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### Digital Psychology: introducing a conceptual impact model and the future of work

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## Conceptual Article

# Digital Psychology: introducing a conceptual impact model and the future of work

### Abstract

The present review is the first of its kind to form a conceptual discussion about a novel field, here referred to as *digital psychology*. The result is a conceptual impact model of digital psychology (in short: CIMDP) highlighting the bidirectional relationship between human psychology (consisting of affect, cognition, and behavior) and digital transformation (driven by datafication, algorithmization, and platformization). The findings of the CIMDP are applied to a relevant field in economy and business development, namely to the digital future of work, which appears to be mediated by organizational behavior and governed by managerial decisions. The resulting model may be used to provide orientation in a new research domain and to guide future studies in psychology, cognitive science, digital transformation, human-computer interactions, organizational behavior, and business management.

### Keywords

Digital psychology, conceptual impact model, bidirectional relationship, human psychology, digital transformation, review

## 1. Introduction

There is a massive digital transformation occurring across our societies, which means that our lives are shifting more and more from physical to digital spheres (Bohlin, 2022; Musik & Bogner, 2019; Uygun & Aydin, 2021). Even though this has been true for the past two decades and more, the process of digitalization undertook a strong acceleration during the Corona pandemic (Amankwah-Amoah et al., 2021). Because of technological innovations like platform economies (Meijerink et al., 2021; Myriam, 2021), edge computing and the blockchain (Panda et al., 2020), as well as rapid developments in artificial intelligence (Fletchen, 2021; Wooldridge, 2021), it does not seem like these trends in digitalization will end anytime soon. This creates new spaces for humans to develop themselves, to get in contact with each other, and to interact with their environment. The emerging digital spaces in fact are not only new tools that can be used to foster productivity, instead they provide completely new places for people to inhabit. It is a mental inhabitation, since, for example, a person immersed in the metaverse, or an augmented reality game is not *physically* somewhere else but is mentally present in a very different space than his or her physical location. In this space, there is the possibility to do other things, learn different information, and meet other people than would be possible in a purely physical fashion (Mukherjee, 2020; Youngs, 2013).

There are natural impacts of “the digital” on human psychology, and there are also psychological influences on digital change, both occurring on several levels. In the current paper, we discuss these dynamics and eventually formulate a preliminary conceptual bidirectional impact model. This is followed up with a brief discussion of how these insights concerning *digital psychology* affect one of the most pertinent domains of the modern economy and current business development pressures – the future of work.

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2  
3 This bidirectional relationship between technology and psychology was described as a key  
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5 characteristic of *digital psychology*, which becomes evident in a quote by Sarkar (2022,  
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7 paras. 4–5):  
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10  
11 Digital psychology is an arena of study that examines the impact of digital technology  
12 and media on psychological aspects of human lives, such as human behaviors,  
13 actions, attitudes, motivation, learning, and others.  
14

15 Interestingly, human psychology also influences the development and evolution of  
16 digital media and technology, such as its influence on business performance, growth,  
17 and economic landscape. Digital psychology explores the bidirectional relationship  
18 between human psychology and digital technology and media that have tremendous  
19 influences on each other.  
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21

