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Developing Digital Competence Framework for Digital Immigrants via Mapping of Perceptions and Meanings

Participation and Security by Improving Digital Competencies

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Abstract in German [Kurzzusammenfassung]

Der Artikel befasst sich mit der Kluft zwischen sogenannten „Digital Natives“ und „Digital Immigrants“ und den Möglichkeiten, auch die „Digital Immigrants“ an eine sichere Nutzung des Internets heranzuführen. „Digital Natives“ ist ein Ausdruck für eine Generation junger Menschen, die ins digitale Zeitalter hineingeboren wurden und von Kindesbeinen an mit dem Internet und dessen Nutzungsmöglichkeiten vertraut sind. „Digital Immigrants“ bezeichnet im Unterschied dazu Menschen, die erst im Laufe Ihres Erwachsenenalters oder noch nie den Umgang mit Computern und Smartphones gelernt haben. „Digital Immigrants“ habe vielfach Berührungsängste mit neuen Entwicklung der digitalen Welt wie etwa sozialen Netzwerken, Messenger Diensten, Video-Plattformen, Online-Einkauf und Online-Banking, obwohl sie gerade davon erheblich profitieren könnten. Bei diesem Artikel handelt es sich um einen Landesbericht im Rahmen des Projektes DigiComp-Projekt (Erasmus+-Projekt: Improving Digital Competencies for Digital Immigrants: Tackling with Digital Divide and Digital Social Inequality), das zum Ziel hat, „Digital Immigrants“ dabei zu unterstützen, die notwendigen Kompetenzen zu entwickeln, um den Alltag in einer digitalen Welt zu meistern und ihre Wünsche und Bedürfnisse in einer digitalen Umgebung erfüllen zu können.

Zwar ist in Deutschland der Zugang zum Internet in der Gesamtbevölkerung bereits relativ weit verbreitet und die Zugangsunterschiede zwischen verschiedenen Bevölkerungsgruppen haben sich seit 2002 verringert. Insbesondere in den Altersgruppen von 67–78 Jahre hat sich der Anteil der Menschen mit Internetzugang seit 2002 etwa verzehnfacht, in der Altersgruppe 79–84 Jahre immerhin etwa verdreifacht. Drei von vier Personen über 60 Jahren haben inzwischen Zugang zum Internet und immer mehr Personen über 70 nutzen das Internet aktiv; zwei von drei Menschen in Deutschland besitzen bereits ein Smartphone und nach neuesten Daten ist der Anteil auf drei von vier gestiegen; darunter finden wir immer mehr ältere Menschen (BMFSFJ 2019, 13; statista 2021a). Dennoch gibt es immer noch eine bemerkenswerte digitale Kluft. Rund 97,3 Prozent der 14- bis 19-Jährigen in Deutschland besitzen 2020 ein Smartphone. In der Altersgruppe der 20- bis 29-Jährigen sind es 98,1 Prozent und bei den 30- bis 39-Jährigen 97,8 Prozent. Der Anteil der Smartphone-Besitzer unter den über 70-Jährigen beträgt nach wie vor nur 52,1 Prozent (statista 2021b). Darüber hinaus bestehen zwischen Frauen und Männern und unterschiedlichen Niveaus formaler Bildung erhebliche Unterschiede bei der Nutzung digitaler Geräte und des Internets.

Auf der Basis einer Literaturanalyse und 20 semi-strukturierter Experteninterviews wurden im Rahmen des o.g. Projektes DigiComp die Vorteile, die digitale Geräte und Internetnutzung gerade für betagte Menschen bieten, untersucht und im vorliegenden Bericht zusammengefasst. Insbesondere wurden die Möglichkeiten der Kommunikation, der Informationsbeschaffung in unterschiedlichen Bereichen, der politischen Teilhabe, des Abschlusses von Geschäften einschließlich Bankgeschäften sowie vielfältiger Assistenzsysteme zur Bewältigung des Alltags und zur Rettung aus Notlagen diskutiert. In diesem Zusammenhang wurden auch einschlägige Risiken, Strategien zu deren Vermeidung und zur Bewältigung von Schadensfällen analysiert.

Ein weiterer Abschnitt dieses Berichtes befasst sich mit den bestehenden Angeboten, betagte Menschen an die neue Technik heranzuführen. Die o.g. Experteninterviews betrafen auch diese Thematik. Zum Kreis der interviewten Expertinnen und Experten gehörten auch betagte Menschen, deren Aussagen und Hinweise in die einschlägigen Empfehlungen aufgenommen werden konnten. Schließlich geht der Bericht auch auf die Rolle und Sicht der Polizei ein, die naturgemäß mit den Schattenseiten der Internetnutzung vertraut ist und gerade von betagten Menschen als vertrauenswürdiger und kundiger Ratgeber geschätzt wird.

Der Bericht schließt mit einer Zusammenfassung der Ergebnisse, insbesondere einer tabellarischen Zusammenfassung der Fertigkeiten, Kompetenzbereiche und konkreten Kompetenzen, die betagten Menschen vermittelt werden sollten, damit sie selbstbestimmt an der digitalen Welt teilhaben können.

1. Digital Competencies for Digital Immigrants – Introduction

Computer, laptop, smartphone and tablet – people who cannot use at least one of these devices increasingly become excluded from modern society. The Internet supplements or even replaces more and more aspects of private and business life. This is natural for the younger generation and we call their members „digital natives“ therefore. But the competence and knowledge to use electronic devices and the Internet becomes essential for men and women of all ages. It is indispensable also for people who did not grow up with Internet and social media to use electronic media properly, save and without fear. There is an urgent need to address the issue of senior citizens and the Internet. Older people often feel overwhelmed and excluded by numerous technological hurdles and security problems. But the Internet and the new technologies could offer them many opportunities. Especially for people of advanced age new technologies and media could make their lives easier and could help them to maintain contacts, to obtain information and to buy goods and services even when their mobility is restricted. Especially the current pandemic clearly shows the added value that digital media offer for young and old. They give in a time of restricted direct contact the only opportunity to see the family and follow up contacts via video calls and the help of apps. It is all the more important to impart the necessary knowledge and skills for “digital immigrants” and give them the opportunity to use the advantages and possibilities of the digital world in a safe way.

Digitization is one of the central developments of our time. The changes associated with digitization have been a field for specialists in the past but nowadays they affect all members of society and no longer just a subgroup. For most people, and meanwhile also many aged people, it has become a natural part of their everyday life to learn consistently about new digital technologies and corresponding devices and applications, to use them and to shape their own lives with them. One can hardly avoid digitization and its consequences: Even people who do not use a smartphone, tablet or computer watch digital television and communicate with a voice robot when they make phone calls. Much information is now inaccessible without access to the Internet, and more and more services one can only use via the Internet. Many of these developments have only just begun and it is not yet clear in every area what consequences they will have for life in the future (BMFSFJ 2020, 6). But it seems safe to expect that digitization of private and business life is advancing at an undiminished speed.

It is common sense that we can observe a significant difference between “digital natives” and “digital immigrants” and we should prevent the gaps between these groups from becoming too great. “Digital natives”, is an expression used for a generation of young people born into the digital age. They are assumed to be inherently technology-savvy (Presky 2001a; 2001b; Tapscott 1998) whereas “digital immigrants”, are those who learnt to use computers at some stage during their adult life. Furthermore, digital immigrants are assumed to resist new technology or at least have some difficulty accepting it (Vodanovich et al. 2010). The Technology Acceptance Model (Davis 1986) has been based on the assumption that users tend to resist or at least have some difficulty accepting new technologies and systems. But with the generation of „digital natives“ a new generation of young people is growing up that seemingly has no problem accepting new information technology. As mentioned above in the meantime even the generation of „digital immigrants“ has – voluntarily or not – entered into the

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Internet and social media. The recent pandemic may have accelerated this development. Therefore, rather than seeing the difference between „digital natives“ and „digital immigrants“ as a rigid dichotomy, we need now to conceptualize this difference as a continuum. Even in the generation of „digital immigrants“ some people are more technologically adept than others (Nedbal et al.2012). The best way to conceptualize this continuum of technology adeptness could be the term of “digital fluency” (Wang 2013). „Digital fluency“ is the ability to reformulate knowledge and produce information to express oneself creatively and appropriately in a digital environment. From this perspective the aim of efforts like the DigiComp project (Erasmus+ project: Improving Digital Competencies for Digital Immigrants: Tackling with Digital Divide and Digital Social Inequality) should be to support „digital immigrants“ to develop the competencies to become digital fluent at least to the level they need to master daily life and fulfill their wishes, desires and needs in a digital environment.

„Digital Competence“ is defined here as a set of knowledge, skills, attitudes (thus including abilities, strategies, values and awareness) that are required when using information technology, the Internet, and digital media to perform tasks, solve problems, communicate, manage information, collaborate, create and share content. Digital competence is necessary to build knowledge and skills effectively, efficiently, appropriately, critically, creatively, autonomously, flexibly, ethically, reflectively for work, leisure, participation, learning, socialising, consuming, and empowerment (Ferrari, 2012, S. 3 f.). The concept „digital competence“ is not restricted to knowledge about the digital world and the skills to solve problems in a digital environment, but digital competence becomes only fluent when it includes the competence to manage information overflow, and a meta-perspective that allows to reflect about the way the digital world develops (Baumgartner, 2015). The spread of new technologies can be understood as a diffusion process in which a certain population group - in particular highly educated young men when using the Internet - discovers a corresponding technology for itself (Peres, Muller, & Mahajan, 2010) or even essentially contributed to its development. Starting from this group, more and more parts of the population will adopt this technology over time if they come into contact with it and if it is useful to them.

In Germany, access to the Internet is already relatively widespread among the entire population and the differences in access between different population groups decreased since 2002. However, there are still groups who are disadvantaged in this regard (Huxhold, 2019). In this context, the investigation of age differences deserves special attention. Access to the resources that the Internet has to offer is seen by many scientists as an almost indispensable tool in the future to deal with age-related losses, for example in health (Antonucci, Ajrouch, & Manalel, 2017). Especially for aged persons who are restricted in their mobility, services that are offered via the Internet could enable them to stay longer in their familiar surroundings (Schmidt & Wahl, 2016). At the same time, it is precisely the senior population who are still the group with the least common access to and use of the Internet. In addition, gender and educational differences in Internet usage are most pronounced in the oldest population groups, which can lead to aged women with a low level of education being disadvantaged in several ways (Huxhold 2019).

In 2017, the majority of people in Germany between the ages of 43 and 84 had an Internet connection. But almost complete coverage was achieved with around 97 percent only in the younger age groups from 43 to 54 years of age, whereas only around 39.5 percent of the oldest respondents between the ages of 79 and 84 had an Internet connection. Over the past few years, however, the age differences have steadily decreased and they are only particularly noticeable in old age. It is the cohorts born earlier that have caught up particularly quickly

during the last years. In the age groups of 67–72 years and 73–78 years, the proportion of people with Internet access has increased about tenfold since 2002 and in the age group of 79–84 years it has even risen by about three times (Huxhold & Otte 2019). Three out of four persons over the age of 60 have access to the Internet and more and more persons over 70 are actively using the Internet; two out of three people in Germany already own a smartphone and according to latest data the share increased to three out of four; among them we find more and more elderly people (BMFSFJ 2019, 13; statista 2021a). But there is still a remarkable digital divide. Around 97.3 percent of 14 to 19-year-olds in Germany own a smartphone in 2020. In the 20- to 29-year-old age group it is 98.1 percent and in the 30- to 39-year-old 97.8 percent. The proportion of smartphone owners among those over 70 is still only 52.1 percent (statista 2021b).

