch transcripts, including the quotes used in this paper, are available from the authors on request.
January 2013 and again in January 2014. We did so because gathering feedback from participants in interpretive studies is “the single most important way of ruling out the possibility of misinterpreting the meaning of what participants say and do or what the researcher observed, and the perspective the participants have on what is going on” (Kaplan & Maxwell, 2005, p. 45). During the feedback sessions, facilitated by EH, the aim was to present results in an accessible way. Participants were encouraged to respond. The discussions that followed were recorded. Moreover, during the second feedback session, the participants were asked to make two Q-sorts (Brown, 1993, Van Exel & De Graaf, 2005). We asked the participants to sort 15 statements on online communication tools and changes in social connectivity derived from the interviews on a normal distribution using a five-point scale that ran from completely disagree to completely agree. One participant had to leave early and declined to complete the exercise. Table 4.3 summarizes the data collected, and how they were analyzed.

Table 4.3. Overview of data collection and analysis

<table>
<thead>
<tr>
<th>Method</th>
<th>Collected data</th>
<th>Data analysis</th>
</tr>
</thead>
<tbody>
<tr>
<td>Participant observations of 16 tablet course sessions</td>
<td>Research notes, pictures, tablet course material</td>
<td>Notes used as input in developing the interview guide</td>
</tr>
<tr>
<td>19 Interviews</td>
<td>Recordings, transcripts</td>
<td>Open and theoretical coding in Atlas.ti, alternated with a phased literature review process</td>
</tr>
<tr>
<td>Ten tablet diaries covering a six-month period</td>
<td>Daily notes recorded by participants on paper</td>
<td>Analyzed in Stata</td>
</tr>
<tr>
<td>Two feedback sessions</td>
<td>Presentations, recordings, pictures</td>
<td>Open and theoretical coding in Atlas.ti, to support the interview data and analysis</td>
</tr>
<tr>
<td>Nine participants, each made two Q-sorts</td>
<td>15 cards sorted on a five-point scale in a normal distribution</td>
<td>Sorts are analyzed using the PQ method software in which a Principle Component Analysis is conducted</td>
</tr>
</tbody>
</table>

4.3.3. Data coding and analysis

The transcribed interviews were coded using Atlas.ti. Our data coding was iterative because it was combined with a phased literature review process in line with the suggestions made by Urquhart and Fernandez (2013). Coding started with a round of open coding followed by theoretical and axil coding (Charmaz, 2006; Saldaña, 2009). All codes were defined and operationalized in the codebook found in Appendix H.
(Hennink, Hutter, & Bailey, 2010). The codebook was developed and refined during various rounds by, and discussions between, the authors.

Once every two weeks, the participants sent completed tablet diaries to the researcher using a pre-stamped envelope. The tablet diaries were then entered into Excel, and many of the qualitative statements they contained were coded into quantitative data. Once all diaries were entered, the data were analyzed using Stata in order consider the daily activities of each participant, while controlling for seasonal effects. The key findings from the tablet diaries are reported in Appendix G.

Data derived from the feedback sessions strengthened and refined preliminary research findings with the participants generally recognizing our interpretations. Supported by the participants’ developing views regarding online communication tools and the changes in social connectivity they experienced, we validated and further elaborated the themes described in the results section.

Descriptive and exploratory between-case comparisons were used to analyze the data (see Tables 4.3 and 4.4 and Appendix I) (Miles & Huberman, 1994). We used the codes from the interviews as a guiding tool in the overall analysis, while continuously considering additional qualitative and quantitative information regarding the adoption process, and wider context derived from additional data sources (see also Table 4.2).

4.4. Results

The results section is divided into three parts. First, we describe how participants felt initially that they were “lagging behind” as non-adopters living in a digitized society. This feeling of lagging behind motivated them to undergo “confrontation” with the tablets. Second, the challenging adoption process was fuelled by three emerging, intertwined adoption mechanisms: knowledge development, value alignment (including intra-actor conflict, inter-actor conflict, and value reorientation), and emotional coping. Finally, we explore changes in social connectivity and develop five themes that illustrate how the adoption mechanisms shaped these changes in social connectivity.
“Lagging behind” motivates “confrontation” with the tablet

In a society full of adopters, the participants, as non-adopters of online communication tools, felt socially excluded. The participants expressed a feeling of adoption being forced upon non-adopters because they were seen as lagging behind. For example, Participant D commented:

D1: It [Computers] is somewhat [...] foisted upon us because everybody is doing it. I understand [that computers have become a “must”], and those that are not doing it, are lagging behind.

Non-adoption equaled “lagging behind,” or exclusion, for these participants. The participants recalled feelings of exclusion as certain services, such as banking, become digitalized, but also in social life. Participant K explained how non-adoption could even lead to exclusion even in offline social settings:

K0: Now look, it is just that, when you are somewhere and they are all talking about the computer. This and that and so on, and you don’t know anything about it. I never spend any time on it. To me, it’s all abracadabra. I would not even know how to turn it on.

Participant K describes a lack of knowledge that excludes him/her from everyday social interactions. This lack of understanding and subsequent exclusion was mentioned as a reason for participants to consider adopting. For example, Participant G explains:

G0: Really, I think: I don’t want this [adoption]. Still I pushed for this, this I want to know, how does all this work? Because you feel you are lagging behind. [...] This computer world and everything, the kids are using it and the grandchildren know all about it. And, when at grandpa and grandma’s - they know nothing!

