Digitalisation of the Individual: A Systematic Review from an Affordances-Use-Outcomes Perspective

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Research Paper

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Abstract

Digital technology affords individuals to transform several aspects of their everyday lives, leading to different usage patterns with positive and negative outcomes for individuals. While digitalisation is discussed in detail from an organizational perspective, a comprehensive review on outcomes of digitalisation from an individual perspective is currently missing. Therefore, this paper aims to summarize and classify outcomes in lives of individuals that are caused by digitalisation. A structured literature review is conducted. The search string includes the digital individual itself and the digital individual as social being. We discuss the findings of 23 papers on the digitalisation of the individual and present the results in a concept matrix. We identify five types of affordances and differentiate four types of technology use. 25 positive and 31 negative outcomes were reported by existing literature. We contribute a more nuanced understanding of affordances, usage patterns and their outcomes which hold valuable insights for both research and practice.

Keywords: Digitalisation, Digitalization, Digitised individuals, Affordances, Use, Individual outcomes

1   Introduction

A growing number of digital technologies (DT) is available for private use, and new innovations are introduced on a regular basis. As individuals adopt these technologies and integrate them into their routines, their everyday life is subject to major impacts. These impacts hold many opportunities to improve peoples' life in many areas such as eduation, well-being, and social welfare (OECD, 2019; United Nations, 2021). However, the digitalisation of the individual may also imply adverse effects and negative outcomes, e.g., addiction, distraction, and isolation (Bronzan, 2019; Turel et al., 2021). The reasons for opposing individual outcomes often correspond to different usage pattern which are enabled by DT. In contrast to organizational use of DT, individuals' usage patterns are characterized by voluntary use which may range from excessive to non-use (Andrade & Techatassanasoontorn, 2021; Gimpel & Schmied, 2019). Therefore, it is important to better understand the far-reaching consequences of digitalisation on an individual level, both, from a research and practice perspective (Matt et al., 2019).

In IS literature, most research regarding the outcomes of digitalisation focus on an organizational perspective (Turel et al., 2019). In contrast, studies aiming to explain aspects of the digitalisation of the individual only recently gain importance (Benlian et al. 2020) and the research findings are highly dispersed. Due to this diversity, research expands across many areas of life such as health, personal identity, or social interactions (Chamakiotis et al., 2021; Grehling & Maier, 2021; Leidner & Tona, 2021) as well as a broad variety of positive and negative outcomes due to DT (Turel et al., 2020). An overview on usage patterns and induced outcomes by DT on the individual level is currently missing but highly needed to synthesise the diverse perspectives in this research stream. As a consequence, we

aim to answer the following research question: *Which individual usage patterns and following outcomes does digitalisation afford in individuals' everyday lives?*

As the digitalisation of individuals is an established phenomenon in information systems (IS) research (Matt et al., 2019; Turel et al., 2020), we conduct a structured literature review in line with the guidelines of Webster and Watson (2002) and Wolfswinkel et al. (2013). We aim to cluster usage patterns and outcomes to individuals lives induced by the use of DT. In the process of reviewing relevant papers, we identify the framework by Turel et al. (2020) as useful theoretical perspective, integrate the notion of usage patterns and apply this lens to our reviewed literature. We contribute to existing literature by introducing a classification scheme to categorize affordances, usage patterns, and outcomes, which can serve as a foundation for future research.

The paper is structured as follows: At first, we present the theoretical foundation and define key concepts to establish a common understanding of the topic. Next, we present the methodology of the literature review. In the results section, we aim to answer the research question. This is followed by a discussion of the findings and implications. Finally, we complete the paper with our conclusion.

2 Theoretical Background

This section aims to give an overview about main concepts to ensure a common understanding. First, we clarify and define the terms digitisation and digitalisation. In the second subsection, we present two different frameworks that are useful to structure research in the field of digitalisation of the individual.

2.1 Digitisation and Digitalisation

Since DT are evolving very fast, the definitions of digitalisation and digitisation may change over time and need to be adapted (Frenzel et al., 2021). Nonetheless, it is important to display the current understanding of the two terms. The term digitisation is often refered to as a technical process, whereas digitalisation refers to the use of DT (Legner et al., 2017). This can be seen for instance at the following definition: Digitisation is a "[technical] process of converting analog signals into a digital form, and ultimately into binary digits (bits)" whereas digitalisation is described as a "[...] socio-technical process of applying digitizing techniques to broader [...] contexts" (Tilson et al., 2010, p. 749). Lenger et al. (2017) agreed with the above-mentioned definition of digitisation, and added "[...] manifold sociotechnical phenomena and processes of adopting and using these technologies in broader contexts" as a definition for digitalisation (Legner et al. 2017, p. 301). Eventually, digitalisation of the individual can be defined as "the proliferation of DT in the lives of individual users" (Matt et al. 2019, p. 315).