Furthermore, there are still differences between age groups, women and men and people with different levels of education. Among persons older than 67 years of age pronounced educational and gender differences regarding access to the Internet still exist. In general, persons in the second half of their lives use the Internet primarily to find information, followed by socializing and entertainment. Women and men use the Internet almost equally often to maintain social contacts. But men are more likely than women to state that they use the Internet for online-banking, and shopping in particular. People with a low level of education use the Internet noticeably little to find information and more than educated groups for entertainment. Senior citizens who have access to the Internet use it less frequently than younger people for all areas, but especially less frequent for shopping (Huxhold & Otte 2019).

In order to reduce the remaining digital divide and to avoid the digital exclusion of certain groups of aged persons, barriers should be removed. In particular, senior citizens who are socially disadvantaged must be supported by financial aid and low-threshold and target group-specific information and educational offers (BMFSJ 2020, 15).

Digital media can significantly improve the living situation of older people, as digitization offers new opportunities to make life easier in old age and enable social participation (BMJV, 2020, p.8). This can be used as the main argument to convince senior citizens that it is worth the effort to use the internet and the digital world in a meaningful and comprehensive way. In addition to the availability of an Internet connection also financial resources and education play a major role. This results in a so called “digital divide” (BMJV, 2020, p. 13) because not all people have the necessary knowledge, skills and other requirements for digital participation. This gap mainly exists between younger and older people and is still large despite the efforts of digital immigrants to learn (BMJV, 2020, p.13). In general, older generations are more reluctant and cautious to learn new techniques. Therefore, the problem in dealing with digital media is still primarily a question of generational differences. Younger people had the opportunity to grow up with digital media and see them as normal accessories. In addition, they can expand their knowledge in the daily exchange with peer contacts. In contrast to this, for older people it is in general much more difficult and time-consuming to learn something new and this is especially true for the digital world, which is strange to them (Schäffer 2006, 19).

At the same time, it is necessary to inform senior citizens about existing risks of the Internet in general but also about specific dangers for aged persons. Therefore, a responsible way to overcome the digital divide has to involve the police and their special knowledge about all kinds of criminality in the cyber space and their experience to avoid them. Easily accessible police officers located in the neighborhoods (so called COPs) usually

enjoy the special trust of senior citizens and are their primary source of information about dangers and risks. But COPs mostly are themselves „digital immigrants“. To educate these trustworthy multipliers of knowledge and skills is therefore essential.

2. Methodology

This report is based on a broad analysis of the German literature on this topic and on 20 qualitative, semi-structured interviews with various experts. Among them the responsible Bremen manager of the project “Digital Ambulances”, which is responsible for imparting digital skills to digital immigrants, the manager of a retirement home, an expert in urban planning who is currently planning a community center, and a bank manager who is responsible for older customers, which are referred in this report as general experts (GE). A second group are police experts and among them the police officer who is in Bremen responsible for the prevention of cybercrime, a manager of community police officers and five practicing community police officers, which are referred as police experts (PE). Last but not least we could interview nine senior citizens, who reported on their own experiences, needs, and expectations about the digital world, and are therefore referred as senior experts (SE). Among these expert senior citizens is a retired teacher for information technology, a former elected head of the district representatives board, an active and a retired member of senior citizens’ representatives board, and a member of the board of a citizens’ association. The ages of these senior experts range from 68 to 93 years. As some of the mentioned experts have positions that exist only once at least in Bremen, data protection laws prohibit to refer directly to the opinions, which they expressed in the interviews. Therefore, we do not reference the interviews individually but summarized in the mentioned categories general experts (GE), police experts (PE) and senior experts (SE).

The research team developed guidelines for semi-structured interviews for each of the mentioned expert groups, which on the one hand ensure the comparability of the interviews, but on the other also provide space for the different functions and perspectives of the respondents. The guidelines also ensured that the questions and topics of this project were dealt with in the interviews. This qualitative design should enable the analysis, understanding, definition, and interpretation of digital competence requirements in line with the perceptions, needs, and expectations of digital immigrants as an inclusive approach. In this way, it is aimed to understand the various aspects of the social reality dealt with, as well as an in-depth exploration activity regarding the research problem. The study focuses on digital competences, which the interviewed experts regard as necessary for digital immigrants in a digital, and only in this framework also on general competencies. From the analysis of the literature and the interviews resulted “digital competence areas”, which will be discussed in the following report.

3. Short history of the digital world

In order to support digital immigrants to catch up on missing knowledge and skills for the digital world it is helpful to resume the history of the digital revolution that took in fact place during the lifetime of „digital immigrants“. Even if they did not take enough notice of it, they could better understand that personal computers, internet and smartphone did not fall from heaven but had been developed mostly by their contemporaries and not by the younger generation of today.

3.1 Hardware

The history of the personal computer as a mass-market consumer electronic device already began after the development of the microprocessor with the microcomputer revolution of the 1970s. Already in 1977, the so called “Trinity”, the Apple II, the Commodore PET and the Tandy Corporation TRS-80 had been released (Byte 1995). These microcomputers had been devices for hobbyists and “nerds” of those days. IBM responded to the success of the Apple II with the IBM PC, released in August 1981. According to shortcomings in patent protection of the design the PC could be copied legally by other manufacturers with the result that the PC became the de facto standard for hardware architecture amongst a wide range of manufacturers that could undercut the prices of IBM making the PC widely accessible. This story to some extent recurred with Apple iPhone and Android smartphones.

Also, the history of the Internet dates back to the 1970s when networking of computers, e-mail and the Internet (= interconnect network; BMFSFJ 2019, 11) had been developed. The core principle of the Internet is that computers are in contact with each other and these contacts can be controlled by the users; then in the 1980s and 1990s the World Wide Web, browsers and hyperlinks have been developed (BMFSJ 2019, 22). It becomes clear that the core elements of the digital revolution have been worked out during the lifetime of „digital immigrants“. After 1990 WWW 2.0 came into use, which allows users to upload content. Services such as YouTube, Wikipedia, social networks, messenger services and video platforms like Skype and Zoom emerged and this may be the turn of tide, where many „digital immigrants“ lost touch (BMFSFJ 2019, 12, 18, 20; Deutscher Bundestag 2020, 49). The collective term “social media” denotes various platforms, which have in common that they enable people to network virtually. Social media allow their participants to exchange text or voice messages as well as images and videos. In addition to individuals, organizations (municipalities, cultural institutions, associations, companies) can also provide information on a regular basis to participants that subscribe to such channels (Deutscher Bundestag 2020, 48). The younger generation picked up all these new possibilities enthusiastically and changed with it the course of the world. But all this already started when nowadays „digital immigrants“ have been teenagers and the „nerds“ of those days revolutionized the business environment with mainframe computers and the PC.

In 2007 Apple introduced the iPhone, which has integrated a mobile phone with a full-fledged computer, which could be controlled with a touch-sensitive screen (touchscreen) to a so-called “smartphone”, that could be connected to the Internet via mobile radio technology. In addition, smartphones can also use other functionalities via so-called apps that were not available in classic computers, such as cameras, GPS receivers, position sensors / gyroscopes etc. This made Internet access possible without a classic computer. The change from bulky devices to smartphones that fit in every pocket led to an enormous expansion of Internet use and to the penetration of everyday life with IT-based communication. Whether to navigate someone to the right place, making an appointment, checking the time or asking about the weather, the internet has become indispensable (BMJV 2019, 20). Since the market launch of smartphones, they have profoundly changed the reality of life and society. Most of the possible range of uses and applications is continually being expanded and further optimized. Millions of apps are on the market and the device features are becoming more and more sophisticated. In 2018 around 66 percent of all people worldwide owned a smartphone; in Germany it was 81 percent (Deutscher Bundestag 2020, 43).

Still today technology develops with giant steps and undiminished pace. More and more stand-alone classic devices become “smart” meaning improved with microprocessors, controllable with apps and connected to the internet. This brings big challenges and opportunities especially for digital immigrants. On the one hand devices they know for years are changing profoundly. Whether to operate a TV-set, to use a washing machine or to drive a car, “smart” technology is ubiquitous and unescapable. There is the case of an old lady, who used to be a safe driver for years but got so nervous and distracted from the beeping and blinking of the assistant systems in her new car that she drove against a wall. Meanwhile she gave up driving a car. But the so called “internet of things” also brings many advantages and the smart home technology is especially promising for senior citizens. The basis of every smart home equipment is the interconnection of the devices and systems in an apartment or house and often the connection of the devices to the Internet. This gives the opportunity to monitor dangerous devices like an electric cooker, but also analyze whether the resident in the appartement no longer moves or has missed his normal routines. The reason for this unusual behavior may be that the resident had an accident or got seriously ill and if the resident had preselected this option, the smart home control unit can send an emergency call to a relative or a health or care center. This option can give aged persons the possibility to stay longer in their own apartments and live a self-determined life (Deutscher Bundestag 2020, 67). Today’s „digital immigrants“ have the chance to be the first generation to be supported in the last phase of their lives by household robots, self-driving cars and possibly even by exoskeletons and thus live much longer than previous generations self-determined and largely autonomous and, despite numerous physical ailments, be able to participate in social life (Deutscher Bundestag 2020, 45). Due to demographic change, this will also become imperative, as the growing number of aged and very old people can no longer be cared for by the declining number of young people. The prerequisite for being able to use these opportunities and avoid associated risks is, of course, that digital immigrants acquire „digital fluency“. As shown, it is in the interests of both the aged and the young generation to achieve this goal.

3.2 Software

But it is not sufficient to explain the history of IT-technology by means of devices like PCs and smartphone or communication technologies like the internet. As already mentioned, a special feature of smart devices is their ability to communicate with each other and with their environment, as well as their ability to take on a variety of tasks and adapt to new tasks and requirements. All this is possible because the functionality of smart devices is not primarily controlled by their physical structure (so-called hardware), but by monitoring and controlling the operations of the devices by a series of commands called programs that can be changed and that are therefore referred to as “software”. Software controls all processes from the basic technical operations of the device to the functions that are specifically useful for its owner. Directly useful and applicable programs are often called “applications” or “apps” for short (BMFSFJ 2019, 14, 17). During the history of IT technology software became increasingly complex and powerful and therefore, could be developed for more and more fields of application. Originally computers were only big calculation machines first for scientific and technical purposes then for business administration. But step by step software and digital technology won almost every field of human communication: writing, visualizing, recording and playing sound, music, and movies and beyond the classic media even interactive virtual realities. We are witnessing the unfolding of artificial intelligence, machines with software that can learn and adjust themselves to new tasks. Nowadays software products support numerous processes and areas of life. For example, they can help solve complex problems, simplify or monitor processes or even control big factories, complex engines like flying planes or the traffic of mega cities. Software products

now often consist of several million lines of program code. This makes an examination of all eventualities with which a software product could be confronted at the moment practically impossible (knowing full well that there are numerous approaches to automatically increase the software quality). In this respect, software products have undetected errors or undesired malfunctions. If these errors or malfunctions can be exploited by unauthorized third parties to carry out harmful operations on a computer system, they are referred to as weaknesses or security gaps in software products (BSI 2021, 22). In addition, even if the device and the software are working properly its users can be exploited and caused to accept fraudulent offers by means of a smart device or disclose sensible data and information. These risks can be reduced but not completely abolished. Therefore, digital fluency includes the awareness about these risks, as well as knowledge and skills to avoid them, and finally the ability to decide with an informed mind and a personal assessment, which risks a person is going to accept.