The decision to adopt, and therefore, to hopefully neutralize the sense of lagging behind associated with non-adoption, is nevertheless a challenging one. First, ICT in general, and online communication in particular, is sometimes simply perceived as “wrong.” For example, Participant A felt that the quality of offline interactions would decrease because of the increased use of online communication tools:
Participant D held a deep aversion to computers, which (s)he felt had limited his/her ability to express him/herself during his/her professional career. The increased digitalization at work was one of the reasons (s)he quit a former job:

D1: I always said: “I don’t want that [a computer]!” I have said that for 20 years. [...] The first time I was confronted with such a thing, I was still a [professional], and eh, well, you had to, in that time, you had to: these computers had to be implemented. And, eh, I remember that I felt like: Is that necessary? I don’t like this. [...] It is not the only reason that I quit [my job], but it was one of the reasons. This is going in a wrong direction, I can’t express myself in this way, I don’t like this: I’ll leave and start in a different job.

Moreover, the participants expressed the view that they were afraid they would not be able to learn and understand ICT. This fear was particularly strong in eight cases, and kept them from adopting ICT. Shortly after the tablet course, C recalled:

C1: And I think it was also this fear I had, like: no, I'm way too old for that [i.e., ICT].

A lack of knowledge regarding ICT and online communication tools (as indicated by Participants K and G) excluded the participants from both online and offline interactions. Strongly held negative perceptions regarding ICT and online communication in particular (expressed by Participants A and D) as well as fear (Participant C) kept them from adoption. These dynamics made the adoption of any ICT, including online communication tools, at least initially challenging for the participants. The participants had to overcome their fears and put aside their negative perceptions of ICT. One participant described this experience as a confrontation:

D1: The first time, the confrontation really, that is the word, with the tablet.
4.4.2. What causes change: three adoption mechanisms

Three adoption mechanisms came to the fore during data analysis: knowledge development, value alignment, and emotional coping. The adoption mechanisms are closely related to the adoption difficulties described above. The mechanisms are defined and described below (see also Appendix H and I).

Knowledge development. The first adoption mechanism that emerged is knowledge development. Knowledge development is the learning process through which knowledge is gained. Knowledge is “a justified personal belief that increases an individual’s capacity to take effective action” (Alavi & Leidner, 1999, p. 5). The use of the word “belief” in the definition suggests that knowledge does not relate to what something is, but what we think it is. Therefore, knowledge can manifest itself by developing vocabulary and skills, and through normative perceptions. Moreover, knowledge allows us to take a particular form of action. During adoption, the participants developed new or refined understandings of the online communication tools introduced to them. In general, the participants had pre-existing ideas regarding online communication. The new knowledge and hands-on experience allowed further development and refinement of these pre-existing ideas. We refer to this mechanism as knowledge development. For example, most participants initially believed that online communication would be complex. After using the online communication tools, some participants adjusted their understanding to some extent. Moreover, during the adoption process, the participants understood online communication as impersonal, short, and ill equipped for in-depth communication. Participant A noted:

A2: It’s convenient, but it’s impersonal.

However, when using email and Facebook, some participants developed the idea that the tools are informative, that is, they could provide local and detailed social information. This development of new knowledge and understanding also fuelled value reorientation (see below).

Furthermore, knowledge development involved the acquisition of ICT vocabulary. At the beginning of the adoption process, ICT jargon such as “online,” “Google,” “Internet,” and “log in” had no specific meaning for the participants. During the adoption period, they developed a refined understanding of their meaning and use.
Finally, the participants developed ICT skills. Nevertheless, several indicated that they found it difficult to remember the things they learned. This made posting messages or photographs on Facebook, and sometimes emailing, a challenge to some, despite their regular use of the media (see Appendix G).

**Value alignment.** The second emerging adoption mechanism is labeled “Value alignment.” Value alignment can be described as the mechanism through which value structures are reinforced or changed through interactions between social actors and ICT (based on Barley, 1986; Leonardi & Barley, 2010). This involves a reflection between the self and the other (either another person or an ICT). Value alignment is different from knowledge development because it only occurs when the focal actor perceives a misfit between their social values and those of other social actors or values embedded in the ICT. From the value alignment perspective, older laggards form an interesting research population. Laggards are often said to hold relatively traditional values, and approach new ICT with certain suspicion (Rogers, 2003). Thus, laggards face the challenge of aligning the values attached to the adopted online communication tools with their traditional social values.

The value alignment mechanisms include value-based conflict, which is well described in the organizational adoption literature (Abubakre, Ravishankar, & Coombs, 2013; Kling, 1987; 1992; Kling & Iacono, 1984; Leidner & Kayworth, 2006; Markus, 1983; Walsham, 2001), value reorientation and value compatibility. Value conflict refers to the incompatibility between the participants’ social values and the values ascribed to the ICT (intra-actor conflict), or the participants’ values and those of others (inter-actor conflict). Value reorientation occurs through the reconciliation of conflicting values (Leidner, 2010; Leidner & Kayworth, 2006; Walsh et al., 2010). Finally, value compatibility describes a situation in which “an innovation is perceived as consistent with the existing values [...] of potential adopters” (Rogers, 2003, p. 240), and it is less relevant in the context of change.

**Value alignment— intra-actor value conflict.** In some instances, we found that the perception of the values embedded in email or Facebook at times conflicted with a participant’s social values. This resulted in intra-actor value conflict. These conflicts often resembled one of the following two examples. First, the participants often found their social desire for close and meaningful contacts to be poorly reflected in
the values they perceived as embedded in email or Facebook, which they defined as “additional,” “quick,” and “short.” Participant B missed “a sense of togetherness” in email communication:

B1: It [email] can be nice for those in a hurry, but like with my son/daughter, just to call him/her, just hearing that little voice. Just that sense of togetherness.