Although some authors switch between the terms digitalisation and digitisation and use them interchangeably (Frenzel et al. 2021), we decide to differentiate between the two terms at the course of this literature review. Hence, we refer to the concept of digitalisation because we focus on individuals who adopt and use DT as well as the outcomes of the technology use.

2.2 Research Frameworks

Digitalisation influences individuals in their five different roles: the individual itself, the individual as social being, as citizen, as customer, and as employee (Matt et al. 2019). This differentiation was used to specify the scope of this literature review and served as a foundation to develop the search string.

Users "who use at least one digital technology in their non-work life domains" are referred to as "digitized individuals" (Turel et al. 2020, p. 929). The interactions between those individuals and technology can be depicted in a three-layer framework (Turel et al. 2020) which we adopt in our study. However, we adapt the framework in order to focus on how DT affords different forms of use and their outcomes. For the course of this literature review, the first two layers are important: In the first layer, the term "functional affordances" refers to things that are enabled, facilitated, or guided by a technology (Karahanna et al., 2018). Furthermore, individuals can integrate technologies into four different so called "life domains" that include personal, work, health, and social. In the second layer, Turel et al. (2020) describe that DT can have a positive or negative impact on the fulfillment of human needs. The three

basic human needs of competence, relatedness and autonomy are integrated in the framework (Turel et al. 2020). The above-mentioned parts of this research framework are used in our concept matrix to structure the outcomes of digitalisation.

3 Methodology

We conduct a structured literature review to get an overview of the existing research on affordances, usage patterns, and outcome of the digitalisation of the individual. This literature review is conducted in line with the process introduced by Webster and Watson (2002). The five-stage method introduced in the paper of Wolfswinkel et al. (2013) serves as a basis to structure the following subsections.

3.1 Define

The review was conducted on the three databases: EbscoHost, Web of Science, and Proquest. Since this topic is relevant from an interdisciplinary point of view, we considered journals belonging to three different research areas in the search process: Instead of focusing on the "basket of eight" and "basket of six", we enriched the search and included all journals belonging to the research areas of general business administration, marketing, and IS. However, in all disciplines a VHB rating of B or higher was required for every journal to be included in the literature search. This ensures that the quality of all considered articles is high and still a broader range of disciplines is included.

The search string consists of two different parts: (digitalisation OR digitalization OR digitisation OR digitization OR digital OR digitised OR digitized OR digitising OR digitizing) AND (individual OR individuals OR social). We identify "digitalisation" and "individual" as the two key terms concerning the topic. In a second step, synonyms were developed to enrich the search string. In the "digitalisation" part of the search string, this was very fast-forward and intuitive. The different spellings of the terms are due to discrepancies between British- and American English. In contrast, for the "individual" part of the search string, a framework by Matt et al. (2019) was used to find related search terms: In their work they introduced five dimensions on how digitalisation impacts individuals. Influences can be allocated to the individual itself, the individual as social being, as citizen, as customer, and as employee (Matt et al. 2019). Including all five dimensions of the construct in the search string would have probably led to very broad and diverging results, which is why we decided to restrict the search string to two of the five dimensions. The individual and social dimension were included in the search string, as they are closely connected. Including citizen, customer or employee would pose the risk of shifting to a governmental or organizational perspective and distancing from the impact of digitalisation on the individuals private life. Within the above-mentioned databases, we applied the following inclusion- and exclusion rules to limit the number of results. Peer-reviewed articles are included, which are published in English language, and belong to a specific set of academic journals. Articles are included if the keywords appear in the title, keywords, or abstract. The publication period is limited from 01/01/2010 to 06/30/2021because of major technological advancements and the growing adoption of smartphones, social media and health devices during the last decade (Turel et al. 2020). These fast changes regarding digital technology cause prior literature to be outdated.

Furthermore, we included publications from two conference proceedings, namely of the European Conference on Information Systems (ECIS) as well as the International Conference on Information Systems (ICIS). Doing so, we aim to ensure that we do not miss the latest research insights in the IS field. The publication period is limited from 01/01/2017 to 06/30/2021. In each conference collection we sorted by relevance and considered the 100 most relevant publications in the search process.

3.2 Search

Applying the above-mentioned exclusion- and inclusion rules, the search results could be narrowed down significantly from 332,198 journal articles in total across the three databases, to 1,199 journal articles in total across the three databases. While every database was used following the same procedure, only one divergence occurred since Web of Science did not offer any filter option to restrict the search

to academic journals. The resulting number of 1,199 articles was considered feasible to serve as an input for the selection stage. Furthermore, 200 conference articles also entered the selection stage.

3.3   Select

We start the stage of selection by removing 330 duplicates (R1) which led to 869 remaining journal articles. These articles were subject to a first analysis which was conducted via scanning all titles, abstracts, and keywords. Using the exclusion rules R2 to R6 (see Table 1), a sample of 57 journal articles and 4 conference articles was identified as possibly relevant for the topic of interest.