## 22 23 24 25 **2. Digital Impact on Human Psychology** 26

27  
28 In the early days, digital psychology was merely referred to as *cyber psychology* or *web*  
29  
30 *psychology* (Ancis, 2020; Attrill-Smith et al., 2019; Gordo-López & Parker, 1999; Norman,  
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32 2017; Piazza & Bering, 2009; Riva & Galimberti, 2001). Since nowadays not everything that is  
33  
34 digital automatically implies that it is online (although it often may be), the latter is generally  
35  
36 considered a part of the former. How we deal with the online world is only a part of how we  
37  
38 deal with the digital world (Suler, 2016). There are various ethical challenges that arise in  
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40 cyber and digital psychology. For example, how do digital technologies modify our extended  
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42 selves and how should we deal with this? How much do we want to merge with technology  
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44 (i.e. through human-computer interfaces)? Should we allow technology to permeate the  
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46 lives of our children? Do we want digitalization to be a part of aging and gerontology? How  
47  
48 can we deal with problematic internet use, online gambling, smartphones, and excessive  
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50 video games? Is there room for e-therapy? Are we happy with how social media influences  
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52 self-perception? How do we feel about digital citizenship or our immersion into virtual  
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3 reality? All this goes to show that there is a societal and ethical relevance to how digital  
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5 technology impacts human psychology (for a detailed analysis on this, see Parsons, 2019).  
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8  
9 More recently, psychologists have started to realize that the vast availability of personal data  
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11 through the Internet of Things (IoT) and our smartphone use can be used for psychometric  
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13 measurements. Interestingly, our liking, texting, and reading behavior online can be used to  
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15 reliably predict personality traits (Azucar et al., 2018; Kosinski et al., 2013; Youyou et al.,  
16  
17 2015). This is called *digital phenotyping* and was employed in a new discipline called  
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19 *Psychoinformatics* (Montag & Elhai, 2019, 2020). Such research has been applied to  
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21 neuroscience and it was found that digital use modified certain brain structures (Montag et  
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23 al., 2017). At the same time, researchers linked smartphone use to molecular genetic  
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25 markers (Sariyska et al., 2018). However, some scholars weighed in to call for caution since  
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27 these avenues were still new and relatively unexplored. For example, Marengo and Montag  
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29 (2020, p. 52) stated: "Results showed that on average, the accuracy of prediction of user  
30  
31 personality scores by mining Facebook data is moderate [...] Currently, personality-  
32  
33 predictions from social media and smartphone data are feasible, but far away from perfect."  
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41 Research in *digital psychology* sometimes manifested under the headings of the "Psychology  
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43 of Technology" with the key interests being digital influences on the brain, workplace  
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45 applications, personality differences, digital literacy, attitudes across lifespan, digital ethics,  
46  
47 childhood and teen development, social media use, and behavioral change (for a detailed  
48  
49 discussion, see Rosen et al., 2015). A major interest was posed through the question if  
50  
51 digitalization (often operationalized as time spent on the screen) has a negative impact on  
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53 psychological wellbeing. Although there are many factors at play that can influence the  
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55 answer to this question, a quantitative study showed that overall, moderate use of digital  
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3 technology was not negatively correlated with wellbeing and may even be advantageous in a  
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5 connected world (Przybylski & Weinstein, 2017). However, a meta-review on the influence  
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7 of social media and the feeling of loneliness revealed a complex picture, indicating that there  
8  
9 is a two-way street: if the internet is used to strengthen one's social ties, the feeling of  
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11 loneliness is mitigated, but if it is used to evade social anxiety, the pain of feeling lonely is  
12  
13 generally increased (Nowland et al., 2018). Apart from this, online platforms can also be  
14  
15 used to continue misbehavior already present in the offline world, which becomes evident in  
16  
17 research dealing with the rise of cyberbullying (Kowalski et al., 2014). Studies dealing with  
18  
19 fears concerning the psychosocial effects of digital transformation show that the effects are  
20  
21 not uniform (meaning that they are context-dependent) and that misbehavior (i.e.  
22  
23 cyberbullying) is often conditioned in the offline world and this strongly dictates how it is  
24  
25 both continued and perceived online (George & Odgers, 2015; Underwood & Ehrenreich,  
26  
27 2017). However, if one focuses on the negative effects of digitalization, one certainly finds  
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29 some (Lissak, 2018): a literature review found negative effects of screen time of children and  
30  
31 adolescents on physical health (poor sleep, cardiovascular diseases, impaired vision and  
32  
33 reduced bone density), on psychological effects (poor sleep, depression and suicidal  
34  
35 ideation), and on neurological patterns (ADHD, dopamine pathways, addiction behavior,  
36  
37 structural brain regions associated with cognitive control and emotional regulation).  
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39  
40 It is clear from this that digital change has an influence on human psychology. In any case, it  
41  
42 is important to note that there is a *bidirectional* relationship at play where technology has an  
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44 impact on us humans but that the same is also true the other way around.  
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### 3. Psychological Impact on Digital Transformation

An in-depth literature review about the role of psychology in digital transformation holds that there are two main factors that define digital change (Bögel & Upham, 2018):

1. **Consumption:** People have to be willing to use and consume a digital good in order for businesses to have the incentive to further invest in advancing a specific technology.
2. **Social acceptance:** These incentives can only be set in place when influential or financially powerful individuals as well as society at large deem a technology as useful and worthwhile.

The two factors are most effectively met when they coincide with macroeconomic needs, such as the psychological adaptivity of new workplace technology. Another review formulated the *Consumer Acceptance of Technology (CAT) model*, in which the authors claim that technology acceptance is underlying a function of both cognition and affect (Kulviwat et al., 2007). In other words, we both have to *think* as well as to *feel* that using a digital innovation makes sense and improves our lives. If this is not the case, then a new technological advancement can be as good as it could technically become, but it would not be implemented and distributed because it lacks any interested users.

These dynamics were studied by a team analyzing the factors that predicted the use of technology. They worked with a sample of 1,204 adults ranging from 19-91 years of age. They found that one of the strongest predictors was the participants' age since older respondents were less likely to adopt new technologies and use digital tools than younger ones. Computer anxiety, fluid intelligence, and crystallized intelligence were important technology use predictors. The effect of age on technology adoption was statistically mediated by cognitive ability, computer self-efficacy, and computer anxiety (Czaja et al., 2006). A similar study analyzed how age influenced the use of a new software that was introduced to 118 workers. Whereas younger employees were more influenced by their own

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2  
3 attitudes towards the technology, older participants were more guided by their own  
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5 subjective norms and perceived behavioral control, although the latter effect vanished over  
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7 time (Morris & Venkatesh, 2006). Such findings need to be taken seriously by companies  
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9 trying to promote technology adoption.  
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13 By far, one of the most important selection pressures for digital transformation is human  
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15 trust. Trust in technology and the information provided by the medium is key for whether  
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17 people want to use and rely on the digital tool or not (Kelton et al., 2008). It was found that  
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19 user satisfaction strongly coincided with both performance ambiguity and digital trust  
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21 (Johnson et al., 2008). These principles become all the more important in modern  
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23 developments where Artificial Intelligence (in short, AI) and related automated algorithms  
24  
25 become mainstream. They heavily learn from and interact with human behavior, meaning  
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27 that they emerge as powerful predictors of choice and as such become rather invasive in our  
28  
29 daily lives. At the same time, the billions of nodes (called “neurons”) in artificial neural  
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31 networks of modern Large Language Models (LLMs) and computer vision applications form  
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33 somewhat of a “black box” because the computations become too complex for many of us  
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35 to track (cf. Adadi & Berrada, 2018). Therefore, there is an active call for “building human  
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37 systems of trust in an accelerating digital and AI-driven world” (Y. Walter, 2022). In other  
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39 words, trust is a central constituent of digital adoption.  
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48 Hence, digital technology does not only influence human psychology, but our psychological  
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50 dispositions at the same time determine which technical advancements are favored, trusted,  
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52 and adopted. The result is that only the tools that coincide with our likings are pushed  
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54 forward, and the ones that strike our distrust will most likely be filtered out.  
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## 4. The Psychological Dimension