Second, in general, the participants were quite concerned with their privacy (social value). In particular, the perceived uncontrollable openness of Facebook was seen as a limitation. Participant G was not at all enthusiastic about Facebook, and explained:

G0: There [on Facebook] you write everything about, like: This I’m doing, that I’m doing, and now this. Yes, that is the idea behind Facebook, I believe. Then you really have to be friends or something, because otherwise I’d say: what has someone else to do with that information?

**Value alignment—inter-actor value conflict.** Email and Facebook adoption was also infused with inter-actor value conflict. In this form of conflict, the perception of values embedded in email or Facebook differ between a participant and other actors. Frequently, these conflicts were related to the participants’ perception that communication enabled by email or Facebook is in some way inferior to other, more synchronous, forms of communication, such as face-to-face meetings or phone calls. This perspective can lead to conflicts in a social context where online communication is considered the norm, rather than the exception. A vivid example was provided by Participant A, when (s)he spoke about Participant B receiving a birthday invitation from a relative by email:

A2: Now well, (s)he [Participant B] says: “that is no use to me!”. “I find this so impersonal”, (s)he said. “I don’t like this” [receiving a birthday invitation by email] [...] but, well, that is the deal nowadays. I also told [son/daughter of Participant B]. “Yes” [the son/daughter says], “but this is the deal nowadays”. I said: “Yes, I know, but we are also living nowadays, but we are somewhat behind. Your father/mother doesn’t like it in principle. (S)he would have rather been called.”

**Value alignment—value reorientation.** Initially, the participants were rather resistant to the idea of using online communication tools. Negative perceptions
sometimes changed slightly over time, or were supplemented with new, i.e., additional, perceptions as the participants interacted with and through email and Facebook. That is, they underwent a value reorientation. A total of 22 months after the first tablet course started, and through the use of Q-sorts, we found that some participants had changed their previous negative perception of online communication tools. Others remained skeptical, with much the same views as before the adoption process started. A spectrum of perceptions could be identified. At one end of the spectrum, two participants (E and G) essentially rejected the idea of online communication, seeing it as non-essential in today’s society, as complex, and as inappropriate for in-depth communication. Somewhere in the middle, Participants A and D believed that, because online communication is used widely, some understanding of this form of communication is indispensable. Nevertheless, online communication tools were perceived as practical and informative, rather than as connecting. For the latter function, online tools were considered too superficial and a risk to privacy. Finally, at the other end of the spectrum, Participants B and F became enthusiastic about online communication, perceiving it as a fun place to meet others. These participants attached more importance to the role of online communication in their wider environment compared with the participants at the other end of the spectrum.

The participants also highlighted value reorientations during the interviews. For example, perceptions changed from uninteresting to interesting; non-functional to informative or fun; and complex to manageable. Participant F elaborated on how his/her perceptions of email changed:

F2: Initially, it is all alien to you. Like, what are those things to me? Nothing! Until you get an email from your sister or someone else, now that I find terrific! So, then I reply. [...] Then, the next day, you are curious: Has someone written me something? Not that I’m lonely, not at all, but it is curiosity. Let me put it this way: you just want to look.

However, conflicting values are not always reoriented, and new or refined values may lead to new conflicts. Overall, we do not find a decrease in value conflicts over time.

**Emotional coping.** Emotional coping also emerged from the data analysis as an adoption mechanism. Emotional coping relates to the way participants manage the
emotions experienced as a consequence of interactions with online communication tools. To date, the way in which adopters cope with the emotions sparked by the adoption process has received insufficient attention within the organizational adoption literature (Furneaux & Nevo, 2008; McGrath, 2006; Ortiz de Guinea & Markus, 2009). Most of the related work was conducted to enhance understanding of how specific emotions, such as enjoyment, anxiety, and playfulness, impact on the perceived ease of use and intention to (continue to) use ICT (for an overview, see Beaudry & Pinsonneault, 2010). The mechanisms through which emotions shape adoption are less well understood. We found that emotions influenced specific adoption behaviors. Adopting online communication tools typically sparked emotions such as enjoyment, curiosity, frustration, fear, and stress among the participants. These feelings seemed to shape subsequent behaviors. Enjoyment made the participants more enthusiastic about the use of online communication tools, whereas, confronted with fear or frustration, the participants would, at least temporarily, give up or stop enjoying tablet interactions. For example, Participant E was afraid of making a mistake. This feeling led to short temporal breaks in adoption:

E1: Well, because you are afraid that you do something wrong. Because you are not so familiar with it.
EH: How do you deal with that?
E1: Well, then I put it [tablet] away for a moment [laughs]. Yes, then I walk away and leave it. But it is annoying.

4.4.3. How the world became “a little bigger”: changes in social connectivity

After defining and describing how the three adoption mechanisms manifested during the adoption process, we now analyze how these adoption mechanisms shaped the changes in the participants’ social connectivity. To answer this question, we explored linkages between the three emerging adoption mechanisms and any changes in social connectivity experienced by the participants. Changes in social connectivity were analyzed in terms of the social actor dimensions of affiliations, interactions, identities, and environments. Linkages were explored within five themes. These themes were developed by systematically coding the participants’ comments, experiences, and personal situations, and feeding the preliminary results back to the participants.
in two feedback sessions. Note, however, that these themes are exploratory in nature, rather than definitive, and are intended to stimulate further research, as suggested in the discussion.

