



## OPEN ACCESS

## EDITED BY

Hyunji Kim,  
Utrecht University, Netherlands

## REVIEWED BY

Sanaul Haque,  
LUT University, Finland  
Barbara Caci,  
University of Palermo, Italy

## \*CORRESPONDENCE

Sameha Alshakhsi  
✉ sameha.a.alshakhsi@gmail.com  
Raian Ali  
✉ raali2@hbku.edu.qa

RECEIVED 18 February 2024

ACCEPTED 03 May 2024

PUBLISHED 03 June 2024

## CITATION

Alshakhsi S, Babiker A, Sindermann C,  
Al-Thani D, Montag C and Ali R (2024)  
Willingness to pay for digital wellbeing  
features on social network sites: a study with  
Arab and European samples.  
*Front. Comput. Sci.* 6:1387681.  
doi: 10.3389/fcomp.2024.1387681

## COPYRIGHT

© 2024 Alshakhsi, Babiker, Sindermann,  
Al-Thani, Montag and Ali. This is an  
open-access article distributed under the  
terms of the [Creative Commons Attribution  
License \(CC BY\)](https://creativecommons.org/licenses/by/4.0/). The use, distribution or  
reproduction in other forums is permitted,  
provided the original author(s) and the  
copyright owner(s) are credited and that the  
original publication in this journal is cited, in  
accordance with accepted academic  
practice. No use, distribution or reproduction  
is permitted which does not comply with  
these terms.

# Willingness to pay for digital wellbeing features on social network sites: a study with Arab and European samples

Sameha Alshakhsi<sup>1\*</sup>, Areej Babiker<sup>1</sup>, Cornelia Sindermann<sup>2</sup>,  
Dena Al-Thani<sup>1</sup>, Christian Montag<sup>3</sup> and Raian Ali<sup>1\*</sup>

<sup>1</sup>College of Science and Engineering, Hamad Bin Khalifa University, Doha, Qatar, <sup>2</sup>Computational Digital Psychology, Interchange Forum for Reflecting on Intelligent Systems, University of Stuttgart, Stuttgart, Baden-Württemberg, Germany, <sup>3</sup>Department of Molecular Psychology, Institute of Psychology and Education, Ulm University, Ulm, Baden-Württemberg, Germany

In recent years, concerns over the potential negative impacts of social network sites (SNS) on users' digital wellbeing are on the rise. These concerns have sparked a growing demand for SNS to introduce changes to their business model and offer features that prioritize users' wellbeing, even if it means introducing fees to users. Still, it is questionable whether such a new model is welcomed by users and commercially valid. In this paper, we investigate (i) people's willingness to pay (WTP) for digital wellbeing services designed to foster more autonomy, control, and personal growth in users and (ii) the influence of sociodemographic variables, personality, and social networks use disorder (SNUD) on WTP. Data were collected through an online survey with participants from two distinct cultural contexts, the European and Arabic. The samples comprised 262 participants from Europe (Males: 57.63%) and 251 from Arab countries (Males: 60.56%). The participants ranged in age from 18 to 66 years ( $M_{\text{Europe}} = 29.16$ ,  $SD = 8.42$ ;  $M_{\text{Arab}} = 31.24$ ,  $SD = 8.23$ ). The results revealed that a notable proportion of participants were willing to pay for digital wellbeing services (Europe: 24%; Arab: 30%). Females in the European sample demonstrated a higher WTP for "Mental Health Issues Minimization" compared to males. In the Arab sample, males showed a higher WTP for "Safeguarding Data Privacy" than females. Multiple regression analyses revealed that SNUD and the need for cognition emerged as significant and positive predictors of WTP in both the European and Arab samples. Differences in the relations of personality traits and sociodemographic variables on WTP in each sample were noted. These insights contribute to our understanding of the factors shaping individuals' preferences and valuation related to digital wellbeing services on SNS and highlight the importance of considering sociodemographic variables and personal factors as well as cultural contexts when planning and introducing them.

## KEYWORDS

digital wellbeing, willingness to pay, data business model, social network sites, social networks use disorder, social media disorder

## 1 Introduction

In the era of digital connectivity, social network sites (SNS) have emerged as a vital medium for communication, interaction, entertainment, and information consumption (Grover et al., 2022). SNS are web-based platforms where users create profiles, interact and share information (Boyd and Ellison, 2007). These platforms enable users to engage with

friends worldwide with a few clicks, access a vast amount of information from various sources, such as news, and even influence public opinion (Fuentes and Peterson, 2021). Despite the immense benefits of SNS, they pose potential risks to users' digital wellbeing (DWB). For instance, the prolonged use of these platforms can potentially trigger addictive behaviors (Ali et al., 2015). DWB is a state in which an individual experiences healthy and safe usage of the Internet (Nansen et al., 2012), while also achieving a balance between the benefits derived from and the potential drawbacks associated with its usage (Vanden Abeele, 2020).