### 4.1. Human Psychology in the Digital Era

As seen above, twenty years ago, authors first discussed the *digital divide*, meaning that demographic variables (mostly age and gender) influenced how people used the internet and if they purchased consumer goods online (Akhter, 2003; Cooper & Weaver, 2003). These dynamics have now changed since demographics became less important and gave rise to psycho-social variables (Multan et al., 2019). In general, constructs in psychology can be modeled along three interdependent factors (Breckler, 1984; Eiser & Eiser, 1986; Forgas, 2001, 2006, 2008; Goldstein, 2014; Gollwitzer & Bargh, 1996; Isen, 1987; Izard et al., 1984; F. Jackson, 1982; L. A. Jackson et al., 1996; Koltko-Rivera, 2004):

- **Cognition:** deals with what we are “thinking”.
- **Affect:** deals with what we are “feeling”.
- **Behavior:** deals with what we are “doing”.

Although it is rare that studies take all three perspectives into account when analyzing the influence of digital technology on individuals, sometimes authors are interested in a comprehensive view – like in the change in cognition, affect, behavior, and even psychophysiology of “digital natives” (Yilin et al., 2017). For the purposes of the present discussion, it appears to be valuable to make use of the distinction between cognition, affect and behavior in the context of *digital psychology*.

### 4.2. Cognition

Digital transformation affects the way we think and construct our mental representations, both of the world and of ourselves (Morales-Martínez et al., 2017; Saunders et al., 2017). In cognitive neuroscience, the term *active externalism* was coined to denote the empirically testable idea that many of us have implemented technological tools into our cognitive

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3 structures (Coin & Dubljević, 2021; Dartnall, 2007; Ludwig, 2015; Lyre, 2010; Smart, 2017; H.  
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5 Walter, 2018). A cell phone, for example, can nowadays be used to store phone numbers,  
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7 personal and business contacts, and a host of other information that we wish to store but  
8  
9 not necessarily memorize. The phone may thus become a sort of a “second brain”, which is  
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11 integrated into our regular cognitive patterns (Campbell et al., 2010; Forte, 2022). There is a  
12  
13 comparable idea in the domain of philosophy known as the *extended mind thesis*, which  
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15 denotes the idea that the human mind is not limited to the brain and body, but that it can be  
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17 extended into the physical world with examples like phones or computers (Farina & Levin,  
18  
19 2021). A fancy discussion revolving around the (physical) merging between humans and  
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21 technology can be found around the topic of *transhumanism* (for a detailed review, see  
22  
23 More, 2013).

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25 A literature analysis entitled “Digital era psychology – studies on cognitive changes”  
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27 highlighted some interesting findings (Vasile, 2012):

- 28 • Some authors were concerned that internet-based activities negatively affect children  
29 and adolescents, but there appeared to be new skills emerging helping them to adapt to  
30 the new digital world.
- 31 • Some authors believed that the rise of IT-technology might be responsible for the growth  
32 of certain disorders, such as ADHD.
- 33 • There appeared to be cognitive changes occurring in users of digital technology that  
34 provided an integrative function for society.
- 35 • There are studies showing that digitalization led to a decrease in skills that were  
36 employed in a “pre-digital human period” (p. 736).
- 37 • The main cognitive change observed had to do with the adaptation to new ways of  
38 information processing.
- 39 • Visual pathways of learning and information processing became more prevalent in a  
40 digitized world, which might result in a decrease of cognitive performance due to  
41 overload.
- 42 • Personality variables appeared to be changing due to cognitive adjustments and social  
43 identity was undergoing changes as well due to new ways of socializing.

44  
45 These cognitive developments seem to yield both emotional and behavioral changes (i.e. via  
46  
47 new phenomena, like cyberbullying).

### 4.3. Affect

In the case of cyberbullying, there are emotional and affective reactions towards digital occurrences. If one gets bullied offline, it dampens a person's self-esteem. This is no less true for online bullying, although a strong difference is that hateful comments can accumulate huge numbers when a community starts to attack a user and it can get especially vicious due to the fact that one can remain anonymous online and does not need to fear practical repercussions (Slonje et al., 2013). Interestingly, a study with 76 participants analyzed 3,649 social interactions across communication channels and found that – for better or for worse – text-based communication influenced self-esteem more than face-to-face or cellphone communication (Gonzales, 2014).