As the first step in our exploration using Q-sorts, we asked the participants which of the changes in social connectivity that they experienced after or during their adoption of online communication tools were the most relevant to them. We found mixed results. However, it was clear that something had changed for all of them. The largest group that could be identified felt that they had become more independent, gained confidence in their own capabilities, and were better informed regarding the events occurring in the village (Participants C, D, F, G, and K). Others emphasized that they felt better able to participate in social life, and had increased knowledge regarding the events occurring in the world around them (Participants A and H). Some also indicated that they increased their contact with remote acquaintances (Participants B and E). By relating the changes in social connectivity mentioned by the participants to the four social actor dimensions, we can derive the overview presented in Table 4.4. Note that the changes occurred both online and offline.

In the second step, we explored how these changes in social connectivity occurred, that is, we investigated the linkages between the adoption mechanisms and the changes in social connectivity. Our findings are summarized in the five themes presented in Table 4.5. Reflecting on these change dimensions, we noted that the participants developed specific normative ideas through emotional experiences and learning how to communicate online with whom, about what, and how. Such copings with emotional encounters with online communication, developing knowledge, and normative ideas about its use directed adoption behavior and fueled changes in social connectivity. The first two themes, “connecting with distant friends,” exploring how adoption mechanisms shaped changes in affiliations in the social-actor dimension, and “voyeurism,” exploring changes in the interactions dimension, offered a rationale for this. Interestingly, most change seemed to be generated in the offline domain, as an indirect consequence of online communication. The last three themes explore linkages to this finding. The theme “joining in” explores changes in offline interactions. “Discovering own abilities” looks at changes in the identities sparked by the adoption mechanisms. Finally, “connecting to society” addresses ICT-induced envi-
rnonmental changes. We found that the adoption mechanisms are intertwined, and jointly shape changes in social connectivity.

Table 4.4. Changes in social connectivity based on the four social-actor dimensions

<table>
<thead>
<tr>
<th>Changes in social connectivity</th>
<th>Mentioned/ranked in</th>
</tr>
</thead>
<tbody>
<tr>
<td>Changes in affiliations, online</td>
<td></td>
</tr>
<tr>
<td>No change in relationships with (close) others</td>
<td>Interviews: A1,2,D1,E1,F1,2,G1,H1,J1,K1</td>
</tr>
<tr>
<td>More independent</td>
<td>Interviews: A1,C1,K1</td>
</tr>
<tr>
<td>Connecting with distant friends</td>
<td>Q sorts: unimportant: E,F,G,H,K</td>
</tr>
<tr>
<td></td>
<td></td>
</tr>
<tr>
<td>Changes in interactions, online</td>
<td></td>
</tr>
<tr>
<td>Observing the village online</td>
<td>Interviews: E2,G1,J1,K1</td>
</tr>
<tr>
<td>Knowing more about village life</td>
<td>Q sorts: important: A,B,F,G; unimportant: C,E, K</td>
</tr>
<tr>
<td>Having more interactions with close contacts</td>
<td>Q sorts: important: D,G,K; unimportant: A,B</td>
</tr>
<tr>
<td></td>
<td></td>
</tr>
<tr>
<td>Changes in interactions, offline</td>
<td></td>
</tr>
<tr>
<td>Better able to participate when ICT is discussed</td>
<td>Interviews: A1,B1,C2</td>
</tr>
<tr>
<td></td>
<td>Q sorts: important: A,B,D,F,G,H,K; unimportant: E</td>
</tr>
<tr>
<td></td>
<td></td>
</tr>
<tr>
<td>Changes in identities, offline</td>
<td></td>
</tr>
<tr>
<td>More self-confident</td>
<td>Interviews: A1,B1,C2,D1</td>
</tr>
<tr>
<td></td>
<td>Q sorts: important: C,D,F,G,H</td>
</tr>
<tr>
<td></td>
<td>Feedback session 2: C,D</td>
</tr>
<tr>
<td>No change in self-confidence</td>
<td>Feedback session 2: J</td>
</tr>
<tr>
<td>Greater trust in own capabilities</td>
<td>Interviews: A1,C1,J1,E1,J1,K1</td>
</tr>
<tr>
<td></td>
<td>Q sorts: important: B,C,D,F,H; unimportant: A,E</td>
</tr>
<tr>
<td></td>
<td></td>
</tr>
<tr>
<td>Changes in environments, offline</td>
<td></td>
</tr>
<tr>
<td>More aware events occurring in the world</td>
<td>Q sorts: important: A,K; unimportant: B,D</td>
</tr>
<tr>
<td>Better understanding of news</td>
<td>Interviews: C1,D1,F1</td>
</tr>
<tr>
<td></td>
<td>Q sorts: important: A,E,K, unimportant: B</td>
</tr>
<tr>
<td>Better participation in society</td>
<td>Interviews: B2,C1,2,D1,2</td>
</tr>
<tr>
<td></td>
<td>Q sorts: important: A,B,F,H; unimportant: C,D</td>
</tr>
<tr>
<td></td>
<td>Feedback session 2: G</td>
</tr>
</tbody>
</table>

Theme 1: connecting with distant friends. When asked during the interviews, most participants stated that they had not experienced any changes in their affiliations with others after adopting email and Facebook. If anything, they indicated feeling more independent. Upon first consideration, these findings are surprising given that nine of the ten participants also reported making frequent use of these online communication tools. A combination of knowledge development and value alignment mechanisms provides a possible explanation for this apparent contradiction. Online communication was understood as superficial, additional, and short (knowledge development). The participants who preferred in-depth communication perceived
### Table 4.5. Five themes linking changes in social connectivity to the adoption mechanisms