Number:	Type:	Explanation:
R1	formal	Exclude, if article was already found (duplicate)
R2	formal	Exclude, if formal criteria from section 3.1 do not apply
R3	formal	Exclude, if the article is a research editorial
R4	content	Exclude, if outcomes of digitalisation are not mentioned
R5	content	Exclude, if the article does not focus on the individual perspective
R6	content	Exclude, if the article is about rare disasters or events

Table 1.   Inclusion- and Exclusion Rules R1 to R6

Content related exclusion rules were applied to journal articles and conference articles. The aim is to filter out articles that do not deal with the research question, even though they cover all relevant keywords and were not excluded by the formal exclusion rules. The content related exclusion rules can be systematically assigned to three different thematic parts:

First, papers were excluded which do not report any outcomes of digitalisation or comparisons between individual lives without digitalisation versus with digitalisation. This was the case if the core findings of the paper either refer to a digital context or analog context, but do not establish any connection between these two contexts. For example, many articles concerning copyright or digital divide were excluded with this rule. In total, rule R4 applied to 150 journal articles and 16 conference articles.

Second, 561 journal articles and 175 conference articles which did not focus on the individuum were excluded via rule R5. In a total of 633 papers, the authors looked at outcomes of digitalisation from an organizational viewpoint. Other papers for example took a governmental or educational perspective or investigated effects of digitalisation on groups.

Third, we decided to exclude papers that do not investigate the everyday life of individuals. In this literature review, we focus on everyday usage patterns of individuals. Therefore, we excluded 34 papers dealing with disasters or rare events by applying rule R6. This left us with a total of 57 remaining journal articles and 4 remaining conference articles. The exact numbers of articles that were excluded by the rules R1 to R6 are depicted in Figure 1. Since it is an iterative process, four additional papers were assigned to the exclusion rules during the analysis stage.

3.4   Analyze

We decide to have a closer look at the most recent journal papers which simultaneously report at least one interaction effect between different areas of life. These articles seemed most promising, because they report far-reaching consequences on multiple life domains and potentially include recent technological developments. Filtering out papers with no interactions and papers that were published within 2010 to 2018 led to a final number of 23 journal articles. As these articles cover the three different research disciplines and various technologies, this approach was considered suitable to narrow down the number of journal papers to be included in the literature review.

After reading the full texts of these 23 articles, another four articles were excluded in an iterative process (see Figure 1). The remaining 19 journal articles were all deemed relevant and, as a consequence,

included in the final concept matrix. Four conference articles are also added to the final concept matrix, which leads to 23 papers in total. Nine Journals are covered by this final sample of 23 articles, namely Information Systems Research, Management Information Systems Quaterly, Information Systems Journal, European Journal of Information Systems, Communications of the ACM, Information & Management, Information Systems Frontiers, Psychology & Marketing, and Journal of Business Research.
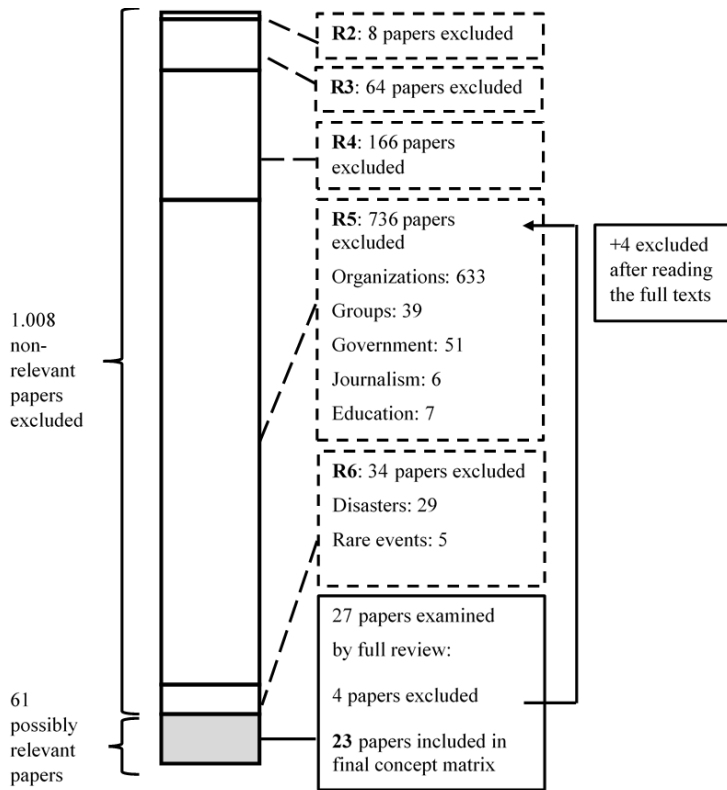

Figure 1.   Selection Process

3.5   Present

The results are presented in the form of a concept matrix (see Table 2) and will be discussed in the following course of this literature review. Not all outcomes can be discussed in detail due to capacity limits. Therefore, the focus of the next sections is on presenting connections between different research streams and putting different papers into context.