Digital platforms can become particularly immersive, which may be due to their interactive nature. This is evident in digital games where users dive into a whole new world that is often distinct from physical reality (except in the case of augmented or extended reality games). It has been shown that they can provoke psychological flow states accompanied by positive emotions, which in turn can positively affect social functioning and self-image (Alexiou et al., 2012). Unfortunately, it is not all fun and games: a study involving 1,557 German internet users found that they often suffered from “digital stress” due to a communication load resulting from private and business e-mails, social media messages, and internet multitasking. This was indirectly related to burnout, depression, and anxiety. Some of the key drivers in the phenomenon were the perceived social pressure, the fear of missing out, as well as the number of social interactions online. The effect was significantly moderated by the respondent's age, which makes the study of digital stress interesting from a life span perspective (Reinecke et al., 2017).

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3 A paper entitled “Cyberpsychology and Affective Computing” detailed that psychological  
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5 research outlined the embeddings of emotion in digital change. The authors suggested that  
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7 such knowledge can and should be used for novel approaches in what they called  
8  
9 “cybertherapy”, and personal development in “positive technology” and “smart health” to  
10  
11 improve personal wellbeing (Calvo et al., 2015). As such, improvements in our understanding  
12  
13 of digital emotion could aid in better digital behavior.  
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#### 18 4.4. Behavior

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21 What we think and what we feel online and concerning our use of digital tools eventually  
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23 defines what we do in the digital sphere. The same is true for ethical intuitions in the digital  
24  
25 space. An empirical “four component model” of moral behavior described the synergistic  
26  
27 influences involving the key factors of sensitivity, judgment, motivation, and action. In this  
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29 model, digital moral action was the result of a function based on thought and emotion  
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31 manifested in sensitivity, judgment, and motivation (Crowell et al., 2008).  
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37 Some of the daily behavior in modern society has partially or completely shifted into the  
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39 digital sphere, like certain forms of communication or shopping behavior. This means that  
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41 marketers had to adapt to reach their potential customer base in a way as to remain  
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43 attractive in the changing digital environment (Cleghorn & Griffiths, 2015; Stephen, 2016). It  
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45 was shown that especially millennials and younger people made use of online-shopping,  
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47 which had its own dynamic: customer decisions were largely influenced by social media and  
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49 impulsive discounts, alongside the person’s needs, provided information, customer reviews,  
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51 confidence, risk level and avoidance, intention and perception (Roopa et al., 2022).  
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56 Interestingly, a study demonstrated that a physical shopping list resulted in more rational  
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3 consumer behavior whereas a digital shopping list yielded much more impulsive buying  
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5 decisions (Huang & Yang, 2018).  
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9 The adapted behavior due to digital change can be very practical, as may be seen through  
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11 the introduction of dating apps like Tinder, Bumble, Hinge, and alike when it comes to young  
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13 people seeking for a mate. The mating strategies of men and women had to drastically  
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15 change in the pursuit of pleasing not only a prospective partner, but first and foremost the  
16  
17 selective algorithms governed by AI. Both genders had to position themselves in a “clickbait”  
18  
19 manner so that one might garner a “right swipe” (Hitsch et al., 2010) and the sheer ubiquity  
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21 of profiles worldwide resulted in somewhat of a fatigue in relation to dating (Schwartz &  
22  
23 Velotta, 2018; Solovyeva & Laskin, 2022). As a result, some authors claimed that people  
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25 were having less relationships and less sex than before the advent of online dating (Proksch  
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27 et al., 2021; cf. Stoicescu, 2020). Men in particular were found to be most discriminated on  
28  
29 the dating apps (Lamphere & Pomykacz, 2022) whereas women appeared to experience  
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31 novel risks of harassment and thus have developed modified forms of protection strategies  
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33 (Mironova et al., 2021).  
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41 Today, digital behavior is often analyzed through a method called “conversation analysis”  
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43 since a major percentage of what we do online is a form of communication (either via text,  
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45 pictures, videos or voice memos). The method allows for a detailed, sequential and  
46  
47 discursive analysis of real-life online interactions (Meredith, 2020). Although digitalization  
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49 affects the behavior of people of all ages, it is especially impactful for young people. As  
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51 Ahuja and Alavi (Ahuja & Alavi, 2017, p. 671) hold:  
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56 Changing lifestyles and a constant digital presence is impacting the minds of millions  
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58 of youngsters as the average amount of time spent on the internet increases rapidly.  
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60 Youngsters are spending a lot of time online-chatting with their friends through social  
networks, playing online games with their peers, and shopping products online. As

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3 the individual need for recognition and self actualisation grows, youngsters are trying  
4 to form and establish identities online.  
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6 Basically, everything we *think* in relation to the digital world belongs to the domain of digital  
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8 cognition, whereas everything we *feel* in the digital sphere pertains to digital affect, and  
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10 everything we *do* on digital platforms deals with digital behavior. And it appears as though  
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12 not only our tools but also our psychology has been increasingly subject to the process of  
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14 digitalization.  
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## 22 **5. The Technological Dimension**