Research suggests that the data-driven business model of SNS could contribute to their negative impacts on users' DWB (Sindermann et al., 2020). In this model, users indirectly pay for SNS services by sharing their data, which is then utilized by the service providers for various applications, including marketing (Matz et al., 2017). As more personal data are collected, the revenue for these service providers increases (Dhawan et al., 2022). This data holds value as it allows for microtargeting through advanced algorithms that understand users' profiles, preferences, and behaviors, leading to personalized advertisements (Winter et al., 2021). The more high-quality data gathered, the better the algorithms refine the understanding of user preferences and produce more personalized advertisement content. The targeting of content including advertisements, in turn, maximizes user's interaction and increases the duration of user engagement with the platform to reveal further user preferences, and present more time to display advertising, which again increases revenue (Dhawan et al., 2022). For example, Matz et al. (2017) demonstrated that personalized advertising based on the Facebook "Like" feature can significantly increase advertising clicks and purchases. Consequently, SNS developers are motivated to prioritize features that promote more data collection (Eikelboom, 2017). Such features, including infinite scrolling, rewards, and personalization, are designed to be persuasive, interactive and engaging, making users spend more time on the sites (Abreu and Campos, 2022), and potentially develop problematic behaviors (Ali et al., 2015; Cemiloglu et al., 2021; Sindermann et al., 2022).

Recent research has advocated an alternative to the data business model that mitigates its negative effects and fosters DWB (Montag and Hegelich, 2020; Sindermann et al., 2020). Sindermann et al. (2020) proposed a monetary payment model, where users would pay a reasonable monetary fee for enhanced DWB services, including the assurance of content quality, privacy protection, and a design that refrains from personalizing content or extending usage time. Their study showed only 21.43% of a German sample was willing to pay (WTP) for such an improved design. This relatively low percentage was justified by the unawareness of people about the impact of the data business model, or the perceived benefits offered by SNS offsetting its negative impacts. The authors also recommended exploring a more integrative model to offer more benefits and value to the users for them to pay. Additional studies have explored the monetary models in different contexts, such as on Chinese platforms (WeChat and QQ) (Sindermann et al., 2022), and among Facebook users (Sunstein, 2020), focusing on WTP for the existing social media services versus willingness to get paid to discontinue using such services to assess their value to the users. Other studies focused on the WTP for specific existing services (Schreiner and Hess, 2015; Brynjolfsson et al., 2019).

Therefore, further investigation is still necessary to evaluate the potential of this alternative model in addressing the concerns raised in relation to the data business model and understand whether people are interested in and willing to pay to support this alternative model when they are used to monetarily free platforms (Dhawan et al., 2022). Understanding people's interest in adopting this alternative model and the services it offers to enhance their DWB is important, as studies have consistently shown that user interest and acceptance play a crucial role for services to be used and yield benefits (Davis, 1993). WTP can also be used as a proxy measure of valuation and to estimate the likelihood of using these services, accordingly.

Furthermore, previous studies have primarily focused on WEIRD samples (Western, Education, Industrialized, Rich, and Democratic) (Henrich et al., 2010). These samples may not accurately represent the interests and perspectives of SNS users from other cultural backgrounds, including Arab countries. Our study aims to bridge this gap by exploring WTP and preferences for digital wellbeing services separately in each of the two culturally distinct groups: Europeans and Arabs. This exploratory approach aims to enhance understanding of whether digital wellbeing services can be broadly applicable in different cultures or if their effectiveness varies based on cultural context.

## 1.1 Background and motivation

While design elements of SNS may be advantageous in certain situations, such as newsfeeds tailored to users' digital footprints, which can enhance user experience by filtering out irrelevant content, the benefits to their users remain debatable (Aguirre et al., 2015). This personalization of content can also contribute to unhealthy usage of SNS, as constant access to personalized content challenges users' self-control, regardless of their individual characteristics (Gui et al., 2017). This can potentially result in problematic behaviors, including excessive use of SNS and stimulation of obsessive and compulsive behaviors (Alrobai et al., 2014). Such problematic usage of SNS has been associated with negative consequences for users' wellbeing, including depression (Andreassen et al., 2016; Yoon et al., 2019), and reduced productivity (Cao and Yu, 2019).