4. Problems and opportunities of the IT revolution

4.1 Communication

As explained above with the IT-revolution technical and social communication has changed dramatically. Already e-mail and PC gave the opportunity to send and receive written information instantly to and from any place in the world where people are living and internet connections are available. Exchange of letters and documents became much faster and easier. Telephone communication became with the invention of the mobile phone at least in western societies accessible at almost any place. With the smartphone both technologies melted together and with the emergence of cloud computing communication is no longer restricted to the capacity of local electronic storage. Online communication complements traditional communication channels, replaces conventional telecommunication and is rapidly gaining importance. Smartphones, tablets and PCs already replaced classic typewriters, telephones, telefax, telegram and mainly also letters on paper. Electronic cameras and smartphones also resembled classic cameras, slide projectors or photo albums. Telecommunications has become as fluent and accessible as direct communication from person to person. For „digital immigrants“ it feels strange to observe young people and couples looking to and writing on their smartphones instead of talking with each other. But for aged and especially persons with restricted mobility these technologies open up former unknown opportunities to stay in contact with their beloved ones, friends and all kinds of organizations and offices. #4.1.01*Digital communication and media can significantly improve the living situation especially of senior citizens (BMJV, 2020, 8). #4.1.02*But as mentioned above only half of those over 70 own a smartphone (statista 2021b). A survey on 299 retired citizens in 2016/17 revealed, that 66% use the internet to stay in contact with friends and family. 72 % use e-mail correspondence, but only 28% messengers like WhatsApp or Snapchat, 13% video platforms like Skype (Telefónica 2019, 7). A survey on 1212 Internet-users in 2018 revealed that 98% of 14 to 29 years old use social media, 92% of 30 to 49 years old, 80% of 54 to 64 years old but only 65% of retired persons (65 years old and older). Regarding YouTube these numbers are 79%, 52%, 35% and only 22% among retired persons. Summing up we still can observe a significant gap in using modern forms of communication even in the field of communication which may have the most obvious advantages for senior citizens. #4.1.03 Interviews* The qualitative interviews with senior citizens for this report confirm the findings of the mentioned survey. All but one senior experts (SE) use smartphones most of them own a PC, laptop and/or a tablet computer. Most of them use WhatsApp and email communication. Only three are active on Facebook, three communicate via Skype or Zoom and one via Instagram. None of our senior citizens mentioned to use Twitter. The police officers and general experts confirm this distribution. But we have also to

mention that all senior experts in our sample have access to the internet. Digital communication has become an important possibility to stay in contact especially with their children, grandchildren, other family members and friends. The general and the police experts agree that digital skills and using the Internet depend much on individual interests and attitudes as well as education, social situation, and gender. A general expert said, “With senior citizens it was a gradual process, in the last 5 years it has become more fast-paced, the older people approached such media faster and more attentively. The children no longer live on site, the media are a good means of staying in touch via Skype, WhatsApp, Teams, Zoom, ..., especially when children or grandchildren live in a different country. Usually, the children are the initiators. The older ones usually find it great, e.g. send photos over, the older ones stay tuned and up to date.”

4.2 Information

“You can find more information about this topic on the Internet”. Whether on television news, on posters or in newspapers - one hears and reads this sentence a lot. But those who don't have the necessary internet access or see the internet as a kind of unknown and dangerous territory unfortunately cannot take advantage of these supplementing information (BMFSFJ 2019, 7). In all aspects of digital society Internet is essential. Internet pages are replacing paper catalogues in all sectors that offer goods and services, also telephone books, dictionaries, maps, handbooks, manuals and even former well-known encyclopaedias. YouTube and similar services offer information on all kinds of topics and fields of interest with a multi-media approach. A new form of infotainment has grown up integrating education, information and entertainment. Internet newspapers supplement classic newspapers and give the opportunity to read different opinions on the same topic. In general, the Internet has already become the main source of current and up-to-date information and most of it is free so far. The limit for uploading content on the Internet is drawn by copyright law, which is currently undergoing a comprehensive reform in Germany. After that, the free upload of film sequences or audio tracks is limited to 15 seconds and newspaper articles to 160 letters. The reform also introduces a new ancillary copyright law for press publishers to provide a minimum share for journalists in the licence income.¹

Also, official information from all kinds of public offices, authorities can be best obtained from Internet pages. The same is true for private companies and organizations. Appointments with town hall and public offices e.g. for the delivery of a new passports as well as many other public documents should be made via Internet. In order to take advantage from the bulk of information presented in the Internet one needs new skills for searching, retrieving and storing information and has to be able to use Internet browsers and search engines. In accordance 93% of senior citizens want to use the internet for retrieving information, broaden their knowledge and learn something new. But actually only 43% read newspapers and magazines in the Internet, inform themselves about topics that are most interesting for them like health issues or access to Internet pages of public offices (Telefónica 2019, 7). Obviously, there is a gap between wish and reality that should be closed. We can only partly support these findings with our interviews. All senior respondents said that they use digital devices and the internet as a source of information. Many explicitly mentioned that they want to keep up with modern times. Nevertheless, by tradition they like to read the newspaper on paper. Possibly, some of the senior citizens are more extensively informed than young people who only get information on the Internet. Senior citizens are very aware of the problem of fake news on the Internet.

4.3 Changing business processes and transferring public services

But not only information can be taken from internet sources it is also possible to order goods and services in the internet, arrange appointments, buy tickets for theaters and public transport. Not only the ordering procedures but also the payment is now carried out on the Internet. Some goods and services like music, movies, electronic books and e.g. translation services can even delivered over the Internet. These new possibilities turned out to be especially useful in times when public life had been restricted due to the Corona crises. Persons, who could not use the Internet properly became cut off from many goods and services independently of their private or public nature. This is one reason why senior citizens were hit particularly hard by the pandemic and the lockdown that went with it. In this respect the lacking ability of senior citizens turned out to be one of the obstacles that slowed down Covid-19 vaccination in the beginning. Although 83% of senior citizens would like to use the internet to avoid running around for goods and services and 69% would like to use its advantage in order to be able to remain independent for longer, only 24% actually use it for business operations including both shopping and banking (Telefónica 2019, 7). And in this respect the pandemic makes a particularly important point clearly visible. Pupils, students, their teachers and professors as well as other persons in professional life on the one hand, received professional support and courses to learn new skills like using video platforms, online meetings and schooling. On the other hand, they were forced to continue their training and adapt to the new world of internet-based collaboration and home-office. Obviously, retired persons are not included in this general improvement of skills and fall back even more. The pandemic brought about a major development boost for the spread of digital processes in many fields of professional and social life. Therefore, it is even more important to support senior citizens to catch up. But especially in this field it is not only necessary to spread the necessary knowledge and skills, to use the internet for business procedures but also to spread awareness, knowledge and skills to avoid the risks and dangers that are connected to such procedures.

The mentioned digitalisation boost during the Covid-19 Pandemic shows besides the possible fall back also a positive development for senior citizens in the field of online banking. In the past, seniors in particular often found online banking to be too complicated and too risky. But a recent survey by the digital association “Bitkom” shows that during the pandemic the share of 65-year-olds and older persons, who use online banking has increased from 22% to 39%. It seems even more important that the senior generation turned out to be informed about risks as well as opportunities so that this positive trend will probably not end in the future (Müller, 2021).

Our interviews support this picture. Seven out of nine senior citizens use online banking. But on the other hand, our interview partners are very critical of the fact that bank branches are closing. Some are involved in senior councils against it. Surprisingly, only three of our senior experts use online shopping, but almost all use the internet to compare offers, look for new products, and read product comparisons. It's not necessarily the lack of skills or the fear of fraudulent offers that some senior citizens avoid shopping on the Internet. Some explicitly told us that they want to support the shops in their neighborhood. A supportive local network has a high value especially for senior citizens. A 93 years old woman explained “The courier of the local pharmacy also gives lessons ... If I have problems with internet banking, I go over to the Sparkasse (municipal savings bank) and ask.” General and police experts emphasize the great diversity among senior citizens regarding online banking and online shopping. One general expert explained: “At 91, my mother doesn't know what a PC looks like, she would probably wipe the internet if she turned on a computer. Others are totally fit like Ms. K. That is totally mixed. I would not make Internet / PC use age-dependent, but rather generation and gender-de-

pendent. ... Internet banking is becoming more and more popular. According to the motto: I can give it a try. Internet banking is seen as totally practical, especially in times of Corona. Seniors can do a lot from home. The discussion about the closure of the “Borgfelder Sparkasse branch” [bank branch in the neighborhood of the interviewed person] has led to an Internet banking boost.”

4.4 Personal interests, hobbies and entertainment

Many people look forward to retirement in order to finally have enough time for their hobbies and personal interests. The Internet offers in this respect a hitherto unknown and almost inexhaustible variety of information as e.g. cooking recipes, repair instructions, guides, comparison portals, crossword puzzles, garden maintenance tips, school holiday dates of the grandchildren, club membership news, sports news, fan pages and so on and so on. Furthermore, all kinds of educational courses can be taken over the Internet. On YouTube one can find courses and instruction videos for virtually any field. Finally, YouTube and many other channels offer all kinds of entertainment. Many of them are free of charge. More and more television and radio stations, and even daily newspapers refer to their websites and also to their own apps for smartphones or tablets. Media companies are increasingly using the diverse possibilities of the Internet, merging texts, photo series, videos and radio reports into one medium. Those programs are often linked to other information on the same topic. Many television stations also make their programs available on the Internet in so-called media libraries, making it possible to watch the programs outside of broadcast times. Who likes to play, is in the right place on the Internet. In addition to classic crossword puzzles and Sudokus, there are many other games on the Internet, many of which are free. There are also countless game apps for smartphones and tablets. Because one can easily take mobile devices anywhere, it is possible, for example, to play a little on vacation or in the garden. In addition, the Internet is the platform for the big new world of electronic gaming with numerous professional games for every taste and interest (BMFSFJ 2019, 21). Therefore, it is not astonishing, that 63% of senior citizens want to use the Internet for hobbies and entertainment. But also here we can see a gap. Only 48% of senior citizens actually use the internet for playing games, 27% to watch TV-programs, 29% to watch videos and 14% to listen to Internet radio stations (Telefónica 2019, 7). Also from our interviews with all kind of experts we can see, that practical applications that support communication and information are in the focus of senior citizens even regarding personal interests, hobbies and entertainment and not so much gaming. Senior citizens use digital devices when they see a clear advantage and stay with traditional media and devices when they get from them what they need. As a senior expert explained: “I like to go to the store myself as long as I can. Shopping on the Internet - younger people do that. I want to see and feel my things immediately. Going to department stores or markets is also a change. I refuse internet shopping. ... On the laptop I can e.g. look at ‘The Bell’, the concert hall, I can see where the seat is where I want to sit.”

4.5 Political participation

The Internet has not only become a big marketplace for all kinds of goods and services but also an important forum for political discussion, online petitions, direct communication with politicians etc. Twitter news and online influencers compete with conventional media and information services. There is practically no political party, initiative and NGO that doesn't maintain Internet pages that explain their political view, aims, and initiatives. Without access to the internet a person is cut off from many discussions and information. If a whole group of people is not participating in internet discussions and communication their interests become overseen and their voice unheard. This can happen to a whole generation if it is not active in the world wide web of ideas and discussions.