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25 *Digital transformation* refers to the process of leading people and social constructs (e.g.  
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27 societies, governments, organizations, or businesses) into a digitized world where the  
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29 handling of digital tools becomes commonplace (Zaoui & Souissi, 2020). This also includes  
30  
31 associated strategic activities, like business model innovating (Bican & Brem, 2020). This is  
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33 why digital business models and digital business model transformation have become  
34  
35 increasingly important for the survival of businesses in a digital era (Hess, 2019; Hinterhuber  
36  
37 et al., 2021; Schrape, 2021). There are in-depth analytical models trying to guide the digital  
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39 transformation, such as the step-wise model by Peter (2017), which starts with the  
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41 conception of an organization *before* the transformation where most of the processes are  
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43 still built upon analog technology, and it ends with the conception of an organization *within*  
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45 the digital era.  
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53 Latzer (2022) refers to the “digital trinity”. These are three features comprehensively making  
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55 sense of the digital change occurring in society and economy, which eventually are propelled  
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57 or selected by psychological mechanisms. The author holds that “This trinity metaphor does  
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59 not refer to theological (Catholic) interpretations of God the Father, Son and Holy Spirit, but  
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3 primarily to its co-evolutionary and complex character” (p. 335). His research showed that  
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5 there appeared to be three key processes to digitalization:  
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- 8  
9 • **Datafication:** Digital data became ubiquitous as we leave online traces and fingerprints  
10 everywhere we click. This process was expanded by the advancements made concerning  
11 the Internet of Things (IoT). The result was that there was more (big) data than ever and  
12 that it became the “new oil” because it became a valuable good powering many modern  
13 digital business models.  
14
- 15 • **Algorithmization:** problem-solving and data processing including decision making  
16 became much more automated, which was bound to be perfected using AI. Statistical  
17 models and mechanistic computation lied at the heart of many modern platforms, and  
18 this led to the phenomenon that many decisions human performed were at least co-  
19 influenced by algorithms. Decisions like which movies to watch, which foods to eat,  
20 which books to read, which education programs to select, and even which dates to go on  
21 were heavily affected by which alternatives and information are pre-selected for us  
22 through machines.  
23
- 24 • **Platformization:** As datafication and algorithmization progressed, people were meeting  
25 more and more online to get connected (i.e. social media). They also visited online  
26 platforms to get informed (such as news outlets) or they did their shopping digitally  
27 (through e-commerce). Both private as well as work life got shifted to online platforms as  
28 home office became not only mainstream but during the Corona pandemic also  
29 imperative for many. There was one trend that went counter the platformization idea,  
30 namely the technology of *edge computing*. This refers to the process that computation  
31 occurs not in a central cloud but locally with fast processors (Al-Turjman, 2018).  
32 However, edge computing did not neglect the idea that business models and social  
33 interactions now exceedingly take place on digital platforms.  
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## 41 **5. The Conceptual Impact Model for Digital Psychology**

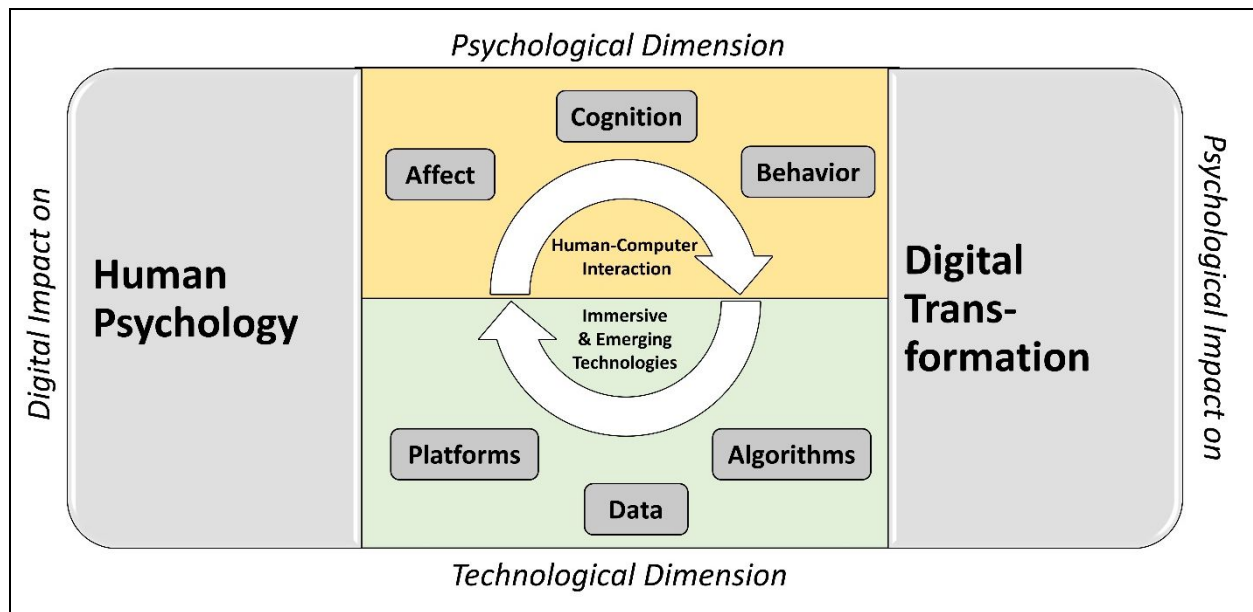
42  
43 The foregoing discussion intended to demonstrate that there are *bidirectional* influences  
44 between human and technological elements. On the one hand, there are digital  
45 developments that directly influence human psychology. For example, studies have shown  
46 that Tinder employs an algorithm that allocates 80% of female users to 20% of top male  
47 users, which appeared to have detrimental effects on many men’s self-esteem. At the same  
48 time, it increased women’s self-perception of being desirable but lowered their hopes of  
49 ever attaining a steady relationship. From a business model perspective, the Tinder AI  
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3 worked well since it was set out to maximize people's time on the app (and letting them find  
4 their perfect match would probably defeat this purpose), but from a social and psychological  
5 perspective, the model had damaging effects. Tinder and similar platforms were strongly  
6 criticized for this, but by and large there was no economic incentive to make significant  
7 changes (Fox, 2019; Portingale et al., 2022; Strubel & Petrie, 2017; Toma, 2022).  
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16 On the other hand, there are psychological impacts on the rate and nature of digital  
17 transformation. Only if users trust the new technology and the associated dynamics will they  
18 adopt a digital tool, which is a necessary prerequisite for technological instruments to  
19 permeate the community. Technological ideas that do not conform to psychological  
20 dispositions but go against them will not find interested users.  
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29 On the psychological dimension, there appear to be three factors responsible for defining  
30 the nature of specificities in our human-computer interactions (HCI). They are affect (how  
31 we feel about and because of computers), cognition (what we think about and because of  
32 computers), and behavior (how we act with and because of computers). On the  
33 technological dimension, there may also be three factors that characterize the rise of  
34 modern immersive and emerging technologies. They are platforms (driving the process of  
35 platformization), data (driving the process of datafication), and algorithms (driving the  
36 process of algorithmization). Together, these dynamics can be visually summarized in the  
37 conceptual impact model for *digital psychology* as depicted in Figure 1.  
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**Figure 1.** Illustration of the Conceptual Impact Model for Digital Psychology (CIMDP).