Furthermore, algorithmic personalization based on data collected from users and their social circle is assumed by some experts to contribute to an information environment similar to a "filter bubble." This term refers to a situation in which individuals are primarily exposed to content that aligns with their existing beliefs and perspectives, consequently limiting their exposure to different viewpoints (Pariser, 2011). Similarly, the phenomenon of "echo chambers," in which individuals are mostly exposed to information that aligns with their attitudes, is debated in the context of SNS (Sindermann et al., 2022). By filtering content based on predicted user preferences, personalized algorithms can negatively affect individuals' understanding of different perspectives. Some scholars argue that it could promote radicalization and undermine democratic principles (Thompson, 2011; Bozdog and van den Hoven, 2015). For example, when individuals rely solely on SNS as their primary source of political news, they risk being subjected to content that reinforces only their own extreme views. The isolation from diverse perspectives can create an environment that nurtures radical ideologies, thereby threatening democratic dialogue and societal harmony. Moreover, research

demonstrated that SNS platforms not only facilitate but also accelerate the dissemination of misinformation including extremism (Vosoughi et al., 2018; Piazza, 2022).

The spread of misinformation on SNS is, therefore, another significant concern that impacts users' digital wellbeing. SNS platforms, driven by their business model that prioritizes user engagement and content sharing, can enable the rapid spread of misinformation, often surpassing the spread of true information (Vosoughi et al., 2018). SNS have been identified as the primary source of fake news, contributing to 88% of its spread (Beauvais, 2022). Consequently, in what is now referred to as "an era of fake news," users are invariably exposed to misinformation as they interact with and share content on SNS. Research found a positive association between extensive use of SNS and an increased likelihood of encountering and sharing of misinformation (Morosoli et al., 2022) and other types of harmful content such as extremism (Costello et al., 2016). Prolonged and repeated exposure to misinformation can lead individuals to accept and act upon false information (Pennycook et al., 2018; Carrieri et al., 2019). Furthermore, the spread of misinformation can negatively impact users' trust in SNS sources and hinder their capacity to distinguish between true and misinformation, thereby affecting their digital wellbeing (Van Duyn and Collier, 2019).

Data privacy, the control individuals have over their personal data and how it is used, is another concern related to the usage of SNS and its business model, with users becoming increasingly concerned about the potential data misuse (Krasnova et al., 2009). This rising concern is closely tied to data security issues, which refer to data protection from unauthorized access and breaches (Sharma and Bollavarapu, 2015). Breaches and misuse of personal data can impact users' digital wellbeing, leading to stress, anxiety, and a sense of powerlessness over the control of personal information (Elhai and Hall, 2015; Elhai et al., 2017). Instances of data security breaches have been prevalent in recent years, with 3,800 data breaches reported globally in the first half of 2019 alone, compromising 4.1 billion data records (Winder, 2019). Adding to these security concerns, misuse of data also emerged, most notably in the Facebook-Cambridge Analytica (CA) scandal of 2018 (Deley and Dubois, 2020). In this case, data from about 87 million Facebook users were used by CA without obtaining explicit consent to create personalized ads, with the aim of influencing users voting behavior in the 2016 US presidential election (Ward, 2018). The CA scandal not only marked a significant violation of privacy but also showed the potential for misuse of personal data in ad campaigns.

Given the aforementioned issues, there are growing concerns about the design of SNS centered on the current business model, which prioritizes the collection of user data, heightened user engagement, and the personalization of content and advertisements, while the quality of content and user wellbeing are not a priority and often compromised. Hence, it is important to seek a viable solution that addresses these concerns while still allowing SNS to be commercially viable.

## 1.2 Overview of the current study

In this study, we further investigate the alternative monetary model for SNS, focusing specifically on user interest in this model and the DWB services it could provide. We build upon the existing literature by assessing user demand for a broader range of digital

wellbeing services. DWB denotes a balanced and healthy relationship with technology, achieved by utilizing its benefits while managing its potential drawbacks (Vanden Abeele, 2020). Research on DWB often focuses on two dimensions: hedonic dimension, which involves enhancing pleasant experience during SNS use without adverse effects on mental health or leading to problematic and potentially addictive behaviors, and the eudaimonic dimension, which is about seeking to enrich one's digital activities with meaning and to promote a good life (Extremera et al., 2011; Steinert and Dennis, 2022). Drawing upon the aspects from the DWB framework (Büchi, 2021) and the digital competences framework (Martzoukou et al., 2020), we acknowledge that DWB is a multi-faceted concept, intertwining elements such as privacy, safety, awareness, controlled digital usage and digital flourishing (satisfaction and fulfillment). The DWB services considered in this paper prioritize safety and responsible use of SNS, advancing user privacy and data security, and enabling users to monitor and control their usage, which fosters awareness and controlled usage of SNS. Additionally, our services include a proactive mitigation to the spread of misinformation and extremism, fostering a safer and more comfortable environment. We also incorporated services that aim to minimize potential adverse impacts of SNS on mental health, such as stress and fear. In promoting digital flourishing, our services provide opportunities for users to nurture their digital virtue and personal growth. By integrating these diverse aspects of DWB into our design, we provide a comprehensive understanding of users' demands, paving the way towards an enhanced digital wellbeing environment.