4   Results

The following sections aim to give an overview of the outcomes of digitalisation in individuals lives as detected by recent literature. As stated by Matt et al. (2019), individuals can choose on their own which technologies to integrate in their lives (Matt et al. 2019). Therefore, for the structure of this section, it makes sense to have a closer look at the concept of technology use as a precondition to enable outcomes of digitalisation in individuals lives.

A paper by Turel et al. (2020) was identified by the literature search, which helped to categorize the outcomes in the concept matrix. Human needs and functional affordances are adopted from the paper and used as dimensions to structure the outcomes (Turel et al. 2020). This framework for classification is promising, since the authors applied three different research papers to their framework, which were all identified as relevant by the literature search in this literature review.

First, we show the distribution of existing research across the years. Second, we give information about the contexts and methodologies applied by the authors. Then, we highlight which affordances are enacted by individuals in order to reach behavioral outcomes. Fourth, we synthesize our findings by investigating the interplay of affordances with positive and negatives outcomes due to digitalisation. Finally, we focus on the positive and negative outcomes associated with the digitalised individual.

4.1 Distribution of Papers across Years

Between 2010 and 2017, one to five articles were published every year, which might be relevant with regard to the digitalisation of the individual. No patterns appear within this time period. In 2018, we found seven articles on the topic, and in 2019, five articles were identified as possibly relevant during the search stage. In 2020, the number of articles strongly increased reaching a total of 18 papers. In the first six month of 2021, ten articles have already been published.

4.2 Used Methodologies and Contexts

Six research articles observe individuals living in Europe as subjects of the study. The same number of papers investigated the effects of digitalisation by studying individuals from English speaking countries (USA, GB). One paper reported outcomes of using the health platform MedicineAfrica in developing countries (Chamakiotis et al. 2021). Andrade and Techatassanasoontorn (2021) refer to a survey conducted in New Zealand. In all remaining articles, the country was not specified.

Regarding the methodology, about three quarters of the authors chose a qualitative approach. An overview of the used methodologies is presented in Figure 2.
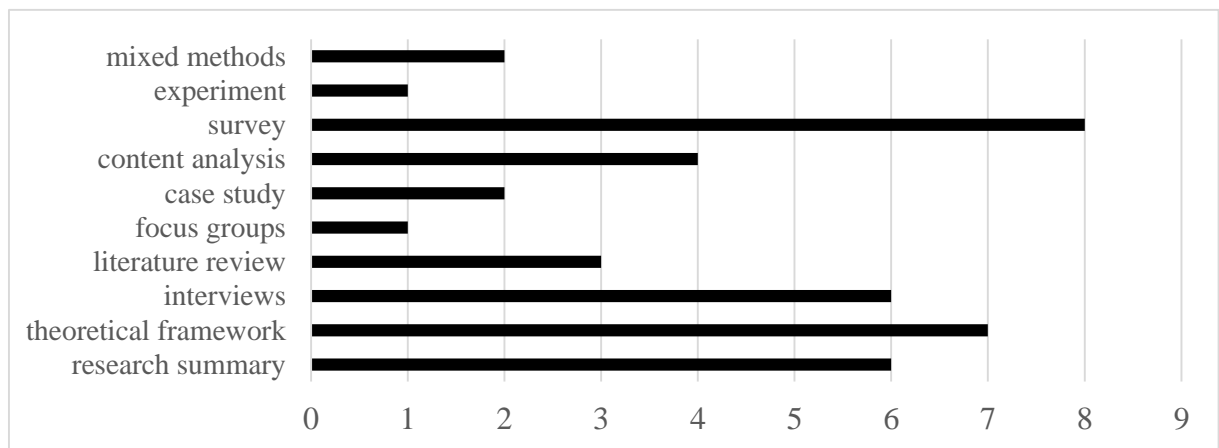

Figure 2.   Used methodologies

Two surveys are conducted on Amazon Mechanical Turk, and the authors recommend using the platform, since higher diversity compared to student samples leads to a higher generalizability (Ogbanufe and Gerhart 2020).

4.3 Affordances

DT use is reported to have different outcomes on individuals lives depending on the functional affordances. We identify five types of affordances, namely *communication*, *expression*, *information*, *managing the personal life* as well as *social relations* (see Table 2). These overarching affordances have been studied differently in the literature.

Social media affords connecting individuals and enables social relations as well as communication. Moreover, social media affords gathering information and reading news. Thereby, social media facilitates the search process for useful information, for example on health data (Marabelli et al. 2021).

Personal health devices, e.g., smartwatches, offer unique characteristics and afford communication with other individuals as well as receiving information from the fitness tracker (Ogbanufe and Gerhart 2020).