We know from the interviews that social participation is one of the aims of the project “Digital Ambulanzen”. Therefore, the project supports and connects initiatives that improve digital competences of senior citizens. Conversely, senior citizens who are involved in advisory boards and projects are confronted with modern communication technologies and learn, for example, to take part in online conferences. The manager of a retire-

ment home reports about two very fit older women with whom she also corresponds regularly by e-mail. The residents' council of the home works a lot with digital technology and also uses projectors for presentations, for example. Another senior expert mentioned that he studied as a retired person economics and politics at Bremen University and therefore had to take part in online lectures.

4.6 Coping with everyday life

Last but not least digital devices and media can be very helpful to cope with everyday life. Appointment management, contact details and opening times of doctors, cinemas, museums, theaters as well as banks and public offices had been mentioned already. One can find also television programs, weather forecasts, timetables of public transport and international flights and one can search for special offers for any kind of goods and services. Furthermore, there are very useful applications that were unknown in the past as e.g. online navigation. In order to stay active and mobile well into old age, e-bikes, assistance systems in cars and online navigation even for pedestrians offer valuable support. Exercise games, pedometers etc. offer the opportunity to promote and maintain personal physical stability and memory training games intellectual stability (BMFSFJ 2020, 20). However, not only with regard to maintaining mobility, but also for safety, there is now a range of digital helpers, such as tracking systems for people with dementia, sensor mats for fall detection or portable measuring devices to monitor vital parameters and send an alarm via internet in case of an emergency. (BMFSFJ, 2020, 21). Also digital doctor visits, and reminders to take medicine can help to maintain the independence of aged and already somehow disabled or handicapped people (BMFSFJ 2020, 25). Furthermore, we are witnessing the first stage of smart-home and robot technology with hoover and lawnmower robots, but robots as care assistants are being developed at high speed and other fields of application will follow (Deutscher Bundestag 2020, 51; Kehl 2018). It seems that senior citizens underestimate these advantages. Only 58% want to use the internet to stay mobile and independent. Only 53% mentioned in a survey that they use internet-based navigation e.g. with Google maps, 66% look at the schedules of public transport presented in the Internet, and only 46% search for information on long-distance travelling and hotels in the Internet (Telefónica 2019, 7).

As already mentioned, digitalization could significantly improve the living situation of senior persons, as it offers new opportunities to make life much easier and enable social participation (BMFSFJ, 2020, 8). Here we have to mention that often older generations are not lacking in interest or the willingness to learn new techniques. Younger generations had the opportunity to grow up with digital media and therefore see them as normal accessories. In addition, they can expand their knowledge in daily exchange with peer contacts. In contrast to this, for older people it is much more difficult and needs more time to learn new skills especially after they have retired and lack professional support (Schäffer 2006, 9). Furthermore, we should not underestimate the number of senior citizens, who have to live from scarce financial resources and are not able to catch up with the fast development of technology and new devices, which are necessary to make use of the internet properly and comprehensively (BMFSFJ 2019, 13).

We also can see from the interviews that senior citizens appreciate the possibility to send an emergency call via smartphone from any place at any time. Senior citizens also use online navigation, produce slide shows from their photos, read ebooks, use text-to-speech and translation apps. Those senior citizens who are able to keep up with development can lead independent lives longer, but this does not apply to all older people. Rather, a digital divide is emerging among the digital immigrants and it is important to prevent that only a small part of the elderly can benefit from digital technology.

5. Dangers and risks with digital communication

So far, this report addressed mainly the opportunities and advantages digital devices and the Internet provides for senior citizens. However, it cannot be denied that there are numerous dangers lurking on the Internet that can cause serious harm of various kinds to those affected. Digital devices, computer programs and apps are not

free from vulnerabilities, which can be used by strangers to gain unauthorized access to the data on and the functions of any digital device, especially when it is connected to the Internet. Vulnerabilities can occur both in applications and in the operating systems (BMFSFJ 2019, 24). But dangers are not only of a technical nature, they are also based on risky behavior. According to a survey on cyber security by the BSI and the crime prevention office of the federal states and the federal government, one in four has already been a victim of crime on the Internet (BSI 2021, 39).

5.1 Technical risks

Technical risks include, on the one hand, malfunctions of digital devices or software, which can lead to lost data or essential functions not being carried out or being carried out incorrectly. The latter is less important for PCs and smartphones, but all the more important for so called wearables, devices, which are used on the go like smart-watches or fitness-trackers, devices that are operated e.g. in a smart home, and devices that monitor, support or even substitute critical health functions. On the other hand, and above all, the dangers and risks that are discussed in regard to digital devices and the Internet are vulnerable or malicious software and links that can be used to spy out personal data, as i.e. Trojans, viruses and links to fake websites etc. Malicious programs include all computer programs and applications that perform malicious operations or empower other programs to do this. Malicious programs usually get in emails, via attachments, or links on a computer. When users click such an attachment or click on a link that leads to a manipulated website, a malicious program is installed. In addition, unnoticed downloads in the background (so-called drive-by-down loads) as well as malicious extensions of legitimate programs are typical forms of attacks. Malicious programs often use weak spots for the infection. These can be in software or hardware products, at network gateways, as well as in the case of social engineering human errors or weaknesses (BSI 2021, 9). While detection methods exist for known malware variants, new variants cannot be recognized as malware immediately after they appear and are therefore particularly dangerous. The number of new malware variants increased by around 117.4 million from June 2019 to May 2020. This corresponded to an average increase of around 322,000 new malware variants per day in the reporting period (BSI 2021, 9). These numbers clearly show the dimension of the problem.

In order to be generally protected against infections by exploiting security gaps that have already been fixed, updates should be imported into IT systems - ideally via central software distribution - immediately after they have been made available by the respective software manufacturer. The greatest danger here is usually for applications that open content from the Internet, such as web browsers, browser plugins, e-mail programs, PDF document viewers and office suites (BSI 2021, 16).

In the case of private persons, the attacks are usually aimed at obtaining personal data, while so-called ransomware is playing an increasingly important role in institutions. Personal data can be used to optimize advertising on websites, but in particular to get passwords for bank accounts, internet shops and other accounts and in the worst case they can lead to an identity theft so that a person completely loses control over what is under their identity said, done or shown on the Internet. It is not possible to produce software that is absolutely free from vulnerabilities but these risks can be minimized. The first and foremost strategy to avoid such risks is to keep software updated, to use firewalls and anti-virus-software and to protect all devices and the private WLAN with strong passwords (BMFSFJ 2019, 24, 25).

5.2 Behavioral risks

Behavioral risks are just as important as technical risks and these already begin with using outdated software and neither using anti-virus software, firewalls or passwords (BSI 2021, 16). In addition, one should be cautious with personal data and become sceptical if such data is collected without it being necessary to do so. However, beyond such simple advice, it is difficult to explain safe and sensible behaviour on the Internet in just a few

words. This is no difference than e.g. in modern road traffic, in which extensive knowledge and experience are required for safe and at the same time speedy progress. But it does not make sense to do without modern means of transport because they are associated with dangers.

Due to the highly networked global relationships in business, state and society, the COVID19 pandemic has extensive effects on almost every area of life. This also applies to the digital world, which is now often a central building block for maintaining the most essential basic supplies for the population, but also for combating the pandemic itself.

Unfortunately, however, criminals also react quickly and flexibly to crises and exploit insecurities and social problems for their own purposes, in particular by inventing new forms of social engineering. This includes attempts at fraud and manipulation which, under false pretenses and by exploiting human reactions such as fear or helpfulness, induce victims to behave in a self-damaging manner; for example, by clicking on a link that installs malware. Attackers who use such methods usually react quickly to media-relevant, high-profile issues and adapt their attack campaigns accordingly. In the course of the COVID-19 pandemic, German authorities observed various campaigns that took advantage of the complex overall situation surrounding COVID-19. These include, for example, phishing and malware campaigns, CEO fraud, and attempted fraud using IT resources, also commonly known as scams. The mood in large parts of the population, which is characterized by fears, worries and insecurity, may increase the chances of success of such attacks, but unexpectedly large clusters did not occur (BSI 2021, 33). But almost immediately after the immediate financial aid measures had been announced and implemented at the federal and state level at the end of March 2020, phishing campaigns attempting to exploit these measures were observed. Fraudsters registered phishing domains for this purpose and designed the websites accessible under them, in some cases identical to the official emergency aid pages. These pages were then brought into circulation using various means such as spam e-mails or search engine placements. It can be assumed that the basic aim of these phishing attempts was to gather information about financially distressed companies and individuals. The attackers were then able to use this information to call up payments on behalf of the victims from the official emergency aid agencies, whereby the actually authorized applicant was denied any assistance, at least temporarily, and the state suffered considerable damage. In the long term, the use of the information obtained through phishing for follow-up attacks on the victims cannot be ruled out. Another serious problem are classic and particularly reprehensible attacks on very old people, such as the so-called grandchildren trick or adapted to the pandemic so-called “shock calls”. “Shock calls” are telephone calls to aged persons, which pretend that a close relative of the phoned person has due to a COVID-19 infection or a violation of quarantine requirements gotten in a critical situation and is in desperate and immediate need of cash. As he or she cannot go to his or her grandparent, uncle or aunt, he or she has to send a friend and urgently asks to hand over money or valuables to this friend (Polizei Bremen 2021; Michel 2021). Fortunately, great efforts by the police, the press and the banks have resulted in such calls being mostly reported to the police and the perpetrators only rarely reaching their aim. But if the aged persons could be reached via video telephony, the perpetrators could use so-called “deep fake” technologies, in which images of the grandchildren e.g. from social media could be misused to simulate a live conversation with the grandchild, which would significantly be more persuasive than a phone call (Achterberg & Zafeiri 2021). Sometimes traditional methods are also used anew. In Germany, for example, a large Internet and telephone provider is currently being criticized for using agents who attempted to sell unnecessary or overpriced mobile phone contracts or Internet access contracts to citizens at their doorstep (Henthy 2021).

5.3 Situation in Germany

Representative online surveys resulted in the following findings (BSI 2021, 39 and 40). The general level of concern among citizens remained constant during the last years: one in four has already been a victim of crime

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on the Internet, 25 percent of them in the last 12 months. Above all, those affected experienced fraud when shopping online (44%) and third-party access to an online account (30%). The protective measures can still be expanded. For example, antivirus programs (57%) and secure passwords (48%) are widespread, but they are far from being used extensively. In addition, only a quarter of the respondents use automatic updates and around a third use two-factor authentication (BSI 2021, 39).

Just over half of the respondents of a recent survey know the current security recommendations for protection against crime on the Internet. In most cases, these are implemented when it is just right (41%) or immediately after a recommendation has been acknowledged (39%). It is noticeable that people who have already been victims several times more often only implement the safety recommendations in the event of a problem (33%), even though they were already familiar with them. The majority of the respondents inform themselves about internet security every now and then (37%), one in four never. Security in online banking (60%) and online shopping (40%) is particularly important to the respondents. Around every fourth respondent receives the security recommendations from the BSI and knows the “BSI for Citizens” website (27%) (BSI 2021, 39).

On average, the risk of data thieves gaining access to passwords is considered to be medium (mean = 2.9 on a scale from 1 = very low to 5 = very high). The respondents consider it most likely that hackers could get their passwords through data theft from companies (mean = 3.3 on a scale from 1 = not at all likely to 5 = very likely). They tend not to believe that they can effectively protect themselves from hackers with passwords. At the same time, they tend not to know when a password can no longer be cracked by hackers (BSI 2021, 40).