<table>
<thead>
<tr>
<th>Change in social connectivity</th>
<th>Adoption mechanisms</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Theme 1: Connecting with distant friends (changes in affiliations, online)</strong></td>
<td>Knowledge development: Online communication tools are defined as informative, impersonal, superficial, additional, and short</td>
</tr>
<tr>
<td>No change in relationships with (close) others</td>
<td>Intra-actor conflict: Online communication is perceived as additional, superficial, and short; in-depth communication is preferred</td>
</tr>
<tr>
<td>Living more independently</td>
<td></td>
</tr>
<tr>
<td>Connecting with distant friends</td>
<td></td>
</tr>
<tr>
<td><strong>Theme 2: Voyeurism (changes in interactions, online)</strong></td>
<td>Knowledge development: Online communication tools are defined as informative, impersonal, superficial, additional, and short</td>
</tr>
<tr>
<td>Observing the village online</td>
<td>Intra-actor conflict: Online communication tools are seen as open, whereas privacy is highly valued</td>
</tr>
<tr>
<td>Knowing more about village life</td>
<td>Inter-actor conflict: Online communication is seen as inferior to other forms of communication, albeit not by other social actors</td>
</tr>
<tr>
<td>Having more interactions with close contacts</td>
<td></td>
</tr>
<tr>
<td><strong>Theme 3: Joining in (changes in interactions, offline)</strong></td>
<td>Knowledge development: Developing a vocabulary to communicate about online communication tools</td>
</tr>
<tr>
<td>Better able to participate when ICT is discussed</td>
<td>Value reorientation: Online communication tools are valued as mainstream communication medium</td>
</tr>
<tr>
<td><strong>Theme 4: Discovering own abilities (changes in identities, offline)</strong></td>
<td>Knowledge development: Online communication tools are understood as complex</td>
</tr>
<tr>
<td>More self-confidence</td>
<td>Emotional coping: Participants perceived themselves as uneducated, slow learners, old. They feared this was incompatible with the complexity of online communication tools; feelings of fear, frustration, and fun related to online communication</td>
</tr>
<tr>
<td>No change in self-confidence</td>
<td>Value reorientation: Over time, online communication tools are more often valued as interesting, informative, fun, and manageable, rather than seen as uninteresting, non-functional, and complex</td>
</tr>
<tr>
<td>More trust in own capabilities</td>
<td></td>
</tr>
<tr>
<td><strong>Theme 5: Connecting to society (changes in environments, offline)</strong></td>
<td>Knowledge development: The Internet is understood as enriching or informative; developing a vocabulary to communicate with regard to online communication tools</td>
</tr>
<tr>
<td>More aware of events occurring in the world</td>
<td>Value reorientation: Online communication tools are valued as mainstream communication medium</td>
</tr>
<tr>
<td>Better understanding of news items</td>
<td></td>
</tr>
<tr>
<td>Better participation in society</td>
<td></td>
</tr>
</tbody>
</table>
online communication tools as incompatible with their social values (i.e., value alignment: intra-actor conflict). In-depth communication was especially important for maintaining connections with those who are close, either geographically or emotionally. As such, online communication was considered more appropriate when connecting with distant affiliations. During a feedback session, Participant A supported this view:

Tablet course teacher: Why is it [email] more impersonal than a postcard?
A: That depends on who you send it to. Like when my son/daughter emails, that I find impersonal. [...] When it is something personal, you just call.

Participant A maintains a close relationship with his/her son/daughter, and thus, when they want to discuss something personal, phoning is seen by Participant A as the more appropriate option. In comparison, Participant D, who rarely called his/her sibling, likes to email him/her. The same is true for Participant B, who now maintains Facebook contact with friends and family living at a distance. In summary, for some participants, online communication tools are important, but only to maintain connections with distant contacts. Here, value alignment (i.e., aligning social values with perceptions of values embedded in online communication tools) combines with the knowledge development mechanism to shape changes in social connectivity.

**Theme 2: voyeurism.** Particular adoption behaviors are of interest when the participants communicate online. Perhaps surprisingly, only some participants set up personal Facebook accounts. Moreover, although they frequently used Facebook, the participants who shared a Facebook account rarely posted messages, i.e., they did not contribute to the online network. Rather, they observed others posting local village-level information. From a social connectivity perspective, this may lead to only limited improvement. Again, explanations for this type of use are to be found in the intertwined relationship between knowledge development and value alignment. First, the participants held strong views of online communication tools, fuelled by their developing knowledge. Occasionally, this would lead to intra-actor conflicts. For example, the participants would emphasize that they value their privacy, while considering online communication tools as open (as with Participant G, value alignment: intra-actor conflict). This intra-actor value conflict infused a privacy-sensitive adoption of Facebook in which the participants “hid” behind a joint account and viewed

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others’ posts anonymously. Second, the participants often understood online communication tools as informative rather than connecting (knowledge development). As such, although participants did not actively participate in the online network, what others posted on Facebook was considered informative and interesting. In particular, local community updates were of interest. In this type of behavior, online communication tools can be seen as a modern form of voyeurism. Participant E provided an example:

E2: *This morning, I read on Facebook that her [a villager’s] son needed [some medical treatment]. [...] Well, I like it that you can read that on Facebook. Otherwise, you would not directly find out. [...] Then you would just have to hear it somewhere, you know? Now, I know.*

**Theme 3: joining in.** New forms of offline communications were enabled by email and Facebook adoption, and acquired shape through knowledge development and value alignment. The participants resisted adopting online communication tools for a considerable period, but eventually felt that these tools had become so mainstream that they at least needed to know something about them (value alignment: value re-orientation). Increased understanding of ICT-related words (knowledge development) allowed new forms of offline communication and social connectivity, as explained by Participant C:

C2: *And I have somewhat the feeling well “I belong.”*

EH: Yes, what do you mean by that?