Individuals need to use them in a certain way to be able to increase their performance by wearing a smartwatch; benefits do not result automatically. This finding is similar to other research, e.g., Leidner and Tona (2021) classify wearables as technologies that enable expression (showing-self) and information (knowing-self). Observing and understanding personal digitalised data is reported to be a necessary precondition for any changes to happen (Leidner and Tona 2021).

In some articles, outcomes only occur if two different technologies are used in combination. Using a certain technology can open the opportunity to participate in an online community via an online platform. For example, fitness trackers provide users with information that they can share in a specialized online forum (Benbunan-Fich 2019). For instance, owners of 3D printers and suitable software may participate in an online community and share their ideas on a specific topic (Friesike et al. 2021).

4.4   Use

The main body of research reports outcomes of technology use on individuals lives. Different technologies are investigated: Seven research papers document outcomes of social media use, the use of platforms, or social networks. Four papers focus on outcomes of the adoption of wearables, and a few authors investigate outcomes of smartphones, smart home assistants, digital TV, or digital photo manipulation technologies. We focus on social media and quantified-self technologies, as there are different findings from different authors available which we aim to put into context.

Regarding the positive and intended outcomes, using social media for example to share photos improves not only present relations, but also enables forming new connections (Pera et al. 2020). As a consequence, social media as a means for interacting and sharing personal experiences is reported to reduce loneliness (Marabelli et al. 2021). Furthermore, sharing photos on social media enhances the overall perceived well-being at least in the context of older technology users (Pera et al. 2020). Since social media enables showing-self, using this technology facilitates self-expression for individuals (Leidner and Tona 2021). However, established relations could also be threatened by social media use, for instance if the other person treated the shared content inadequately. This could lead to feelings of loss of control and autonomy which might even cause individuals to end the relationship (Pera et al. 2020). A loss of autonomy could further be induced by social comparison, which causes individuals to adapt and restrain their real identity (Leidner and Tona 2021).

Another study was also conducted in a health context that reports similar outcomes: Exchanging knowledge and experiences helps individuals to learn more about their disease and also provides a better foundation to decide on the right path of treatment (Cuomo et al. 2020). Nevertheless, using social media to get information and read news can also bear the risk to come across misinformation (Kirkpatrick 2020). Both, users who actively spread content like for example their political views, and the social media platforms themself which automatically recommend certain content to certain users can be seen as mediators (Kirkpatrick 2020).

Similar to social media, quantified-self technologies can also have positive or negative outcomes on individuals lives: Esmaeilzadeh (2021) found that the use of personal health devices can strengthen IT identity. IT identity is expressed by feelings of connectedness and enthusiasm towards an IT, which make IT usage seem to be part of an individuals sense of self (Esmaeilzadeh 2021). IT identity arises from using different features of the smart device in various situations and integrating it into routine activities (Esmaeilzadeh 2021). Against this backdrop, Ogbanufe and Gerhart (2020) studied relevant outcomes of increased IT identity. They expand the IT identity framework, by finding that IT identity results in innovative ways to use the smart device for example to communicate with others (Ogbanufe and Gerhart 2020). Therefore, the construct of IT identity is a mediator that translates the use of technology into innovative individual performance (Ogbanufe and Gerhart 2020).

Using quantified-self technology in the right way can lead to positive outcomes such as execution of recommended actions, non-execution of problematic actions, and increased knowledge about the health condition (Moya and Pallud 2020). The need for autonomy is fulfilled, because resources are available

for enhanced decision making (Leidner and Tona 2021). Negative outcomes might include objectification of the own body, increased data-visibility, and feelings of guilt if unachieved objectives are displayed in red (Moya and Pallud 2020). As a result, individuals might pay more attention to areas of their lives that are measurable or digitisable (Leidner and Tona 2021).

4.5   Excessive Use

Another large proportion of research reports outcomes of excessive technology use on individuals lives. Different technologies are investigated, like for example social media (Marabelli et al. 2021), digital TV (Feiereisen et al. 2019), or smartphones (Kugler 2020). In addition, another paper was published which investigated constant checking behavior (Gerlach and Cenfetelli 2020). The authors do not focus on any technology, since this type of excessive behavior is not tied to a certain digital device (Gerlach and Cenfetelli 2020).

There is only one paper by Kugler (2020) that reveals mechanisms and moderators that could potentially turn technology use into excessive technology use. He observed this connection in the context of smartphone and video game usage. In his research summary, perceived success in a video game may be a mediator that turns use into excessive use (Kugler 2020). Furthermore, the strength of the effect might vary depending on individual characteristics like mental health: depression might strengthen the effect, since these individuals could engage in excessive use to distract themselves (Kugler 2020). He also refers to other articles that observed individual characteristics like social status and gender to moderate the relation between smartphone usage and excessive smartphone usage (Kugler 2020).