The number of passwords that must be available in different contexts, whether at home or on the go, is a challenge for the respondents. Almost four fifths of the respondents (78%) use up to 20 online accounts that use a password to be protected. Three quarters of the respondents (74%) try memorizing the passwords themselves. Around a third (34%) write down passwords on paper, 15% save them in a password manager (multiple answers were possible) (BSI 2021, 40).

Two thirds of the respondents (67%) state that they use completely different passwords. 10 percent of the respondents use their own rule according to which passwords are created, 6 percent of them pursue the strategy of deriving a password from the initial letters from a randomly formed sentence. Of the 39 percent of respondents who are familiar with password managers, only just under a third (27%) use such technical aids to create strong passwords and to log into online accounts. The main reason for not using such software is reservations (67%). Particularly strong is the concern that a hacker could get all the passwords used in one fell swoop (78%); there is also widespread skepticism about the seriousness of providers of such programs (58%, multiple answers possible) (BSI 2021, 40).

Two thirds of respondents would like to get more information on how they can protect themselves from data theft (66%). Practical tips on how to use passwords securely with a large number of accounts are the focus of interest in information (59%), followed by recommendations as to which software is suitable for protecting your own online accounts (52%) and information about the advantages - and disadvantages of password managers (49%, multiple answers possible) (BSI 2021, 40).

The group with the largest proportion (36%) helped themselves after a criminal offense. This also corresponds to the desire for information: More than half of those affected consider a checklist to be helpful in an emergency. In addition, the respondents would like more information in the future on how to recognize crime on the Internet (58%) and what a victim can do (46%). Police and BSI have already responded to these needs and launched a series of checklists that can be downloaded from the respective websites (see www.bsi-fuer-buerger.de). This will be continuously expanded (BSI 2021, 39).

With the establishment of an own department, the BSI is intensifying its work in digital consumer protection. Among other things, experts will deal with the question how the state framework for cyber security can be designed to be consumer-friendly, what secure consumer products and services can be offered and consumer concerns on cyber security issues can be dealt with in a service-oriented manner (BSI 2021, 41).

In order to make consumer protection effective, it is necessary that state, business, and society work together. For example, the BSI concluded a memorandum of understanding with the NRW consumer center in 2017 and the Federal Association of Consumer Centers in 2020 with the aim of deeper cooperation. The cooperative approach also includes the exchange with science and academia in order to incorporate perspectives from different specialist disciplines into the work and to work together on innovative solutions. In September 2019, the BSI and the Consumer Research Network organized an interdisciplinary consumer research forum on the subject of digital nudging. At the event, findings from behavioral economics were applied to information security issues. The discussion always focused on the common goal: to strengthen digital consumer protection in Germany (BSI 2021, 41).

The interviews show a mixed picture. The senior experts we could interview presented themselves both aware of the risks and dangers of the Internet but not frightened. The interviews with police officers painted a different picture. They experience senior citizens as victims of numerous crimes from fraud to identity theft, and in particular the COPs often point out that older people are too careless with digital devices and disregard basic security measures. In contrast, the general experts point to the problem that senior citizens reject the use of digital devices and the Internet because of their fear of falling victim to crime. But all experts agree that support and training are necessary to enable even more senior citizens to use digital technology and the Internet safely and independently.

6. Competence and Security by training and information

Senior citizens usually are not naïve with regard to these dangers. On the contrary, information from the media or hearsay stirs up concerns especially among aged persons. Often, they are afraid of doing something wrong and causing damage. Many fear financial losses especially from online purchases or online banking. They also fear misuse of personal data on the Internet or are afraid of revealing things that could be used by intruders or fraudsters in real everyday life (Telefónica 2019, 9). Senior citizens are aware that inexperience with new technical systems can easily lead to falling victim to criminals (BMJV, 2019, 15, 35). In contrast to young people the problem with senior citizens is to give them a realistic picture of the risks and countermeasures because they otherwise tend to avoid digital services completely. Therefore, courses and support programs should be offered for each application or service, which discuss the respective concerns and explain the possible countermeasures in a clear and understandable way. But a further problem is to inform digital immigrants about these available support programs and motivate them to take part. At this point again the police and especially COPs, who enjoy the trust of senior citizens have the role of advisors and multipliers that hardly can be overestimated.

The problem that the benefits of a technology are associated with risks does not only apply to digital information technology and the Internet. It should therefore be a sensible starting point to explain the problem to „digital immigrants“ using examples from the analog world that is better known to them. We have already discussed the example of road traffic above. In this context, the German Ministry that is responsible for senior citizens makes use of the parallels to a house or apartment. In this context, too, it is important to take precautions, exercise caution and observe numerous rules. So, one should lock the door and not leave the window tilted when one leaves the house. One shouldn't let strangers into the house without further ado. Great caution is required when uninvited visitors want to do business which, as so-called door-to-door sales, are intended to arouse scepticism from the outset. In addition, the building fabric must be constantly monitored, maintained

and regularly renewed. Cracks in the wall, broken roof tiles etc. have to be repaired, frost damage removed, but also doors and windows, for example, have to be replaced from time to time, even though they are not defective, because the requirements for thermal insulation and, in particular, burglary protection have increased. Nevertheless, nobody will want to do without the advantages that a house or an apartment offer (BMFSFJ 2019, 24). The same should become true with digital devices and the Internet.

Such examples are intended to make it clear to „digital immigrants“ that digital devices and the Internet, while new technologies, do not necessarily differ in particular aspects from current technology. The benefits outweigh the existing risks when used sensibly. However, the risks cannot be eliminated once and for all, but require sustained attention without being fearful or negative. Most „digital immigrants“ can still remember the hardship their own parents had with phones, TVs, and driving cars. But even if one didn't learn to drive a car, one couldn't escape the dangers of modern road traffic, but had to forego the benefits. It's not much different today with the digital revolution and the Internet.

As in the past with their own parents, information from the media or hearsay stirs up concerns. There is often a fear of doing something wrong or broken and of suffering major financial losses, especially when shopping online or doing online banking. There is also a great fear of misuse of personal data on the Internet and the fear of revealing things that intruders or fraudsters could use in real everyday life (Telefónica 2019, 9).

6.1 Need-based promotion of digital skills for senior citizens

In the project “Digital mobility in old age”, the requirements for a needs-based promotion were examined and tested in model projects. On this basis, ten recommendations have been drawn up, which should serve to support persons with different learning motivations and skills of the very heterogeneous group of senior citizens, who comprise more than three decades of age, and to enable, encourage and empower them in a sustainable way to participate in the digital society. These recommendations largely agree with the findings of other studies and can be regarded as current knowledge (Deutscher Bundestag 2020, 110; Doh 2020; Schramek & Stiel 2020; Stubbe et al. 2019).

Many aged persons are unsure whether they can cope with the challenges of using tablets, PCs, smartphones or the Internet on their own. The older the people are and the less learning experience they have in other areas, the greater the (self) doubts tend to be. These doubts relate both to coping with problems with Internet usage and to self-confidence in being able to achieve the learning objectives of the respective offer. In addition, some do not act out of their own conviction, but because they feel pressured to do so by their personal environment or are afraid of losing touch with society (Telefónica 1999, 8).

Therefore, the first step in planning a support program should be to assess the motivation and ability to learn as well as the previous learning experiences in the post-occupation phase. This can be done, for example, in the context of a consultation.

Second, support programs should encourage participants to use digital media in order to deal with everyday tasks independently and enable them to do so. It is important that they experience learning success in the process. Conversely, imparting knowledge of how to operate a device (e.g. tablet PC or smartphone) and individual Internet applications comes second. In order to encourage the participants, special didactic elements should be used as support. These can be positive experiences of people of similar age, which are conveyed personally in a conversation, or alternatively, reports recorded on video (video testimonials). The findings of research on pedagogical or better geragogical work with aged persons should be used (Deutscher Bundestag 2020, 109; Dietel 2017).

Participation and Security by Improving Digital Competencies

A third point is that in classic learning formats such as courses or training, groups should be as homogeneous as possible in terms of learning experience, ability to learn, and the previous knowledge of the addressees. In this way, the pace of learning can be better adapted to the needs of the participants, and the trainers can avoid that some people feel progress coming too slow while others feel overwhelmed. In addition, the lower the learning experience, the smaller the (sub) groups should be. Special emphasis should be given to the specific biographical, social, cognitive, sensory and emotional-motivational peculiarities of the intended target group (Bubolz-Lutz & Stiel 2018; Doh et al. 2018; Gallistl et al. 2018).

Fourthly, it should be taken into account that the motivation to learn can be increased if the program demonstrates a benefit in coping with everyday activities such as communicating with personal surroundings, supplying with food and other everyday items or organizing leisure time (Dietel 2017; Kamin 2020). Transitional situations such as retirement or the loss of relatives are important starting-points. The everyday activities of senior citizens are largely reflected in the gratuities examined in the study "Digital mobility in old age". These include contacts with family and acquaintances, improving knowledge, entertainment and pastime, orientation and movement in new surroundings or the saving of running around. These gratuities represent the concrete and tangible benefit for seniors. The courses should focus on the respective everyday situation and contain discussions about the participants' previous practice. The additional benefits of digital media can be demonstrated and made tangible in specific exercises. The operation of the devices is shown and practiced step-by-step - almost on the side.

Fifth, training should always start with simple applications and only introduce more complex applications in further steps. When it comes to communication, this means, for example, that e-mails are discussed first before addressing video telephony via Skype, facetime, etc., where the participants can also see each other. Finally, a messenger service such as WhatsApp can be shown with the option of exchanging photos, audio and video recordings. When shopping, you can start with an online price comparison of goods or look for a nearby shop that offers a certain item on the Internet. The participants can then order a low-priced item in the online shop, initially as a guest without registration.

Sixth, it turned out that senior citizens prefer written documentation on the subject so that they can read in peace what they saw and did under guidance. These materials should show each individual operating step, as precisely as possible, as it was practiced in training. Therefore, all participants should use the same browser. The apps used and discussed in the course should be up to date on all devices.

The seventh point of these recommendation is security. As already mentioned, information from the media or hearsay creates serious concerns among senior citizens. They are typically afraid of doing something wrong or damaging when dealing with new types of equipment and technologies. Others fear financial losses from online purchases or online banking. There is also widespread concern that personal data could be misused on the Internet, e.g. by intruders or fraudsters. Such concerns are justified, but the risks and dangers are sometimes overestimated. It is therefore important to discuss the respective concerns with each application and to use examples to address possible countermeasures. The consumer advice centers and the police offer up-to-date information in the internet on phishing emails and fake shops that can be used in trainings. Furthermore, the Federal Office for Information Security (BSI) offers most recent information on online security at the Internet address www.bsi-fuer-buerger.de; (BMFSFJ 2019, 27). Then it should be shown how problems that have already arisen can be overcome. As part of a course, the participants should learn what they can do if they have forgotten a password and how they can prepare for such a situation and avoid it better. A frequently asked question is what to do if an item that had been ordered online arrives with damages or the wrong item was delivered. It is good to know what rights apply to withdrawals and returns of goods when doing online business. It is even better if, for example, the participants purchase a low-priced item and use their right of return within

the course and send the item back. In this way, the participants experience how they can successfully cope with problems themselves and are given a positive experience of self-efficacy.