In exploring who is interested in such an alternative model that prioritizes users' digital wellbeing, the differences in interest based on sociodemographic and personality characteristics are important (Sindermann et al., 2020, 2022). In the study conducted by Sindermann et al. (2020), gender, age, and the Big Five personality traits — extraversion, agreeableness, conscientiousness, neuroticism, and openness—were assessed in examining who supports the alternative monetary model going along with DWB services (Rammstedt and John, 2007). Their findings revealed that only the agreeableness trait was positively correlated with WTP. However, their sample was limited to Germany, and their study included lesser DWB services that investigated in the current study. Furthermore, differences related to sociodemographic factors and personality traits have been found to influence SNS use behaviors and motivations. For example, studies have indicated that females are more likely to use SNS excessively and are more prone to social networks use disorder (SNUD) (Su et al., 2020; Twenge and Martin, 2020), while those high in neuroticism may use SNS obsessively to cope with stress (Orchard et al., 2014; Huang, 2022b). Similarly, individuals with a high need for cognition (NFC), those who enjoy thinking and information processing tasks (Cacioppo et al., 1996), actively seek information, potentially leading to information overload and cognitive fatigue due to the vast, easily accessible data on SNS (Lee and Ma, 2012; Ouardi et al., 2016; Nam and Hwang, 2021). Given that these personal differences influence the usage behavior of SNS, it is intriguing to investigate whether these differences are reflected in the interests towards DWB services and WTP for them. Furthermore, research suggests that personality differences can influence strategic decision-making (Haley and Stumpf, 1989), and are related to different reactions to design elements (Sindermann et al., 2022). Therefore, it is valuable to investigate the influence of personality traits and cognitive dispositions on the DWB services as design elements on SNS.

In addition, a potential correlation between excessive use or social networks use disorder and users' interest in DWB services can be postulated. Users of SNS might perceive these platforms as "Wasting Time Goods," (Sunstein, 2020), which implies that despite extensive time spent on these platforms, users may regard them as valueless and means of wasting times. Consequently, excessive use of SNS may not be associated with WTP. This assumption was supported by a previous study which found WTP for social media did not significantly correlate with excessive or social networks use disorder within the context of WeChat and QQ (Sindermann et al., 2022). This raises the question whether the same applies to other SNS and when incorporating more DWB features. Our study aims to address this gap, determining to what extent SNUD will impact the WTP for additional DWB features on SNS.

In summary, we aim to investigate people's interest in a novel different business model on SNS that prioritizes users' wellbeing in exchange for monetary payment. This study will contribute to our understanding of the feasibility of such model and identify the individuals who are more likely to adopt these services, i.e., to pay for them. Therefore, this paper aims to answer the following research questions for each of the two samples: Arab and European (predominantly Germans):

RQ1: What is the extent to which people are willing to pay for digital wellbeing features on social network sites?

RQ2: Are sociodemographic variables including age, gender, education, and financial status associated with willingness to pay for digital wellbeing features on social network sites?

RQ3: Do social networks use disorder, need for cognition, and personality traits predict the willingness to pay for digital wellbeing features on social network sites?

## 2 Methodology

The survey study was designed on SurveyMonkey<sup>1</sup> and Qualtrics<sup>2</sup>, web-based survey platforms. The survey was created in English for the European sample and subsequently translated into Arabic for the Arab sample. The authors, who were proficient in both languages, performed the translation following the suggested back-translation procedure (Brislin, 1970). The survey included two main parts:

Initially, respondents were asked if they were familiar with the data business model, and the concept was defined to ensure a shared understanding. By providing this information, we aimed to reduce potential bias that could arise if some respondents were knowledgeable about the model while others were not. The first part of the survey examined participants' WTP for digital wellbeing services on SNS. The second part of the survey assessed participants' personal characteristics focusing on SNUD, personality traits, and NFC. The questionnaire also asked participants to provide sociodemographic information including gender, age, education level, financial status, employment status and country of origin.