In contrast, other papers just start with excessive use as an antecedent that leads to various outcomes without reporting any connection between use and excessive use. Negative outcomes of excessive technology use include problems of attention (Gerlach and Cenfetelli 2020), and risk of depression (Kugler 2020) (Marabelli et al. 2021). Unlimited content available on digital TV makes individuals feel like they cannot control their TV consumption anymore which in turn leads to a perceived loss of structure (Feiereisen et al. 2019). While most of the authors only report negative, unintended outcomes of excessive technology use, one paper sticks out because it shows an intended and positive outcome: Constant checking of digital devices can enhance the competence to reach an enduring goal, e.g., the goal to maintain social bonds or to stay informed (Gerlach and Cenfetelli 2020). However, the value of gathered information is a moderator which determines whether excessive technology use really helps to reach the goals (Gerlach and Cenfetelli 2020).

4.6   Combined use

In combination, different DT can have a positive impact on individuals lives. The combination of technologies can lead to an increased motivation (Benbunan-Fich 2019). For individuals who want to solve problems without relying on companies, the combination of technologies can be beneficial, as it facilitates getting inspired, and enables them to obtain and integrate feedback (Friesike et al. 2021).

In contrast, Moya and Pallud (2020) report negative outcomes for users that combine quantified-self technologies and online platforms. Users who did not meet their training goals could be exposed to negative comments. Not being able to keep up with the demands of the community can cause feelings of guilt (Moya and Pallud 2020).

All previous examples involve individuals who adopt two different technologies by choice. However, another scenario exists where technologies are adopted by different parties: If many individuals use online social networks, a lot of data is created, which causes organizations to use investigative technologies like for example digital forensics (Kim et al. 2020). This could lead to a violation of group privacy, which in turn has negative consequences for individuals, as their individual privacy might also be disrespected (Kim et al. 2020).

Reference	Affordances	Type of affordances					Technology use				Outcomes	Type of outcome			
		Expression (EX)	Information (IN)	Communication (CO)	Social relations (SR)	Managing personal life (ML)	Excessive use (EU)	Combined use (CU)	Use	Non-use (NU)		Positive outcome (PO)	Negative outcome (NO)	Intended outcome (IO)	Unintended outcome (UO)
(Andrade & Techatassanasoontorn, 2021)										x	Reduction of choices for individuals who prefer to minimise reliance on DT		x		x
(Bélanger & James, 2020)									x		Increased complexity of privacy decision making		x		x
(Benbunan-Fich, 2019)	Digitally tracking physical activities		x					x			Improvement in consciousness of actual state	x		x	
(Benlian et al., 2020)	Playing music, ordering products, controlling smart home devices, acquiring information		x			x			x		Increase in strain		x		x
									x		Adverse effects on an individual's social relationships		x		x
(Chamakiotis et al., 2021)	Connectivity among dispersed individuals				x				x		Improvement in health outcomes	x		x	
(Cuomo et al., 2020)	Gathering information and sharing experiences about cancer	x	x	x					x		Improvement in decision-making and understanding of disease	x		x	
									x		Decrease in hope		x		x
									x		Increase in confidence in own therapies, recuction of anxiety and fear	x		x	
(Deng & Gonzalez, 2018)	Creating, editing and sharing content, fostering relationships, sharing knowledge, collaborating	x	x	x	x				x		Easier to maintain communication and sustain relationships despite distance	x		x	
									x		Easier to seek and acquire new information and knowledge	x		x	
(Esmaeilzadeh, 2021)	Monitoring and controlling health conditions		x						x		Increased strength of IT identity				x
(Feiereisen et al., 2019)	Viewing digital TV content		x		x				x		Inflexibility and choice of consumption	x		x	
									x		Decrease in consumption, sociality, decrease in contact with peers		x		x
						x		x			Increased control, decrease in structure, addiction		x		x

Reference	Affordances	Type of affordances					Technology use				Outcomes	Type of outcome			
		EX	IN	CO	SR	ML	EU	CU	Use	NU		PO	NO	IO	UO
(Fried et al., 2020)	Capturing personal photos					x			x		Increased ease of capturing photos	x		x	
	Sharing personal photos	x							x		Increase in body shaming		x		x
	Editing personal photos	x			x				x		Increased pressure to adjust appearance		x		x
		x			x				x		Altered self perception, empowerment	x		x	
(Friesike et al., 2021)	Solving problems independent of firms			x		x		x			Increased opportunities for inspiration	x		x	
								x			Descreased barriers for distribution, increased possibility to integrate feedback	x		x	
								x			Increase of interactions	x		x	
(Gerlach & Cenfetelli, 2020)	Satisfying information needs		x				x				Increased satisfaction	x		x	
			x				x				Problems of attention		x		x
(Gimpel & Schmied, 2019)	Automating decisions and actions, rapid innovating and diffusion	x	x	x	x	x	x				Reduced physical and psychological health		x		x
							x				Addiction		x		x
									x		Personal attacks		x		x
(Grehling & Maier, 2021)									x		Mood improvement	x		x	
									x		Exhaustion		x		x
(Kim et al., 2020)	Sharing interests, activities, real-life connections				x			x			Risk of privacy breaches		x		x
(Kirkpatrick, 2020)	Reading news		x						x		Increase of misinformation		x		x
(Kugler, 2020)									x		Decrease in mental and physical health, decrease in relationships, stop pursuing goals in the real world		x		x
									x		Smartphone addiction		x		x
							x				Increased anxiety, increase in depression		x		x
							x				Mood modification, tolerance, salience, withdrawal symptoms, conflict, relaps		x		x
(Leidner & Tona, 2021)	Knowing-self		x						x		Increase in ability to act with greater autonomy, increase in access to resources that help to live a virtuous life	x		x	
									x		Shift of attention to digitizable areas of self		x		x
	Showing-self	x							x		Increased possibility of being visible and free to self-express	x		x	
									x		Behaving to ensure that displayed self will receive approval, reduction of freedom of expression and autonomy to develop own identity		x		x