In order to achieve sustainability, it is eighth important that each step is practiced by each participant at least once with help and once alone, before continuing with the subject matter. If a course only takes place once or twice a week, homework should be given. These should enable the participants to repeat what they have learned in the course or to practice in a slightly modified variant. Since this will most likely lead to further questions, support in the form of a personal or telephone consultation should be offered on one or two interim appointments.

Ninth, and also with regard to the sustainability of the course, it must be taken into account that support programs with a limited duration usually end before all participants have sustainably acquired what they have learned. Some participants buy equipment during or after a training session, but notice afterwards that they have forgotten a lot of what they have learned or that new problems arise that were not discussed during the training. For some seniors, the lack of later support is even a reason to forego training altogether. In such cases, long-term support such as regular consultation hours or round tables for exchanging experiences are helpful. When announcing a course, it should be pointed out that there will be such additional support during and after the course. In addition, existing online learning courses with videos and the like that can be used at any time can also be offered.

Tenth but not least; not every course to improve the digital skills of senior citizens is really suitable and effective for this target group. Therefore, quality standards for courses have to be defined and compliance with them has to be evaluated on a regular basis. This is the only way to achieve the goal that senior citizens can participate in the digital society in a safe and sustainable way. Minimum requirements for the roles of supporters, trainers, coaches or consultants should also be defined. They should not only have profound knowledge of digital technology and the Internet, but also didactic abilities to support senior citizens not only in achieving technical skills but also in encouraging and strengthening self-efficacy (i.e. trust in their own problem-solving ability) (Telefónica 2019, 8 – 10).

6.2 Further recommendations

A particular barrier to the use of digital devices and the Internet is the technical language that uses numerous anglicisms and abbreviations that have a deterrent effect on „digital immigrants“. It is therefore necessary to explain these terms, their function and, in particular, their pronunciation as clearly and understandably as possible; The brochure „Nie zu alt fürs Internet! (“Never too old for the Internet! BMFSFJ, 2019) is worth imitating not only in this aspect.

In addition, the legal aspects must not be neglected. The European and national legislators have created numerous regulations in civil, criminal and public law, which should at least be conveyed in general terms and whose knowledge is no less important for digital traffic than traffic law is for road traffic.

Digital immigrants should e.g. know that it is under European law possible that users can request the respective companies or institutions to provide them with information about their personal data stored and their further use. Each federal state in Germany has a data protection authority that monitors different companies and institutions. If it is no longer necessary that a company or institution uses individual data for processing business or task-fulfillment, anyone can request that the company or institution deletes the data (BMJV, 2019, p. 52).

Already since decades the legislator tries to catch up with the development of digital technology and the internet in all branches of civil law. As an example from recent past, the European Payment Service Directive 2

(PSD2) and the German Payment Services Supervision Act (ZAG) were introduced in Germany. The aim was to increase the security of payment transactions, to strengthen consumer protection, to promote innovations and to increase competition in the market. In order to substantiate the requirements of PSD2, the European Banking Authority (EBA) in cooperation with the European Central Bank (ECB) formulated regulatory technical standards (RTS) for strong customer authentication, among other things, in order to increase the security of digital financial transactions. Authentication solutions that rely on two independent elements of the categories/factors knowledge, possession, or inheritance (biometrics) are considered as strong customer authentication (SCA). This includes, for example, authentication with a physical card in the form of a chip card (ownership factor) and PIN (knowledge factor). ChipTAN, SMS-TAN and pushTAN (each represent the ownership factor) in combination with a knowledge-based authentication factor, e.g. the online banking PIN or with a fingerprint (biometric factor) meet the requirements (BSI 2020, 47).

The so-called digital estate is not yet comprehensively regulated by law, although there have recently been pioneering court rulings.² The more people move around the internet, the more traces they leave behind. If someone dies, the bereaved also have to deal with his or her digital legacy such as e-mail accounts, accounts in various social media, in clouds, internet shops and of course online bank accounts. It is advisable to take care of the digital estate while someone is still alive so that the heirs do not have to go through lengthy negotiations to access and delete such accounts. However, the testator may not want to spread his entire life in front of his or her heirs via email traffic and other accounts (BMFSFJ 2019, 52).

Personal data and personal property are also protected against serious violations by criminal law. It is a specific task of the police to stand aside the victims in such cases and investigate against possible offenders. As already mentioned, the COPs are contact persons and confidants, especially for senior citizens. But COPs are mostly police officers who belong themselves to the generation of digital immigrants and who struggle with the digital world, even though they should be able to support senior citizens. It is therefore an important task not only to support senior citizens in general, but also in particular to enable COPs to fulfill to the special tasks that are assigned to them as contact persons and confidants especially for senior citizens.

7. National and local agencies, initiatives and projects to improve a safe use of IT and Internet by „digital immigrants“

Senior citizens have meanwhile numerous opportunities to obtain help and support in acquiring knowledge and competencies in dealing with digital devices, digital media and the Internet. Without claiming to be exhaustive, the following should be mentioned here: Self-help groups for senior citizens, courses from senior citizens' councils and initiatives, senior citizens' homes, adult education centers, multi-generation houses, senior citizens offices, e-learning courses supervised by tutors, help from mostly younger family members - digital natives, advice from professionals – e.g. the computer shop around the corner, consumer advice centers for problems with purchased hardware and software (BMFSFJ 2019, 55). The pandemic currently shows that learning opportunities can easily be implemented from home in order to learn directly with and on the Internet. Especially for senior citizens there are numerous opportunities to fall back on support and get help within their nearby social environment. Grandchildren in particular who had the chance to grow up as “digital natives”, are very familiar with the functions of the Internet and can transfer that knowledge to older people (BMJV, 2019, 58).

Despite all these good approaches, it is not in question that the efforts to professionalize and diversify the development of digital skills and competences among senior citizens must be significantly increased if the risk of digital exclusion of a large group of senior citizens should be mitigated (Deutscher Bundestag 2020, 110). On the other hand those programs and courses made clear that senior citizens definitely are able to develop digital skills and competencies in order to find their way around digital media (BMFSFJ, 2020, 35). However,

². BGH Urteil vom 12. Juli 2018 – III ZR 183/17: Contract for a user account with a social network is inheritable. The digital estate is to be treated like the inheritance of property. <https://www.bundesregierung.de/breg-de/aktuelles/digitalen-nachlass-rechtzeitig-regeln-842050>.

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many senior citizens depend on sufficient support and suitable courses and programs (BMJV, 2020, 35). But the broad variety of available programs can quickly become confusing and many programs primarily highlight the technical side of the devices instead of teaching how to use them properly (BMJV, 2020, p. 36).

The number and variety of programs to support senior citizens and their caregivers in the acquisition and application of digital technologies has expanded and differentiated enormously in the last 25 years. These programs have increased since providers of digital systems and applications provide AI-based operating aids with which standard questions about installation, maintenance or repair can be answered in the chat with bots via the Internet. In particular, a large number of support programs could be established - often with state funding - which meet the wish of senior citizens for informal, self-determined and lifeworld-oriented learning (Deutscher Bundestag 2020, 110).

So far, the development has, roughly summarized, resulted in the following approaches: First, informal programs in the social area to introduce senior citizens and their caregivers to everyday digital applications. Second, institutionalized counseling programs with the aim of a differentiated development of digital skills, especially for the use of assistance technology in one's own living environment and in the context of different care arrangements. Thirdly, not only senior citizens themselves, but also (caregiving) relatives can benefit from technical advice, as they are often involved in complex and possibly ethically sensitive decision-making processes for the organization of accompaniment and care for aged persons without receiving adequate support (Apfelbaum et al. 2016 ; Kricheldorf 2020). Technical advice for aged persons and their support networks can also be useful in this context. Fourth, future-oriented potentials can also be identified in the combination of learning and assistance structures with internet-based learning formats, which can cover individually varying needs for the further development of digital sovereignty in everyday environments. However, efforts to provide support must be significantly stepped up, since the penetration of all areas of life with information technology is proceeding at an undiminished speed. This is especially for the quantity, stability and sustainability as well as the quality of the programs and courses (OECD 2001; BMFSFJ 2017; Ehlers and Naegele 2017; Initiative D21 2019).

In order to implement the identified and needed programs, the Federal Ministry for Family, Seniors, Women and Youth (BMFSFJ) has been funding a "Service Point for Digitization and Education for Older People" at the Bundesarbeitsgemeinschaft der Senioren-Organisationen e. V. (BAGSO = Federal Working Group of Senior Citizens Organization).³ The service point now acts as a nationwide point of contact for all topics related to lifelong learning. In addition, the advisory board "Digitalisierung und Bildung für ältere Menschen" (Digitization and Education for Senior Citizens) exists since 2018, which is dedicated to promote digital skills and digital sovereignty as well as approaches of informal and non-formal education for the "Generation 50 plus". Following relevant preparatory work (e.g. BMFSFJ program "Contact Points for Senior Citizens"⁴), uniform quality standards are to be developed in future for low-threshold programs for building digital competences among senior citizens and their caregivers. To support low-threshold education located close to home, numerous internet-based courses have also been launched, which provide corresponding materials that can be downloaded via Internet.

Websites such as "Digital-Kompass.de"⁵, "Digitale-Nachbarschaft.de"⁶ or "Digitale-Chancen.de"⁷ and "wissensdurstig.de"⁸ also provide media-pedagogical recommendations for imparting competences to senior citizens and supporting materials for the implementation of educational events as a combination of face-to-face and e-learning formats. A guideline for planning and designing digital support programs for senior citizens is in constant development (Kubicek 2019). Since 2012, under the patronage of the Federal Ministry of the Interior (BMI), the "Goldene Internetpreis – Digital aktiv im Alter" (Golden Internet Prize - Digitally active in old

³<https://www.bagso.de/aktuelle-projekte/servicestelle-digitalisierung-und-bildung-fuer-aeltere-menschen.html>.

⁴<https://www.serviceportal-zuhause-im-alter.de/programme/programm-anlaufstellen-fuer-aeltere-menschen.htm> and <https://www.bmfsfj.de/bmfsfj/service/publikationen/laenger-zuhause-leben/77502>

⁵<https://www.digital-kompass.de>.

⁶<https://www.digitale-nachbarschaft.de/>.

⁷<https://digitale-chancen.de/content/sdcprojekte/index.cfm/action.show/key.62/secid.144/secid2.191>.

⁸<https://www.wissensdurstig.de>

age) has been awarded, which recognizes and promotes initiatives to develop digital competencies (Deutscher Bundestag 2020, 111).⁹

Programs to support digital competences that want to fulfill the requirement of sustainable anchoring in the social space of senior citizens are usually based on volunteers in the residential area of the target groups. These work as technology companions or as technology guides, who are often in constant contact with the heterogeneous support networks and established care structures for senior citizens. As an example, we present here two types of programs, which have been implemented with state funding since 2014.

The “Senioren-Technik-Botschafter“ (Senior Technology Ambassador) program funded by the Federal Ministry of Education and Research (BMBF) was groundbreaking. As part of this program, low-threshold programs for introducing senior citizens to digital technology were developed and established nationwide at 18 municipal locations. Senior citizens with an affinity for technology are employed in the sense of a “peer-to-peer” approach in order to introduce other seniors to the use of information and communication technology (ICT) in a familiar environment. In fact, evaluations from various accompanying research confirm that age-like technology educators can generally motivate senior citizens to use technology. But they only receive positive feedback from learners if they also have thematically appropriate didactic skills (Apfelbaum & Schatz 2014; Doh et al. 2015; Doh et al. 2018). Furthermore, the combination of formal and informal learning environments and the availability of own mobile devices of participants are beneficial for the learning success. Overall, a positive correlation between (increased) self-efficacy and (expanded) spectrum of use of ICT applications could be demonstrated (Doh 2020). However, it is criticized that only a limited number of projects have been systematically evaluated and that this program has not yet provided an overview of the the landscape of programs and of successfully evaluated methods to develop digital competence (Ehlers & Teichmüller 2016; Kubicek & Lippa 2017).