C2: *Well, it wasn’t like that before was it? All those computer conversations, all those difficult words, one didn’t understand anything. I used to think: Well, this is not for me, it will pass me by. Because I don’t have that [a computer], but now I think: I can join the conversation, because I have such a thing too.*

**Theme 4: discovering own abilities.** The participants reported increased self-confidence and capabilities through the adoption of online communication tools. Considering the three adoption mechanisms yielded a more complete understanding of these changes in social connectivity. We observed that most participants initially feared being unable to learn to understand the apparently complex online communication tools (knowledge development) because of self-perceptions of being old, poorly educated, and inexperienced. After the participants made the decision to adopt, fear
led to careful usage, non-adoption of optional functions, and reports of failures and (sometimes) of trying again (emotional coping). However, as the participants became more experienced, some of them started to enjoy the adoption process (emotional coping). These participants changed their opinion not only about online communication tools (value reorientation), but also about themselves. Instead of being incapable, they now considered themselves as (more) capable.

A1: That you created your own email and that you are then able to send an email. It makes you think: huh? I never thought I would be able to do that. No. [...] That's then most surprising to you.

We observed a wide variety in identity-related change among the participants, often depending on their perceptions of their ICT skills. During the second feedback session, the participants discussed this issue. Participants D and J clearly experienced different changes:

D: Yes, it gave me, in that respect, a positive boost. Look, at a certain moment you turn 65 and then you become old, yes. [others: laughter] Yes, you become old. And then you think: would I still be able to do this? Can my brain still process this much information? And then you find out that it is still possible. Thus, for me, it was like: look at this! I may not be that young, but I’m also not that old. [...] J: I have the feeling: I’m incapable.

From the beginning, Participant J was concerned as to whether (s)he would be able to use ICT and communicate online, whereas this was less of an issue for Participant D, who had pursued higher education. It may be that relatively minor ICT-related fears can be overcome, whereas a fear deeply rooted in self-identity may be more difficult to change.

**Theme 5: connecting to society.** The adoption of online communication tools, and using ICT in general, sparked a sense of being reconnected to contemporary society. The participants realized that online communication tools have become mainstream (value reorientation), and appreciated the informative qualities of online communication tools as well as ICT in general (knowledge development). They now used ICT to read the news or search for information on a wide variety of topics relevant to them, making them better aware of the events occurring in the world. They also bet-
ter understood ICT-related news items broadcast on the television or reported in the newspaper. Participant C explains:

C1: *And you also heard for example, you often heard on television: www this-and-that dot NL [Internet abbreviation of the Netherlands]. And yes, you now have some understanding of how that works. It’s not so alien anymore.*

This made Participant G reflect during the second feedback session: *“the world has become a little bigger.”*

### 4.5. Discussion

In this research, we explored through which mechanisms the adoption of online communication tools changes the social connectivity of older laggards. We did so in order to critically assess the assumption that older laggards’ social connectivity can benefit from online communication. By combining insights from the adoption factor literature with the situated change perspective (Orlikowski, 1996; 2000) and the social actor theory (Lamb & Kling, 2003), we proposed a process-oriented perspective on older laggards’ adoption. More specifically, our analysis of the adoption mechanisms that shape changes in older laggards’ affiliations, interactions, identities, and environments contributed to the current literature in three ways. First, this study highlighted how older adult adoption factors manifest themselves in adoption mechanisms during older laggards’ active adoption of online communication tools. Moreover, we empirically validated the intertwined nature of adoption mechanisms. Finally, research attention was drawn to older laggards, who represent an increasingly important, yet understudied, research population (Xie, 2008a), especially with respect to online communication. Our results suggested that lower online participation levels of older laggards spark feelings of lagging behind and social exclusion. Moreover, the adoption process of online communication tools is challenging for these digitally disconnected older adults. Although a means to an end rather than an end in itself, the adoption of online communication tools over time can improve aspects of older laggards’ social connectivity not only online, but also, and importantly, offline. The extent of change was shaped through the adoption mechanisms.
4.5.1. Theoretical implications

Confirming that social exclusion is a consequence of non-adoption. Similar to some earlier studies, we found that older laggards felt socially excluded as a consequence of their initial non-adoption of online communication tools. Indeed, the literature has shown that non-adopters of online communication tools (irrespective of their age) are affected by the online communication patterns of others, which may lead to social exclusion (Hage & Noseleit, 2015). Our findings as to why older laggards are affected by the online communication of others are comparable to the findings of Lüders and Brandtzæg (forthcoming), who showed that older non-users perceive social network sites as replacing “real” communication, for example, when “friends and family members are ‘somewhere else’ in shared social settings” (p. 15). In addition, we find that older laggards report problems communicating about ICT offline, also reported by Eisma et al. (2004), leading to feelings of alienation (Turner, Turner, & Walle, 2007). The finding that non-adoption may lead to social exclusion supports earlier work and provides a justification for looking at changes in older laggards’ social connectivity as a consequence of online communication tool adoption.