## 2.1 Participants and procedure

A total of 513 participants were recruited for this study through the Prolific<sup>3</sup> and Cint<sup>4</sup> platforms, consisting of 262 participants from Europe and 251 from Arab countries. The inclusion criteria for participants required them to be 18 years or older, users of SNS, and fluent English speakers for European participants or Arabic speakers for Arab participants. Participants were invited to take part in the study and were given information about the study. Those who met the inclusion criteria and agreed to participate in the study were given a link to the anonymous questionnaire. Participants were informed that they were free to stop at any time. Four attention checks were included in the survey to ensure data quality. Participants who failed two or more attention checks were excluded from the analysis. Eligible participants were compensated for their participation after completion. The study was approved by the Institutional Review Board (IRB) of Qatar Biomedical Research Institute (QBRI) at Hamad Bin Khalifa University.

The European dataset included participants from Germany, the Netherlands, Finland, Sweden, Norway, Switzerland, and Denmark. The Arab dataset included participants from Egypt, Jordan, Morocco, Tunisia, Lebanon, Syria, Palestine, Algeria, Oman, Bahrain, Saudi Arabia, Sudan, Iraq, Yemen, UAE, Kuwait, and Somalia. The countries in each of the two group share cultural similarities as outlined by the World Values Survey, a large-scale cross-national research study that explores global cultural, societal, and political attitudes and values (Inglehart et al., 2022). The data used in this study are part of a large survey aimed at exploring WTP on social media.

## 2.2 Measures

### 2.2.1 Willingness to pay for digital wellbeing

Willingness to pay for digital wellbeing services for SNS was measured by 10 items. All items were rated on a five-point Likert scale (1 = very unlikely to 5 = very likely). Five of the 10 items were developed by Vanden Abeele (2020). Due to the exploratory nature of our study, the scope was broadened. By scanning the literature and looking at the digital wellbeing concepts, another five items were developed in our current study. The 10 items are provided in the Supplementary Table S1. The total score was calculated for the 10 items, and its reliability was assessed using Cronbach's alpha,  $\alpha = 0.93$  for the European sample, and  $\alpha = 0.94$  for the Arab sample, indicating very good reliability.

### 2.2.2 Social networks use disorder

Social networks use disorder was measured using the Social Media Disorder (SMD) scale (Van Den Eijnden et al., 2016). The SMD scale consists of nine items corresponding to nine diagnostic criteria: Persistence, Tolerance, Withdrawal, Preoccupation, Escape, Problems, Deception, Displacement, and Conflict. Each item was answered using a five-point scale (1 = never to 5 = always). The reliability of the scale was assessed using Cronbach's alpha,  $\alpha = 0.90$  for the European sample and  $\alpha = 0.85$  for the Arab sample, indicating a good reliability.

1 <https://www.surveymonkey.com>

2 <https://www.qualtrics.com>

3 [www.prolific.co](http://www.prolific.co)

4 [www.cint.com](http://www.cint.com)

### 2.2.3 Big five inventory – 10

Big five inventory (BFI)-10 measures the Big Five personality traits using 10 items on a 5-point Likert scale (1 = strongly disagree to 5 = strongly agree) (Rammstedt and John, 2007). The Big Five comprises five dimensions of extraversion, agreeableness, neuroticism, openness, and conscientiousness. The score of each dimension was calculated based on two out of the 10 questions.

### 2.2.4 Need for cognition

The need for cognition (NFC) was measured using six-item scale developed by de Holanda Coelho et al. (2020). This scale is a shortened version scale of the original 18-item scale developed by Cacioppo and Petty (1982). The scale items were measured on a 5-point scale (1 = extremely uncharacteristic of me, 5 = extremely characteristic of me). The scale was reliable in the two samples, with Cronbach's alpha values of 0.86 and 0.81 for the present European and Arab samples respectively, indicating a good reliability.

## 2.3 Data analysis

A combination of descriptive statistics, Exploratory Factor Analysis (EFA), t-tests, correlations, and regression analyses was performed on each sample using JASP version 0.17.1 (JASP Team, 2022). Descriptive statistics were used to provide an overview of the data, and EFA was performed to determine whether the 10 willingness to pay (WTP) items could be categorized into meaningful factors and used as dependent variables in the regression analyses. We applied parallel analysis, which is recommended as an accurate method to estimate the number of factors to extract (Henson and Roberts, 2006). Principle Axis Factor estimator and oblique rotations (Oblimin) were employed in the EFA analysis, which allowed for correlations among the factors because there was no *a priori* reason to assume that the factors would be orthogonal. The factors derived from EFA were scored by averaging the respective individual item scores. *T*-test and correlations were subsequently used to examine the association between the total score of WTP and WTP factors, on one hand, and sociodemographic variables, on the other. Multiple regression analyses were conducted separately for each of the European and Arab

samples to examine the relations of social networks use disorder and psychological factors with the WTP total score. Furthermore, a series of multiple linear regression analyses were performed to investigate the relations of the variables of interest with WTP for “Monitoring SN Usage” and “Usage not Prolonged.” Given the existing body of literature that focuses extensively on the overuse of internet, including SNS, and associations with digital addiction, it is important to further investigate the demands of our designed services that mitigate these concerns. For instance, a review study on digital wellbeing, have identified screen time and addiction as the most frequently explored themes (Widjaja and Baek, 2023).