Reference	Affordances	Type of affordances					Technology use				Outcomes	Type of outcome			
		EX	IN	CO	SR	ML	EU	CU	Use	NU		PO	NO	IO	UO
(Marabelli et al., 2021)	Enabling online communication, creating communities, generating and exchanging various multimedia content	x	x	x	x				x		Reduced loneliness	x		x	
									x		Ease of seeking health information	x		x	
							x				Risk of depression, increase in addictive behaviors		x		x
							x				Cyberbullying		x		x
							x				Increased spread of misinformation		x		x
(Moya & Pallud, 2020)	Tracking physical data (e.g., steps, calorie intake and heart rate), sharing information with friends		x	x					x		Increased motivation to achieve goals, increased execution of recommended actions	x		x	
									x		Prevention of negative behaviors and increase in healthy behaviors	x		x	
									x		Adoption of vision for the body		x		x
									x		Increase of knowledge	x		x	
									x		Reduction of physician consultations	x			x
									x		Increased possibility of reassurance, decreased uncertainty, decreased anxiety, reduction of cognitive load	x			x
									x		Increased visibility of data		x		x
								x	x		Increased feeling of guilt		x		x
(Ogbanufe & Gerhart, 2020)	Interacting with others and fitness tracking		x	x					x		New ideas about communicating, interactig, and socializing	x			x
									x		Increase/decrease of IT identity				x
(Pera et al., 2020)	Sharing life experiences and interests	x			x				x		Breaking of social bonds, loss of control over photographic image		x		x
									x		Increase in subjective well-being/mental heath, increase in strength of existing bonds, creation of new bonds	x		x	
(Sedera & Lokuge, 2020)	Creation of digital content	x							x		Digital perfectionism anxiety		x		x
SUMMARY	22	10	13	7	6	7	11	6	42	1	58	25	31	22	36

Table 2.   Exercept of concept matrix

4.7   Outcomes

In sum, 25 outcomes of digitalisation could be classified as positive in the concept matrix, whereas 31 could be classified as negative. However, this superficial level of analysis is misleading. Being aware of positive and negative outcomes due to digitalisation is reported to be a crucial goal of the IS community (Marabelli et al. 2021). They aim for leveraging the benefits of IT use while simultaneously preventing possible downsides from doing harm (Marabelli et al. 2021). This shared understanding probably explains why six of the authors who report negative outcomes in their papers instantly try to come up with a solution to mitigate unintended, negative effects, e.g., Feiereisen et al. (2019) and

Benlian et al. (2020). As there are mechanisms available to cope with risks that are induced by technology use, counting the positive and negative outcomes is not sufficient if one wants to tell if digitalisation has a beneficial effect on individuals lives overall. Table 2 summarizes all findings.

5 Discussion

5.1 Discussion of the Findings

This literature review gives an overview about outcomes in lives of individuals due to digitalisation that are reported by existing literature. The three life domains health, personal, and social are all affected by digitalisation. Digitalisation can rather have a positive effect on the fulfillment of human needs or a negative effect. Regarding the three human needs, evidence was found that digitalisation can influence the perceived degree of autonomy, competence, and relatedness. The outcomes are caused either by the use of digital technology, or excessive use, or non-use, or the combination of different technologies. Authors refer to different technologies with different functional affordances. 51 outcomes were identified and classified in a concept matrix.

Even if the scope of the literature review was initially set to the years of 2010 and later, it is important to stress that more than 50 percent of the articles that were considered as possibly relevant were published in 2019 or later. This means that the research on the digitisation of the individual has gained popularity and relevance in the past three years and probably a lot of progress will be made soon in this evolving field. Therefore, it is necessary to constantly keep track of the publications and conduct literature reviews on a regular basis.