## 6. Implications for the future of work

The dynamics found in the Conceptual Impact Model for Digital Psychology (CIMDP) have practical consequences. An important area for society and economy is the evolution of work-related assets. Among them lies first and foremost the question of how jobs and work will look like upon further experiencing an ongoing digital transformation. As the impact model implies, the answer to this question will depend upon both psychological as well as technological factors that both influence each other.

Already two decades ago, Valcour and Hunter (2004) discussed that technological advances (especially in IT and telecommunication) affect a person's work-life integration. Ever since the Corona pandemic, these effects have become mainstream (Ratten, 2020). A research report by McKinsey & Co. (2021) declared that the strongest disruption is seen with jobs that have a high proclivity for physical proximity. The reason for this is naturally not the biology of the virus itself, but the social trends that followed, which became immanent in a push for

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3 digitalization in most industries. This trend was actualized through the introduction of  
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5 collaborative technologies and the respective adaptations in the psychology of work. A  
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7 literature review dealing with digital developments during COVID-19 highlighted three  
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9 factors that appeared to be central to the experience of work, as well as the impact of  
10  
11 technology on work and employment. They are: (i) issues of control, (ii) managerial  
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13 surveillance, and (iii) resistance to the digital change (Hodder, 2020). A major practical shift  
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15 to how work was generally conceived was the normalization of the home office, which was  
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17 not only an add-on to many jobs but for a period of time was a politically enforced work  
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19 modality  
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26 The digitalized work place was sometimes referred to as the *Work Environment 4.0* and it  
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28 was added that intentional forgetting may be a helpful feature promoting change,  
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30 adaptability, and agility in this environment (Schüffler et al., 2020). In these dynamics,  
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32 working with digital Management Information Systems (MIS) is commonplace to provide  
33  
34 consistent information, even in environments defined by constant (digital) change. However,  
35  
36 similar to what was discussed above, the MIS can only be adopted if it is adequately  
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38 incentivized and garners the necessary social trust, which also influences worker  
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40 performance (Meeßen et al., 2020). A key tool in the digital workspace is the integration of  
41  
42 interactive assistive systems that act as a sort of cognitive companion. This helps employees  
43  
44 to structure, make sense of, and delete information (Niessen et al., 2020; Siebers et al.,  
45  
46 2017). The assistive cognitive companion is grounded in a knowledge base and is applied  
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48 using machine learning. Human appreciation is used to both amend the knowledge base as  
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50 well as to feed the AI with decision-relevant information (Niessen et al., 2020). As Kluge,  
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52 Antoni, and Ellwart (2020, p. 3) hold: “With the implementation of such solutions, new  
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54 challenges emerge – challenges of managing technical change and technology acceptance.”  
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3 A paper on the introduction of new technology in the workplace puts it well when saying  
4 that employees must come first, and technology comes second. The authors tracked the  
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6 implementation of smart glasses in a manufacturing company and found that the adoption  
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8 worked best when employees were brought into the loop from the very beginning. Already  
9  
10 when starting the project, their perspective was taken into account, rather than consulting  
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12 them after all the decisions were made (Paruzel et al., 2020).  
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18 The CIMDP holds that digital transformation occurs along the dynamics of datafication,  
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20 algorithmization, and platformization (Latzer, 2022). Similar trends have also been observed  
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22 in the digitalization of work (Parker & Grote, 2022; Poutanen et al., 2019). Four intervention  
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24 strategies were identified and it was found that they contribute to a positive influence of  
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26 technological introduction on job resources, employee well-being, safety, and performance  
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28 (Parker & Grote, 2022):  
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- 34 1. **Design choices:** Work design choices have to be taken into account when new  
35 technology is implemented, and they need to be consistent with sociotechnical systems  
36 of joint optimization.
- 37 2. **Human-centered design:** During the design and procurement phase of new technologies,  
38 human-centered design principles have to be proactively considered.
- 39 3. **Macro-level policies:** Organizationally oriented intervention strategies need to be  
40 supported by macro-level governance strategies and policies.
- 41 4. **Broad empowerment:** The focus should not only lie in making employees fit for the use  
42 of the new technology, but they (as well as other relevant stakeholders) should be  