## 3 Results

### 3.1 Participants

In total, the study comprises 513 participants from European and Arab countries. The sociodemographic breakdown revealed that 303 participants were male (59.06%). The average age was 30.18 years (SD = 8.39). In the per-sample description, the Arab participants showed descriptively slightly higher WTP ( $M_{\text{Arab}} = 29.55$ ,  $SD = 10.80$ ) than the European participants ( $M_{\text{European}} = 27.76$ ,  $SD = 10.26$ ). Detailed descriptive statistics for each sample are shown in Tables 1, 2.

### 3.2 Exploratory factor analysis

To explore whether the 10 items of WTP could be categorized into a smaller number of variables, Exploratory Factor Analysis (EFA) was conducted using the entire dataset as well as each of the two samples separately. To evaluate the adequacy and suitability of the data for factor analysis, the Kaiser–Meyer–Olkin (KMO) measure of sampling adequacy and Bartlett's test of sphericity were calculated. The overall KMO measures for the entire dataset, the European sample, and the Arab sample were 0.87, 0.84, and 0.88, respectively. Bartlett's test of sphericity for the three datasets was statistically significant ( $p < 0.001$ ). These results indicate that the data are appropriate for the EFA (Bartlett,

TABLE 1 Descriptive statistics of sociodemographic variables.

Variables		Whole sample N (513)	European sample N (262)	Arab sample N (251)
Gender	Male (%)	303 (59.06)	151 (57.63)	152 (60.56)
	Female (%)	210 (40.94)	111 (42.37)	99 (39.44)
Age	M (SD)	30.18 (8.39)	29.16 (8.42)	31.24 (8.23)
	Range	18–66	18–66	18–59
Employment (%)	Student	133 (25.93)	76 (29.01)	57 (22.71)
	Employed/Self-employed	340 (66.28)	170 (64.89)	170 (67.73)
	Not employed	40 (7.80)	16 (6.11)	24 (9.56)
Education (%)	Basic Education	194 (37.82)	135 (51.53)	59 (23.51)
	Higher Education	319 (62.18)	127 (48.47)	192 (76.49)
Financial Status	Not at all well off	26 (5.07)	16 (6.11)	10 (3.98)
	Not so well off	102 (19.88)	76 (29.01)	26 (10.36)
	Average	260 (50.68)	102 (38.93)	158 (62.95)
	Quite well off	107 (20.86)	61 (23.28)	46 (18.33)
	Very well off	18 (3.51)	7 (2.67)	11 (4.38)

TABLE 2 Descriptive statistics of willingness to pay for digital wellbeing services.

Variables	Whole sample M (SD)	European sample M (SD)	Arab sample M (SD)
Total score of Willingness to Pay (WTP)	28.63 (10.56)	27.76 (10.26)	29.55 (10.80)
Data not used for marketing.	2.63 (1.31)	2.62 (1.27)	2.65 (1.35)
Data protection.	2.98 (1.38)	2.90 (1.32)	3.05 (1.44)
Usage not prolonged.	2.71 (1.34)	2.71 (1.36)	2.71 (1.31)
Fake news reduction.	3.09 (1.43)	3.06 (1.43)	3.12 (1.43)
Extremism reduction.	3.06 (1.39)	3.02 (1.40)	3.11 (1.37)
Usage monitoring features.	2.56 (1.33)	2.41 (1.33)	2.71 (1.32)
External Apps access allowed.	2.52 (1.27)	2.45 (1.26)	2.60 (1.28)
Mental health issues minimization.	2.97 (1.37)	2.97 (1.37)	2.96 (1.38)
Digital virtue ensuring.	2.85 (1.30)	2.61 (1.25)	3.11 (1.29)
Personal development.	3.27 (1.33)	3.02 (1.32)	3.53 (1.30)

More details on the 10 items are provided in [Supplementary Table S1](#).

TABLE 3 EFA results of the eight items of willingness to pay.