A second type of programs based on the experience of the “Senior Technology Ambassador” program was developed with the BMBF project QuartiersNETZ33 (2014-2018) (Ehlers & Teichmüller 2016; Bubolz-Lutz & Stiel 2018; Stiel et al. 2018). The support from technology ambassadors is based on the commitment of technology-savvy volunteers of all ages who show interested senior citizens in courses, consultation hours and home visits in which way technical devices and digital media work and support them in handling them. The programs should consider the needs and wishes of the senior citizens so that the transfer of technology competencies can be linked directly to the everyday routines of the target group. In addition, seniors should be encouraged to abandon their reservations about digital technology and to open up to the acquisition of operating skills. Corresponding evaluations (Stiel et al. 2018) point to an improved impact compared to traditional education. However, it could also be shown that the integration of target groups that are difficult to reach (e.g. people in need of care) requires targeted cooperation with established institutional support systems (e.g. care service providers). The projects have been embedded in a city-wide, senior citizens' policy reform process aiming at expanding digital participation even for typically difficult-to-reach sections of the population. This supported the establishment of sustainable structures (Stiel et al. 2018).

An example for the mentioned second type of programs is the network “Digitalambulanzen” (digital ambulances) in the cities of Bremen and Bremerhaven as well as other German cities that offers digital learning opportunities, courses, consultation hours or meetings in order to enable senior citizens to participate in the digital world, which has become a precondition for digital as well as social participation. The Breman Senate has implemented this project to support senior citizens, who often have little knowledge or skills to find their way around the digital world without help from outside.¹⁰ The project is oriented specifically to the possibilities and individual needs of senior citizens in order to enable permanent support within digital areas and to ensure social opportunities (Senat Bremen 2020). Members of this project are different organizations such as “AWO

⁹<https://www.goldener-internetpreis.de>.

¹⁰https://www.finanzen.bremen.de/organisation/herbsthelfer/netzwerk_digitalambulanzen-86560.

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Bremen”, “SelbstBestimmt Leben e.V.” or “Ambulante Versorgungsbrücken” as well as many other facilities that cover a wide range of support programs and complement each other in their fields of competence. With the focus on care for aged persons, a total of 25 charity organisations are currently network partners of the project (Netzwerk Digitalambulanzen, March 2021). The advantage of different facilities can be seen in the quick and easy accessibility. Therefore, it is possible to attend digital courses from home or at nearby locations, which gives almost a guarantee that every person can get access to digital media in a supportive way. In addition, individual programs are collected and can clearly be presented together on one website. This makes the overview for senior citizens a lot easier and help to avoid confusion (Senat Bremen 2020b).

We could interview general experts and among them the manager of the project “digital ambulances”. The perspective in this project is that senior citizens form a very heterogeneous group. The project works with people aged 60 to over 100. The heterogeneity is based on the different social spaces and also on the different financial resources of the senior citizens. That is why many small solutions on several levels are necessary. There is no central starting point. Age matters less than other differences. The project has linked participants and initiatives in Bremen and formed a network so that knowledge and resources are shared. The aim is to increase the proportion of senior citizens who participate in digitization and thus in social participation in a target group-specific manner through support from the different participants in their neighbourhoods. The project has to be expanded further into the region. There are separate projects in other federal states. Each project should adapt to the local infrastructure in order to get the participants to work hand in hand. A prerequisite for participation as a partner in the project is the willingness to exchange ideas, participation in working group meetings, signing a cooperation agreement and the openness and willingness to actively contribute and contribute positive experiences. We are looking for partners primarily from civil society, but also from the private sector. For our project we need multipliers who have a clue, ideally people whom we train who are themselves aged persons. Because people in the same age group prefer to listen to each other and have the same language. To this end, we create training documents for full-time employees and volunteers. The aim is to increase the digitization of senior citizens, starting with lower-threshold to higher-threshold offers. It starts with basic training. We want to train digital assistants among volunteers (e.g. peers). For this we need our network partners. In our eyes the solution lies in the neighborhoods. However, during the Corona pandemic many offers have been canceled. The project is funded by the national government.

The Bremen association „Ambulante Versorgungsbrücken e.V.“ which belongs to the Bremen-wide Network of Digital Ambulances is since 2020 a partner organization of the “Bundesarbeitsgemeinschaft der Senioren-Organisationen” - Federal Working Group of the Senior citizens Organisations (BAGSO). Through volunteers, “Ambulante Versorgungsbrücke e.V. offers people over 60 years of age the opportunity to find their way into the digital world. The association includes the Project “Digital Kompass”¹¹ which intends to make it easier for senior citizens to use digital media as well as to help them assess the risks and reduce their prejudices. Tablet and Smartphone courses have been offered since 2017 and volunteering digital assistants are available to answer questions and accompany newcomers individually if needed. A variety of seminars, and numerous basic courses offer the opportunity to learn e.g., how to use Google Maps, WhatsApp, online banking, media libraries as well as online shopping. Because senior citizens get a step by step instruction to learn something new in their own pace, their willingness and eagerness to learn continues. There are currently about 100 locations that participate in the project “Digital Compass” in Germany and offer free internet-related programs for senior citizens. These facilities train volunteer employees as digital guides and offer a meeting point for senior citizens to exchange knowledge and experiences on all subjects around digital devices, media and the Internet.

Finally, the “Seniorenlotse” (pilot for senior citizens)¹² is an online portal that offers for people over 55 years current information on the topics health, living, travel and society. It provides insights to the use of digital

media. This project is initiated and funded by the official “Landesseniorenvertretung Bremen” (Breman Representation of Senior Citizens) which consists of members from the regional seniors’ representatives of Bremen and Bremerhaven. The aim of this institution is to support specific issues of senior citizens in order to enable them to participate and actively shape the society. The special feature within this project is that senior citizens write their own posts at the online portal “Seniorenlotse”. As a result, senior citizens themselves get into contact with digital media as authors in an internet forum and can exchange ideas within the “Computer-Tips” category and expand their previous knowledge of digital media. Within this category, course times and training courses are presented as well as the digital advice magazine “Levato” is uploaded in regular intervals. The magazine clarifies general uncertainties about data protection and provides tips on how to use the internet correctly.¹³

Without such an approach, senior citizens and their caregivers especially in bigger cities now lack an overview of provider-neutral and trustworthy information, training and advice programs that provide local or digital information about digital applications and their specific functionalities. As a result, it is hardly possible for senior citizens and their social networks to oversee the variety of digital programs and to receive suitable support in deciding for or against them (Deutscher Bundestag 2020, 112).

On the other hand, surveys show that only half of the municipalities in Germany are prepared for the new requirements of digital media, therefore a large part of its potential remains unused (IAR, 2019, 2). An example for its unused potential is the insufficient expansion of broadband Internet, which occur especially in rural areas and makes the access even more difficult for digital immigrants (IAR, 2019, 3). Therefore, the German Federation, the federal states and municipalities need to support and promote skills and competences in digital media for their senior citizens, and should provide the financial resources and necessary legal regulations (BMJV, 2020, 37). Otherwise, a further digital divide between metropolitan and rural areas could become firmly establish.

8. The role of police and especially COPs in this undertaking

The offenders recognized the possibilities of committing crimes on the Internet very quickly and use the medium, especially why it regularly does not require direct contact between the victim and the perpetrator. This circumstance can cause situations where senior citizens in particular do not notice that they became a victim of a crime. Since the code of criminal procedure stipulates that the police have to investigate criminal offenses, contact between the police and citizens occurs at the latest when a criminal offense has been detected (sec. 163 GCCP, German Code of Criminal Procedure).

But the police have not only the task to investigate and prosecute crimes, but also to prevent them. This mandate results from the police laws of the respective federal states, e.g. in Bremen the Breman Police Act. Especially in respect to senior citizens this task seems to be paramount. The trust of senior citizens in the police is very high and the police therefore have a great influence, their advice will be heeded. It would therefore be an nearly ideal situation if the police could catch up against crime with preventive advice and help senior citizens to take advantage of the internet in a save way.

The Bremen police, like the police forces in most federal states, have therefore set up a prevention center that regularly offers lectures since years e.g. under the title "Living online - really safe?" These lectures take place not only in the prevention center, but also in the city districts and in old people's homes, so that senior citizens can also take part in lectures close to their places of residence. Network partners support the prevention center for this purpose. Citizens can also contact the prevention center in person, by phone or email. The police use their special knowledge of current crime trends and react as quickly as possible with information campaigns

¹³<https://seniorenlotse.bremen.de/2017/07/aufgaben-der-seniorenvertretungen/>.

and sometimes also with specific items such as so-called RFID blockers in the form of "Safe Card" covers. Safe cards protect against criminals who try to read other peoples' credit card data wirelessly in confined places.

The so-called contact police officers create a special closeness between the police and the citizens. The "contact police officers", or COPs for short, are especially responsible for crime prevention in their respective city districts. They are always in conversation with the citizens and always have an open ear for the worries and needs of the citizens in their districts. They act as a "link between the citizens and the police station" and embody the police's closeness to the citizens. The COPs were introduced throughout Bremen as early as 1999 and among other things, they visit schools, kindergartens and, last but not least, old people's homes, where they explain and help. From this description of tasks it follows that the COP is still the "policeman from next corner", especially for the elderly, whom they can trust and whom they can speak to in the event of problems. This relates to all situations in life and thus, in recent times, in particular to security issues when using the Internet. However, the COPs also have the opportunity to actively address Internet use and security to senior citizens in discussions, through lectures and with information materials. This opportunity should be used intensively, but it requires that the COPs themselves have appropriate knowledge of Internet security, even though they mostly belong to the generation of digital immigrants. It is therefore not surprising that a needs analysis in the run-up to this project showed that the COPs need training with regard to digital media and safe use of the Internet. The aim of this project is therefore to start right here and impart the COPs the skills they need in order to be able to advise senior citizens about safe Internet use. In doing so, they are fulfilling their legal duty to prevent criminal offenses in the best possible way.

From the interviews we know the COPs engage especially in prevention and support people who have become victims of crime. Regarding prevention they give lectures in many places like schools, community centers and also homes for senior citizens. COPs also try to come into close contact with citizens. They visit public places, events and move around a lot in order to be directly accessible. They are an important point of contact for the safe use of digital devices and the Internet and for all questions about crimes against aged persons and cybercrime. However, they also report their own deficits in this regard and see a need for training. In addition, the police in Bremen maintains a prevention center that especially deals with the prevention of cybercrime. Therefore, it was astonishing that the police are not a partner in the "digital ambulances" project, and neither the police knew about the "digital ambulances", nor did the ambulances know about the extensive prevention work of the police. In this respect, the networking should still be improved.