43 trained in work design and related topics.  
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46 A study conducted with 947 employees in 46 subsidiary firms analyzed how digital  
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48 transformation initiatives affected employee outcomes. The authors included three outcome  
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50 variables, namely affective commitment, psychological safety, and change-oriented  
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52 organizational citizenship behavior. The study found that digitalization initiatives were  
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54 negatively correlated with all these employee outcome variables, showing that digital  
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56 transformation may be an immensely destabilizing force for the workers. However, the  
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3 negative effect was moderated by the CEO's experience in situations of challenge. Hence,  
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5 the more experienced in difficult situations a CEO was, the better the psychological  
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7 employee outcomes upon the transformation initiatives became (J. Lee et al., 2021). In other  
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9 words, managerial decisions by an experienced leadership staff had a positive impact on the  
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11 organizational behavior to facilitate positive psychological employee adaptations in the  
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13 context of the firm's digital transformation.  
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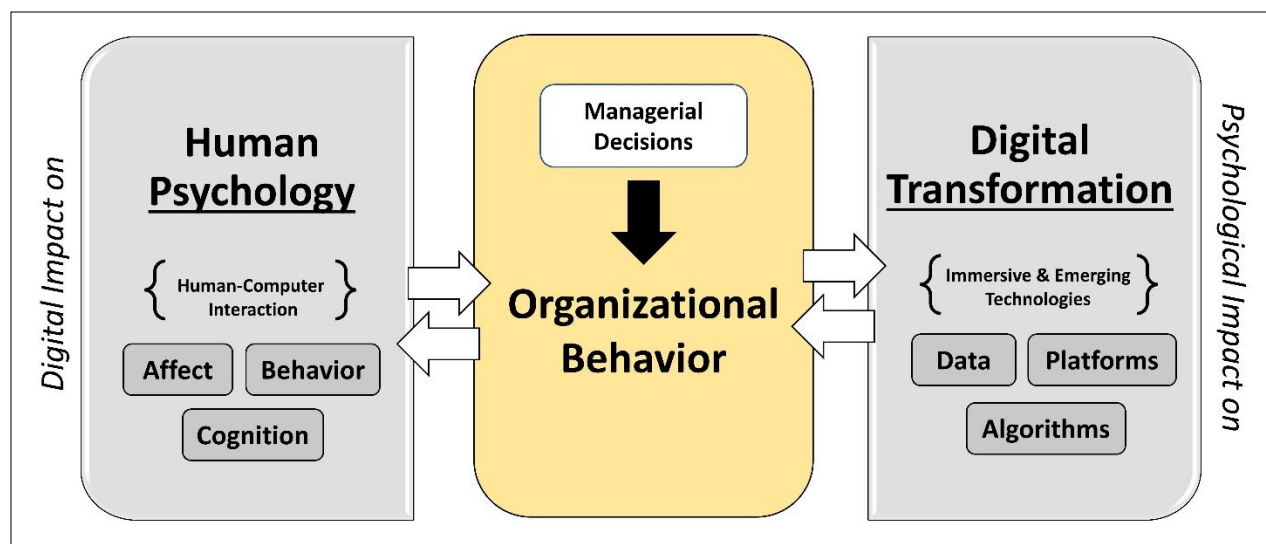
18 An article discussing the workplace of the future in the context of digital work claims that the  
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20 *how* and the *what* gain in relevance, and that the *where* and the *when* lose their significance  
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22 (Dittes et al., 2019). One key insight is that "Digital work is deeply rooted in organizational  
23  
24 identity" (p. 654). The authors identify four major management challenges which  
25  
26 organizations need to overcome to introduce digital work environments effectively:  
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- 31 • **Challenge 1**  
32 Digital work overload: The need to avoid technostress and to achieve a better work-life  
33 balance.
- 34 • **Challenge 2**  
35 Culture and leadership paradigms: The need to harmonize prevailing organizational  
36 culture and leadership strategies with new agile ones.
- 37 • **Challenge 3**  
38 Digital natives and digital immigrants: The need to address their different expectations.
- 39 • **Challenge 4**  
40 The top-management: The need to be both pioneers and apprentices at the same time.  
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44 Although there are positive effects of digitalization at work, much research has emphasized  
45  
46 the negative psychological outcomes, which was sometimes referred to as "the dark side of  
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48 digitalization in the future of work" (Bamel et al., 2022, p. 1). The authors have also made  
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50 suggestions how this "dark side" can be mitigated, namely by promoting work-life balance,  
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52 by the democratization of work and work technologies, by promoting employee  
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54 empowerment, by promoting entrepreneurial behavior, by reskilling for mastery, and by  
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56 directly focusing on employee wellbeing (Bamel et al., 2022). Although enforced remote  
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3 working via digital platforms can sometimes induce stress, exhaustion, and negative effects  
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5 on subjective wellbeing (Singh et al., 2022), there are digital wellbeing applications that can  
6  
7 help mitigate these effects (Parry et al., 2023).  
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11 Overall, it may be safe to argue that the future of work is becoming increasingly digital and  
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13 that therefore the dynamics of *digital psychology* apply, indicating that one is dealing with a  
14  
15 bidirectional effect where technology influences human psychology and *vice versa*. There  
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17 appears to be an added layer to the discussion of *digital psychology* in the context of work-  
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19 related issues, namely the role of organizational behavior. The organization determines how  
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21 the digital transformation is introduced into the firm and by which means employees  
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23 become empowered to deal with digital change. Based on the present discussion and  
24  
25 inspired by the above introduced conceptual impact model for digital psychology (CIMDP),  
26  
27 the managerial decisions seem to affect the organizational behavior, which itself appears to  
28  
29 be a mediator between the psychological dynamics of the employees and the nature of the  
30  
31 digital transformation, which can be seen in Figure 2. The psychological dimension remains  
32  
33 to consist of affect, cognition, and behavior, whereas the technological dimension still  
34  
35 incorporates data, algorithms, and platforms. However, the organization influences the  
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37 firm's nature of digitalization, and it decides how employees are assisted to deal with digital  
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39 change. As such, organizational behavior (as directed by managerial decisions) is a part of  
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41 how digital psychology is construed when applied to the digitalized future of work.  
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**Figure 2.** Illustration of the role of organizational behavior in the digital future of work using the conceptual impact model for digital psychology (CIMDP).