	European sample				Arab sample			
	1	2	3	4	1	2	3	4
Factor 1: Safeguarding Data Privacy								
1 Data not used for marketing	0.87				0.83			
2 Data protection	0.86				0.88			
Factor 2: Reducing Harmful Content								
1 Fake news reduction		0.91				0.67		
2 Extremism reduction		0.93				0.50		
Factor 3: Monitoring SN Usage								
1 Usage monitoring features			0.75				0.84	
2 External Apps access allowed			0.80				0.83	
Factor 4: Fostering Ethical & Personal Growth								
1 Digital virtue ensuring				0.78				1.02
2 Personal development				0.80				0.63
Cronbach's alpha, $\alpha =$	0.87	0.93	0.77	0.80	0.87	0.85	0.88	0.89

1954; Kaiser, 1974). For the entire dataset and the European and the Arab samples, the parallel analysis yielded four factors, accounting for 76, 73, and 80% of the variance, respectively. Furthermore, the commonly applied criteria of visual inspection of the scree plot and interpretability indicated that the four factors should be retained.

The items, “Usage not prolonged” and “Mental health issues minimization,” were removed because they had low factor loadings (<0.4) and/or cross-loadings close to their main loadings on another factor (difference <0.20) in both the combined and the Arab samples (Matsunaga, 2010). Further, within the European sample, “Usage not prolonged” had factor loading lower than 0.4. The factor loadings for all other items were above 0.40. The four factors were identified as Factor 1: Safeguarding Data Privacy (20% of the total variance using the entire dataset), Factor 2: Reducing Harmful Content (20%), Factor 3: Monitoring Social Networking Usage (17%), and Factor 4: Fostering Ethical & Personal Growth (19%). In the European context, the variance explained by each factor was as follows: Factor 1: Safeguarding Data

Privacy (19%), Factor 2: Reducing Harmful Content (22%), Factor 3: Monitoring Social Networking Usage (16%), and Factor 4: Fostering Ethical & Personal Growth (16%). Simultaneously, within the Arabic sample, the proportion of variance explained by each factor was: Factor 1: Safeguarding Data Privacy (22%), Factor 2: Reducing Harmful Content (14%), Factor 3: Monitoring Social Networking Usage (22%), and Factor 4: Fostering Ethical & Personal Growth (23%). The factor loadings of the rotated solution are shown in [Table 3](#).

The 10 DWB items represent proposed services to be included in an alternative model to the data business model. Consequently, our study aims to examine all 10 services. However, during the exploratory factor analysis (EFA), “Usage not Prolonged” and “Mental Health Issues Minimization” items were removed due to low loading and cross-loadings into factors in the Arab sample, indicating a potential cultural difference in the perception and expectation of SNS use and its effects on wellbeing. Therefore, we investigated “Usage not Prolonged” and “Mental Health Issues Minimization” items separately as two individual variables.

TABLE 4 Proportion of participants who were/were not willing to pay on average for digital wellbeing services.

	European sample	Arab sample
Not willing to pay	39%	34%
Neutral	37%	36%
Willing to pay	24%	30%

The proportion of participants was calculated based on the average scores of the 10 items. Not willing to pay on average (scores 1.00–2.50), neutral (scores 2.51–3.50), and willing to pay (scores 3.51–5.00). Please note that different numbers would be observed when following an alternative rule to calculate percentages as reported in Kannen et al. (2024).

TABLE 5 Willingness to pay for digital wellbeing with gender differences.

	European (N = 262)			Arab (N = 251)		
	Male (151)	Female (111)	Gender differences	Male (152)	Female (99)	Gender differences
Total willingness to pay	27.24 (10.14)	28.47 (10.43)	$t(260) = -0.96, p = 0.339, d = -0.12$	30.09 (10.76)	28.72 (10.85)	$t(249) = 0.98, p = 0.327, d = 0.13$
Safeguarding data privacy	2.73 (1.24)	2.80 (1.20)	$t(260) = -0.45, p = 0.652, d = -0.06$	3.00 (1.28)	2.63 (1.33)	$t(249) = 2.21, p = 0.028, d = 0.29$
Reducing harmful content	2.95 (1.36)	3.16 (1.37)	$t(260) = -1.26, p = 0.209, d = -0.16$	3.20 (1.30)	2.99 (1.31)	$t(249) = 1.26, p = 0.208, d = 0.16$
Monitoring SN usage	2.42 (1.19)	2.44 (1.14)	$t(260) = -0.11, p = 0.911, d = -0.01$	2.68 (1.22)	2.62 (1.24)	$t(249) = 0.36, p = 0.723, d = 0.05$
Fostering ethical and personal growth	2.79 (1.20)	2.85 (1.15)	$t(260) = -0.45, p = 0.651, d = -0.06$	3.33 (1.23)	3.30 (1.24)	$t(249) = 0.20, p = 0.846, d = 0.03$
Usage not prolonged	2.65 (1.37)	2.80 (1.35)	$t(260) = -0.90, p = 0.369, d = -0.11$	2.74 (1.34)	2.67 (1.29)	$t(249) = 0.45, p = 0.652, d = 0.06$
Mental health issues minimization	2.83 (1.36)	3.17 (1.36)	$t(260) = -2.02, p = 0.044, d = -0.25$	2.94 (1.36)	2.99 (1.43)	$t(249) = -0.28, p = 0.784, d = -0.04$