9. Conclusions

From the evidence collected in this report it becomes clear that age in itself is not a reason that excludes people from the benefits of modern information technology and the Internet. During the last years and reinforced by the pandemic an increasing number of digital immigrants significantly improved their digital skills and some very old persons have developed to advanced users. We can give an impressive example from our interview with a 93 years old lady:

"I download the apps that I want. I play bridge and skat with the tablet. I also hear music with the tablet. Besides, I use the Internet for information, e.g. about other cities. I am now moving to Neuruppin to live with my son in a senior citizens' flat, so I already searched the net on information about this city. I've also been doing online banking since I was 90, the Sparkasse [municipal savings bank] showed me that, and it was also filmed. The film can now be seen on YouTube (I have a different name there - for security reasons). I get along well with the tablet. I also watch the stock market news every morning, as I have stocks. I don't watch them on Saturday and Sunday, there is nothing going on on the stock exchange either. I'm also on YouTube and I do some online shopping (from time to time - fashion). Furthermore, I am using the online payment service PayPal. I get along

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well with that. I also write emails. For example, I create birthday greetings for my children on the tablet. I also skype with my family. I have three children and 11 grandchildren. Otherwise, I couldn't see them. Take a look [shows films of her grandchildren].”

This example clearly shows the benefits senior citizens can gain from digital technology and the Internet. But at the same time other aged persons almost completely fail in developing such skills and become excluded from modern society. Contemporary, we face a growing digital divide not only between digital immigrants and digital natives but also among different groups of digital immigrants. As a manager told us a new generation of inhabitants is arriving in homes for aged persons who have learned to use computers, e-mails and the Internet during their professional live. But with retirement they do not need to improve their skills and they do no longer profit from courses for professionals offered from employers. But the digital revolution is proceeding at an undiminished pace. As many experts mentioned the problem is not the age but the capacity to catch up with the ongoing digital revolution. As for children in schools, students in universities and employees at work, retired citizens consistently need courses and personal support that is tailor-made for them. Otherwise, successes like the ones the old lady reports hide the fact that large parts of retirees miss out on the digital world and remain or become excluded.

The following table shows necessary elements of courses and support systems that result from the evidence collected for this report:

1. Necessary New Skills for the Digital Age (Fertigkeiten)	2. Competency Areas Related to Skill (Kompetenzbereiche in Bezug auf die Fertigkeiten)	3. What are the Concrete Competencies that Digital Immigrants Should Have in These Competence Areas? (Medium-level) (Welche konkreten Kompetenzen sollten sie haben?)
Technological skills	Hardware related competencies	Knowledge about relevant hardware and its functions Competence to use basic functions of PCs and Tablets Competence to use basic functions of smartphones Competence to operate and connect devices like keyboards, printers, displays headsets, video cameras, routers, signal repeaters or to find experts for these tasks Competence of live-long-learning in order to catch up with the ongoing development of new hardware devices and features as e.g. smart devices like smart TV sets.

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	<p>Software related competencies</p>	<p>Knowledge about relevant software and apps and their functions Basic competences regarding operating systems and their functions Competences to find, select and install useful software and apps Competence to use software and apps at least on a medium level Competence to update and upgrade software and apps Competence to learn about new software and apps and become familiar with their use.</p>
	<p>Internet related competencies</p>	<p>Competence to find internet providers and close a contract Competence to install internet access or let it install Knowledge about basic terms, concepts and functions of the internet Competence to connect and re-connect to the internet after a failure Competence to use browser software and “surf” throughout the internet Competence to download content from internet and save it on one’s own device Competence to understand and use a cloud storage</p>

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		<p>Competence to realize new helpful and dangerous offers throughout the internet and social media and continually learn to assess use or avoid them.</p>
	<p>Risks and dangers</p>	<p>Awareness on relevant risks of electric devices as e.g. batteries going up in flames because of overheated devices or short-circuits.</p> <p>.....</p> <p>Competences to restart broken systems or finding support in such situations</p> <p>.....</p> <p>Competence to update software and apps</p> <p>.....</p> <p>Awareness and competence to avoid risks connected to the download of new software and apps</p> <p>.....</p> <p>Awareness and competence to avoid spyware, malware, computer-viruses</p> <p>.....</p> <p>Competence to install and maintain firewalls, anti-virus-software, adblockers</p> <p>.....</p> <p>Competence to create and use hard passwords, secure places to safe passwords and safe strategies to retrieve forgotten passwords</p> <p>.....</p> <p>Awareness and competence to adjust cookies</p> <p>.....</p> <p>Awareness of fake websites</p>

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Communication skills	Competencies regarding E-Mails	<p>Competences to create and use E-Mail Accounts</p> <p>.....</p> <p>Competences to write and read e-mails and to record and play voicemails</p> <p>.....</p> <p>Competences to save and delete e-mails</p> <p>.....</p> <p>Competences regarding analog literacy meaning reading and writing as a prerequisite of digital literacy</p>
	Competencies regarding social networks	<p>Knowledge about different types and functions of social networks as e.g. facebook, messengers as e.g. WhatsApp, Telegram etc.</p>
	Competences regarding online video platforms like Skype or Zoom	<p>Connecting and disconnecting necessary devices like speakers, microphones and cameras</p> <p>.....</p> <p>starting and stopping video calls</p> <p>.....</p> <p>Participation in meeting rooms</p> <p>.....</p> <p>Compiling meeting rooms and inviting other people</p>
	Risks and dangers	<p>Awareness of spam mails, e-mails infected with malware, and malicious links or attachments.</p> <p>.....</p> <p>Awareness of e-mails with incriminated content like invitations to participate in illegal business relationships</p> <p>.....</p> <p>Awareness of fishing-mails and awareness of dangerous links in e-mails</p> <p>.....</p> <p>Awareness of hate-speech, so called shit-storms, doxxing etc.</p> <p>.....</p> <p>Competence to charge criminal acts to the police whether directly or via internet and social media</p>

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Skills for searching and saving information	Text based information retrieval	<p>Using search engines like google, encyclopedias like Wikipedia, homepages of different kinds of institutions and organizations.</p> <p>.....</p> <p>Storing links and content form internet pages and social media pages.</p> <p>.....</p> <p>Using general features of internet pages as e.g. sub-pages, FAQ-pages, contact areas, support areas, “about us” areas etc.</p>
	Multi-Media based information retrieval	<p>Searching and using video platforms like YouTube,</p> <p>.....</p> <p>Searching and using media centers and hybrid libraries e.g., of broadcasting networks, radio and television stations</p> <p>.....</p> <p>Competencies to participate in webinars.</p>
	Risks and dangers	<p>Competence to assess relevant from irrelevant, trustworthy from fake information.</p> <p>.....</p> <p>Awareness on information overflow, algorithmic information selection and so called “echo chambers”.</p> <p>.....</p> <p>Creating an account</p>
Skills regarding sharing of information	Competence to use messenger services like Whats App	<p>Sending and receiving text and voice messages</p> <p>.....</p> <p>Using and interpreting emojis</p> <p>.....</p> <p>Taking and sending photos</p>
	Competence to install and maintain a social-media profile	<p>Creating content, and taking digital pictures e.g. with a smartphone</p> <p>.....</p> <p>Uploading pictures and content especially to social networks</p> <p>Copy and paste content from available sources</p>

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	Competence to install and maintain an own homepage	Not necessary on medium level	
	Risks and dangers	Awareness and competences regarding copyright regulations Awareness, knowledge and competences regarding protection of personal data	
		Knowledge about and competence to enforce data protection legislation	
Business related skills	Online shopping	Retrieve relevant shops, use price comparison platforms, evaluation platforms, ticket offices etc. on the Internet. Create accounts at relevant shops Know and use internet-based payment services Competence to buy and use smartphone tickets e.g. for theatre visits, public transport etc.	
			Competence to assess and write customer comments
		electronic auctions, small ads etc.	Knowledge about this new form of distribution of goods and services
		Competence to participate in auctions as buyer and seller	
	online banking	Competence to create, maintain, and use online bank accounts on different devices Competence to create and use two and three-factor authentication	
		Knowledge about and competence to use new financial services like PayPal, direct pay, Apple and Google Pay, Smartphone payments etc.	

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	Risks and dangers	<p>Develop adequate sensibility for personal data, protection of business-related data, passwords and internet-based advertising</p> <hr/> <p>Develop awareness regarding fake-shops, product piracy, illegal pharmacies etc.</p> <hr/> <p>Awareness on legal issues regarding online-shopping especially on consumer rights</p> <hr/> <p>Awareness on fishing, man-in-the-middle attacks and other forms of cybercrime.</p> <hr/> <p>Awareness on personalized and AI supported advertising</p> <hr/> <p>Competence to find trustful information and support regarding risks and risk prevention e.g. on internet pages and social media accounts of the police</p> <hr/> <p>Knowledge about and competence to use new kinds of insurances like Trusted Shop</p> <hr/> <p>Competence to charge criminal acts to the police whether directly or via internet and social media</p>
Personal interests, hobbies and entertainment	General Internet	<p>Retrieving and using relevant information in the internet</p> <hr/> <p>Competence to store links and content</p> <hr/> <p>Competence to download and install relevant apps</p>
	Multimedia pages	<p>Competence to retrieve and use relevant multi media pages like YouTube etc.</p>

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		Competence to write comments, assess third party comments
		Competence to subscribe and unsubscribe channels
	Social networks	<p>Competence to create and close accounts on social networks</p> <p>.....</p> <p>Competence to establish and maintain a social network account upload content, pictures etc.</p> <p>.....</p> <p>Competence to understand and use specific forms of communication like “Likes” and “Unlikes”, Emojis etc.</p> <p>.....</p> <p>Competence to invite friends, accept and refuse invitations</p> <p>.....</p> <p>Competence to create user-groups, participate in, and withdraw from user-groups</p>
	Risks and dangers	<p>Awareness and competences regarding protection of personal data</p> <p>.....</p> <p>Awareness regarding social engineering</p> <p>.....</p> <p>Awareness regarding fake news, and echo chambers</p> <p>.....</p> <p>Awareness regarding personalized and AI supported advertising</p>
Participation skills	Online petitions	<p>Knowledge about this new form of political participation</p> <p>.....</p> <p>Competence to assess online-petitions and their initiators</p> <p>.....</p> <p>Competence to participate in on-line petitions</p>

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	discussion groups	<p>Knowledge about this new form of political participation</p> <p>.....</p> <p>Competence to assess discussion groups and their participants and initiators</p> <p>.....</p> <p>Competence to participate in discussion groups</p>
	commenting content in the internet	<p>Competence to assess comments and write comments</p> <p>.....</p> <p>Competence to observe communication rules and netiquette</p>
	Risks and dangers	<p>Awareness on hate speech, so-called shit-storms, doxing, internet-based stalking</p> <p>.....</p> <p>Awareness on influencers, fake news, influencing by foreign unfriendly secret services</p> <p>.....</p> <p>Risk of no-participation of sub-groups of the population causing non-representation of the interests of these sub-groups.</p>
Coping with everyday life	Information based support	<p>Competence to retrieve all kinds of useful information from the internet as e.g. opening time of doctors, cinemas, museums, offices etc., timetables of public transport, TV-programs etc.</p>
	Assistance systems	<p>Competence to use navigation systems</p> <p>.....</p> <p>Competence to use smartphones with special buttons for emergency calls</p> <p>.....</p> <p>Competence to use tracking systems and apps</p> <p>.....</p>

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		<p>Competence to use sensor mats for fall detection and portable devices to monitor vital parameters and send an alarm via internet in case of an emergency.</p> <p>.....</p> <p>Competence to use reminder apps for appointments, taking medicine etc.</p>
	Activity systems	<p>Knowing about and using exercise games, memory training games etc.</p> <p>.....</p> <p>Competence to use pedometers and similar devices connected to smartphones</p>
	Smart home devices	<p>Competence to use smart-home devices like lawnmower robots</p>

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