Older laggards’ adoption factors and mechanisms. The adoption mechanisms reported in this study build on and seem compatible with findings presented in the adoption factor literature (Appendix E). Our longitudinal approach allowed us to examine how adoption factors manifested themselves during the adoption process through the adoption mechanisms, i.e., knowledge development, value alignment, and emotional coping. In line with Paul and Stegbauer (2005), we found that older laggards are a heterogeneous group. They embody diverse adoption factors profiles, fuelling particular adoption mechanisms that induce diverse changes in social connectivity. For example, we observed the joint influence of cognitive limitations (Czaja et al., 2006; Chou et al., 2013; Lee et al., 2011; Sayago and Blat, 2010; Sayago et al., 2011; Wolfson et al., 2014), self-efficacy (Chung et al., 2010; Lüders & Brandtzæg, forthcoming; Nahm & Resnick, 2001; Pfeil et al., 2009), and difficulties with jargon (Chou et al., 2013; Pfeil et al., 2009; Xie et al., 2012) during knowledge development. Our participants had difficulties remembering basic steps. They forgot that they had to press “enter” after typing a search term in Google, or that the tablet would “go to sleep” after a number of minutes (cognitive limitation, difficulties with jargon). These difficulties fuelled the participants’ self-doubt of their ability to operate a tab-
let (lack of self-efficacy). Moreover, similar to the adoption factor literature, our participants made normative statements about online communication, for example they perceived it as a superficial form of interaction (Lehtinen et al., 2009; Lüders & Brandtzæg, forthcoming). Through the value alignment mechanism, we were able to analyze how older laggards dealt with their normative perceptions of online communication when their perceptions deviated from those of others, i.e., through value conflicts. In addition, we documented value reorientations. Particularly in the early stages of the adoption process, participants often felt that online communication was irrelevant to them, as it was considered a cold, superficial and complex form of communication with high privacy risks. Over time, some participants also began to view online communication as informative, connective when considering distant contact, and fun. Even so, initial predominantly negative perceptions remained, making their perception of online communication multi-facetted. Finally, computer anxiety (Chung et al., 2010; Karahasanović et al., 2009; Nahm & Resnick, 2001; Xie et al., 2012) and feelings of fear (Erickson, 2011; Gibson et al., 2010; Hill et al., 2008; Maier et al., 2011; Morris et al., 2007) did not result in outright rejection, but in particular forms of usage, i.e., careful usage and temporal non-adoptions. Clearly, the factors that influence older laggards’ adoption of online communication tools identified in the literature manifest themselves in the adoption mechanisms analyzed in this study.

Thus far, and to the best of our knowledge, few empirical studies have explicitly focused on the mechanisms that underlie adoption, and most of the studies that focused on working populations were conducted in an organizational context (Bunker, Krautz, & Nguyen, 2007; Koch, Leidner, & Gonzalez, 2013; McGrath, 2006; Meissonier & Houzé, 2010). A noteworthy exception is the research conducted by Trocchia and Janda (2000), who used adoption mechanisms to draw a distinction between younger and older users. In this chapter, adoption mechanisms are used to gain richer insight into how and when particular factors manifest themselves during the adoption process, and how they give rise to particular adoption behaviors.

**Intertwined nature of the situated adoption mechanisms.** We find that the three adoption mechanisms, knowledge development, value alignment, and emotional coping, emerge in the interplay between the focal social actor, other social actors, and the online communication tool at hand. As such, they are situated phenomena.
For example, knowledge development is “culturally construed and represented in memory” and “should importantly influence and even determine how one thinks about the object” (Markus & Kitayama, 1991, p. 231). In addition, related to value alignment, actors have perceptions regarding social norms, which are based on shared values, and regarding values perceived to be embedded in ICT. Based on these perceptions and personal values, actors determine their personal, temporal positioning with respect to these social norms, and to the values embedded in ICT (Thompson, 2012). Neither these social norms, the values embedded in ICT, or one’s personal position within those norms, can be understood in isolation. Value alignment is then part of the continuous fine-tuning of one’s position relative to others. The same is true for emotional coping. Although emotions are often perceived as being “natural,” this is arguably not the case (Lutz, 1988). Rather, emotions “can be viewed as cultural and interpersonal products of naming, justifying, and persuading by people in relationship to each other. Emotional meaning is then [...] an emergent product of social life” (Lutz, 1988, p. 5). Our situated perspective allowed us to explore and generate a deeper understanding of the linkages between the adoption mechanisms and the wider context. These linkages allow adoption mechanisms to shape not only individual adoption behavior, but also social change, for example, by changing older laggards’ sense of social connectivity.

Our findings suggest no particular sequence with which adoption mechanisms occur. Instead, they indicate close interrelationships between the mechanisms. Outside the adoption literature, psychological and IS papers studied these interrelations. For example, scholars have argued that both values and emotions fuel decision processes on what behavioral action should follow from a certain observation (Adolphs, 2009), and defined the two concepts in close relationship to each other (Alvarez, 2008; McGrath, 2006; Thompson, 2012). This literature states that our consciousness is a form of feeling that tells us how we are doing in terms of good and bad. Based on these processes, incoming information is interpreted, knowledge is developed, and subsequent behavioral actions are determined. This indicates that value alignment, knowledge development, and emotional coping jointly shape individual adoption behavior. As such, the three adoption mechanisms are situated and intertwined.

**Linking adoption mechanisms to changes in social connectivity.** The final result section of this study explored how adoption mechanisms jointly shape particu-
lar changes in older laggards’ social connectivity through five themes. The innova-
tiveness of these themes does not lie in the identification of specific changes in social
connectivity. Many of these changes, both online (Gibson et al., 2010; Morris et
al., 2007; White & Weatherall, 2000) and offline (Sayago and Blat, 2010; Sayago et
al., 2011; Xie, 2007; 2008b), have been identified before. Instead, what is novel is the
explicit link between particular combinations of the adoption mechanisms that shape
specific changes in social connectivity. Our findings suggest that changes in social
connectivity are highly situated and depend on the exact interplay between the adop-
tion mechanisms, i.e., interactions between understanding of what a particular ICT
is, personal values, emotions, and perceptions of social norms.