5.2 Directions for Future Research

Some areas were identified with many research findings, but still, research on the digitalisation of the individual is scarce. Thus, we propose three directions for future research based on our literature review:

(1) Application of a holistic view on affordances: Prior research in the realm of the digitalisation of the individual addresses only one or two of our five identified affordances which enables individuals to reach certain outcomes. Furthermore, these affordances are often very specific although our study shows that they can be categorized into five types. Thus, we suggest future researchers to consider several types of affordances in their approach to study usage pattern as well as outcomes of the digitalisation of the individual. Moreover, we would recommend to classify the identified affordances in order to generate a common understanding of the suggested five types of affordances.

(2) *Consideration of different types of use*: The results of our study show that different usage patterns (e.g., excessive use, combined use) have been studied separately in existing research. However, we believe that considering several types of use in future research will be beneficial to better understand how different usage patterns may lead to the same or contrasting outcomes for individuals. Morever, we we found least research in the areas of technology non-use and the combination of technologies. Furthermore, it would be beneficial to enhance the knowledge about pathways that could turn technology use into excessive technology use. This can be used afterwards to investigate how to reduce excessive use, since the majority of reported outcomes of excessive technology use is negative and unintended. Since there are some contradicting viewpoints in the research field of excessive technology use, that raises the need for further clarification. Regarding the terminology of "excessive use", "technology addiction", or "constant-checking", different authors argue in favor of different viewpoints. Nevertheless, Kugler (2020) suggests that researchers should focus less on the terminology and classification of excessive use but rather come up with solutions, as the negative implications are real.

(3) *Joint examination of positive and negative as well as intended and unintended outcomes of digitalisation*: Our results show that previous research focuses either on positive or on negative, respectively intended or intended, outcomes of individuals' digitalisation. Thus, we propose that future studies should investigate contrasting types of outcomes together. By examining both, researchers can try to find solutions to prevent negative outcomes. Moreover, some areas are already covered by existing

literature, e.g., outcomes of social media use or wearables. In contrast, other topics like the outcomes of smartphones, or digital TV, or smart home assistants are less often observed in an individual context by existing papers. Lastly, we want to suggest the call of Andrade and Techatassanasoontorn (2021) to get a deeper understanding of the outcomes of digital enforcement in the lives of technology non-users.

5.3   Implications for Practice

Providers of social media platforms, manufacturers of wearables and smartphones, as well as companies which provide digital photo manipulation technologies, digital TVs, smart home assistants or other DT, and developers of video games can draw valuable conclusions from this research. They could use the insights on the one hand to improve their products or services. In doing so, they may reduce negative outcomes such as exhaustion or addiction by integrating features which address affordances that result in positive outcomes (e.g., *managing personal life* by providing tools that solve everyday problems). Moreover, companies could use the findings on the combination of technologies when planning collaborations with other technology firms by considering partners that offer DT which enable additional affordances (e.g., integrating a *communication* tool in a *social* platform). If their technology is used excessively, companies should reiterate negative outcomes for their users lives may make them rethink their and adjust the business model to sustain their user base in the long-term.

On the other hand, research insights could be incorporated when companies communicate with their customers. For example, firms could adapt their advertisings and show the positive outcomes that are perceived by individuals who use their technology (e.g., reduced loneliness). Using existing research data lowers the need to run surveys by the company itself, which could result in cost savings. Startups that want to enter the market by introducing new digital innovations can use the findings of this literature review. They get to know areas of life that are affected negatively or needs that are unmet and may be able to detect a market gap. Insights on individuals in a digital environment can be used to increase the problem-solution-fit which may have a positive effect on the success rate of the new products or services.

6   Conclusion

As mentioned in section 3.1, the digitalisation of the individual is a fast-evolving field. Due to capacity limits, the latest developments newer than 06/30/2021 could not be considered in this literature review. Furthermore, neither all roles of the individual nor all areas of life as introduced by Matt et al. (2019) or Turel et al. (2020) were taken into consideration. This would however be a necessary step, since the different areas of life are closely connected and interrelated (Turel et al. 2020). The outcomes are assignable to the different types of technology use, but still, there is no strict distinction established so far, which leaves room for interpretation. We did not apply a backward search since the rather high amount of possibly relevant papers did not urge a need for including additional articles.

To sum it up, in this paper we aim to give an overview about outcomes in lives of individuals that are caused by digitalisation. Therefore, we conducted a structured literature review following the procedure introduced by Webster and Watson (2002). In the literature search, we analyzed 23 relevant papers to answer the research question. Most authors investigate the effect of using a certain digital technology (e.g., social media or quantified-self technologies) on individuals lives. Some authors examined the implications of excessive technology use. Least research was done on individuals who use different DT in combination, and individuals who refuse to adapt technologies in their lives. On an aggregate level, we found that digitalisation can impact multiple areas of life simultaneously, and is able to facilitate or hinder the fulfillment of basic human needs. These far-reaching and complex consequences, in combination with a fast-evolving landscape of DT urge the need for further research on the digitalisation of the individual.

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