### Conclusions and Future Directions

The present discussion was the first of its kind to highlight how psychological dynamics influence technological change and how the latter is affected by the former, which here was referred to as the bidirectional relationship of *digital psychology*. The results were summarized in a preliminary impact model for *digital psychology* (the CIMDP), and they were applied to an important trend in economy and business development, namely the digital future of work. It became evident that organizational behavior governed by managerial decisions ought to be conceived as a mediating force between psychological features and the nature of digital transformation since it is the top-management that eventually decides upon how the organization directs the digital transformation, and also how employees are led forward into the digital change. People can react on the levels of

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3 emotion, cognition, and behavior, whereas the digital change presently is strongly driven by  
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5 datafication, algorithmization and platformization.  
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9 The present review forms a discussion that is largely conceptual and aims to introduce a first  
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11 framework in a novel field called *digital psychology*. The model was created with the goal to  
12  
13 help future research to structure the experimental designs and to make sense of the findings  
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15 in a broader conceptual picture in the context of *digital psychology*. Future studies can  
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17 either test these relationships quantitatively, make sense of them more in-depth on a  
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19 qualitative level, or can enrich the model by adding more knowledge as more studies in the  
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21 domain emerge.  
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### 30 **Conflicts of interest**

31  
32 There are no conflicting interests to declare.  
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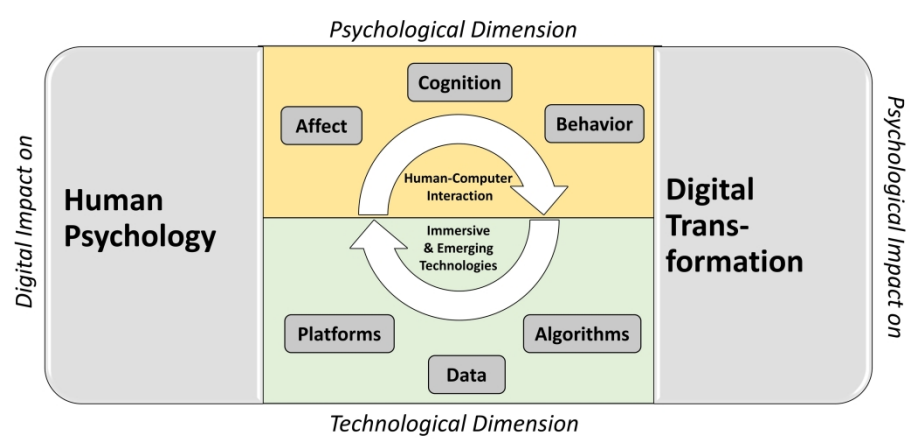


Figure 1. Illustration of the Conceptual Impact Model for Digital Psychology (CIMDP).

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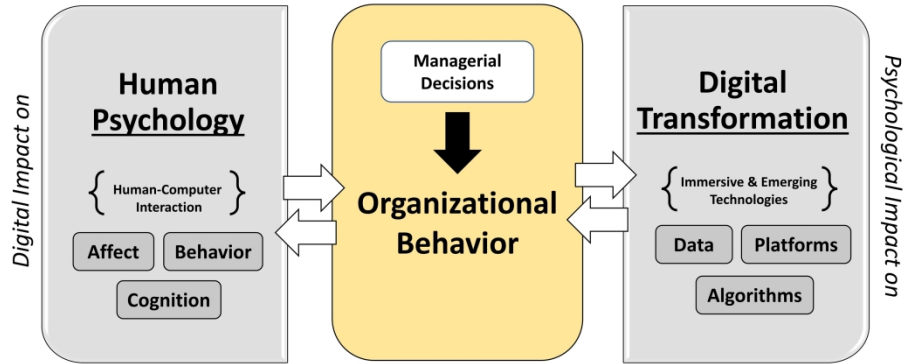


Figure 2. Illustration of the role of organizational behavior in the digital future of work using the conceptual impact model for digital psychology (CIMDP).

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