Based on the five themes, we formulate two propositions to guide future research.
First, the first two themes considered the direct consequences of online communi-
cation on social connectivity, i.e., “Connecting with distant friends” and “Voyeurism.”
Online communication tools were often used in ways that seemed to generate limited
social connectivity. For example, Facebook accounts were shared, and often used for
passive communication or communication with predominantly distant contacts. Nev-
evertheless, these limited types of use in terms of interactivity and openness matched
older laggards’ knowledge base, social values, and emotional experiences. Moreover,
they enabled particular positive changes in social connectivity. Mismatches between
these factors occasionally led to conflict and did not result in any positive changes in
social connectivity. Adoption mechanisms enable the matching and re-matching of
older laggards’ knowledge base, social values, and emotional experiences over time.
Based on these findings, we propose that:

Proposition 1: Online communication tools contribute to an older laggard’s social
connectivity when they are used in accordance with ones values, emo-
tions, and knowledge.

Second, the changes in social connectivity presented in the three remaining themes
were not so much induced by online communication itself, as by the general shift
from being a non-adopter to being an adopter, i.e., “joining in,” “discovering own abil-
ities,” and “connecting to society.” The observation that a mere shift from being a
non-adopter to an adopter could change perceptions of social connectivity underlines
the deeply social nature of technology adoption and use (Fulk, Schmitz & Steinfeld,
1990). In many societies, the widespread popularity of ICT creates social pressure on laggards to adopt (Agarwal, Animesh, & Prasad, 2009; Hage & Noseleit, 2015). This study shows that this pressure does not merely occur in the exclusion from additional communication channels. In addition, non-adoption is often accompanied by a general lack of what for many others has become “common knowledge.” This lack of knowledge creates exclusion in a wide variety of social situations in the private and public domain, and can reinforce often pre-existing feelings of low self-confidence. During the adoption process, older laggards developed knowledge regarding online communication, which occasionally led to value reorientations. As a consequence, ICT-related conversations (e.g., I Googled) and news items (e.g., go to our website: www dot) became easier to follow and more meaningful. This allowed a better social inclusion offline. This indirect outcome on online communication tool adoption was more prominent than the direct effect of online communication. Thus, we state that:

Proposition 2: Adoption of online communication tools results in a deeper understanding of technology related remarks during offline communication, which enhances older laggards’ social connectivity.

4.5.2. Practical implications

Policymakers could use the results of this study to develop context-sensitive implementation strategies for ICT related to wellbeing, i.e., strategies that fit the local context of the target population. We would advise considering that adoption of online communication tools is a challenging process for older adults who have, so far, not adopted such ICT. Moreover, this adoption process can trigger a range of changes in both online and offline social connectivity. Given that adoption is challenging and online communication induces changes in social connectivity, policymakers may want to apply a stepwise approach aimed at decreasing the adoption threshold, i.e., the experienced confrontation with ICT, by reducing it into smaller steps. The first step could merely be to get older laggards to start talking about online communication and experiment with modern ICT together in informal settings. Next, familiarizing older laggards with ICT, that is, developing their ICT-related knowledge (rather than hands-on skills) and actively discussing affordances of ICT can be a second step. As a final step, formal training should be directed specifically at older laggards, with the same level of previous computer experience. Each of the suggested steps could,
by itself, already contribute to changes in older laggards’ and non-adopters’ social connectivity, because simply providing accessible information regarding what ICT and online communication tools entail, and showing what they can do, may reduce feelings of social exclusion by allowing non-adopters to join in and better understand related conversations.

4.5.3. Limitations

As with any study, this study has some limitations. Given the interpretive approach, the results are liable to social interpretation bias. This is common in this type of value-related research and “because of our own culture, it is difficult for us [researchers] ... to both live in our cultural context and to question it” (Smircich, 1983, p. 355). Through data triangulation, feeding back results to the participants, and using Q-sorting, we aimed to minimize this danger. Further, our results are based on the extensive observation of ten older laggards from one sub-culture within a single project. While any statistical generalization is impossible, we would argue that the adoption mechanisms that emerged are analytically generalizable (Lee & Baskerville, 2003). Moreover, although we conducted longitudinal research, the time span was limited. We closely followed the participants for eight months, and had a second feedback session after a further 14 months. However, the adoption process should be viewed as a continuous, and as some conflicts are resolved, new conflicts emerge.

4.5.4. Future research

Future research on the adoption process and social connectivity of older laggards could usefully aim to extend our findings to other research populations. We would expect the adoption mechanisms that we saw among older laggards to also come to the fore in other older populations or generations. However, the mechanisms’ relative importance might differ. For example, because laggards are known to retain relatively traditional values (Rogers, 2003), the value alignment may be prominent among such groups. Moreover, additional adoption mechanisms may be at work in other adoption populations. A further avenue would be to perform large-scale studies to assess patterns in adoption mechanisms and accompanying changes in social connectivity.
4.6. Conclusions

This study was inspired by an observed confusion related to the idea that older laggards’ social connectivity benefits from online communication. Our study points to specific efforts that can stimulate older laggards’ adoption process, by respecting and offering room for personal particularities and peculiarities in knowledge development, value alignment, and emotional coping. Recognition of these adoption mechanisms and their interrelationships allows a deeper understanding of the conditions under, and the processes through, which meaningful changes in older laggards’ social connectivity may result from adopting online communication tools. Such an understanding offers new perspective on our views on ICT adoption and its relationship with human wellbeing.