### 3.3 The extent to which people are willing to pay for digital wellbeing

As shown in Table 4, participants were categorized based on their aggregated willingness to pay (WTP) scores for the 10 proposed digital wellbeing services on SNS. Participants with scores ranging from 1.00 to 2.50 were categorized as unwilling to pay, those with scores from 2.51 to 3.50 were considered neutral, and participants with scores from 3.51 to 5.00 were grouped as willing to pay. An alternative method to derive percentage values from this measure has been provided by Kannen et al. (2024), which would result in different numbers.

### 3.4 Association between willingness to pay for digital wellbeing and sociodemographic variables

An independent-samples *t*-test was used to examine gender differences in willingness to pay (WTP) for digital wellbeing services. The assumption of normality was not violated, as assessed by skewness and kurtosis and by Q-Q plot. The homogeneity of variance was assessed by Levene’s test, which showed no significant differences in all cases. Table 5 shows the results of the *t*-test, specifically examining gender differences for each of the European and Arab samples.

The results indicated that, in the European sample, females ( $M = 3.17, SD = 1.36$ ) demonstrated a significantly higher WTP for the

item “Mental Health Issues Minimization” than males ( $M = 2.83, SD = 1.36$ ). In the Arab sample, a gender difference was found significant in the WTP factor for “Safeguarding data privacy,” where the mean value for the male group ( $M = 3.00, SD = 1.28$ ) was higher than that of the female group ( $M = 2.63, SD = 1.33$ ). For the other items, no significant gender differences were observed.

Pearson’s correlation was performed to analyze the associations between willingness to pay (WTP) and the demographic factors of age, and education level (operated as Point-biserial correlation). Due to its ordinal nature, Spearman’s correlation was used for financial status. The results, presented in Table 6, revealed intriguing patterns. In the European context, a significant negative correlation was observed between age and the WTP item “Mental Health Issues Minimization” ( $r = -0.13, p = 0.041$ ). Additionally, a significant positive correlation was observed between education level and the WTP item “Usage not Prolonged” ( $r = 0.20, p = 0.001$ ). On the other hand, in the Arab sample, no significant association were found between WTP and the three factors of age, education, and financial status.

### 3.5 Do social networks use disorder and psychological factors predict willingness to pay for digital wellbeing?

To gain a better understanding of the factors potentially influencing willingness to pay (WTP) for digital wellbeing services, we conducted multiple regression analyses for each sample. The

TABLE 6 Pearson's correlations of WTP variables, age, education level, and financial status.

	WTP total score	Safeguarding data privacy	Reducing harmful content	Monitoring SN usage	Fostering ethical and personal growth	Usage not prolonged	Mental health issues minimization
European sample							
Age	-0.01	0.01	-0.02	0.02	-0.02	0.06	-0.13*
Education (Basic) <sup>(1)</sup>	0.07	0.06	0.00	0.05	0.07	0.20**	0.03
Financial status <sup>(2)</sup>	0.02	0.04	-0.01	0.06	0.01	0.06	-0.03
Arab sample							
Age	-0.02	0.01	-0.04	0.01	0.04	-0.03	-0.11
Education (Basic) <sup>(1)</sup>	0.05	0.08	0.03	0.02	0.02	0.08	0.02
Financial status <sup>(2)</sup>	0.10	0.06	0.11	0.09	0.10	0.09	0.10

\* $p < 0.05$ , \*\* $p < 0.01$ , \*\*\* $p < 0.001$ . <sup>(1)</sup>Equivalent to Point-biserial correlation; <sup>(2)</sup>Spearman's correlation.

purpose of the analysis was to examine the extent to which the independent variables, including gender, age, education level, social networks use disorder, personality traits and need for cognition, explain the variation in the dependent variable, the total WTP score. Furthermore, a series of multiple linear regression analyses were performed for each sample to investigate the impact of the variables of interest on WTP for "Monitoring SN Usage" and "Usage not Prolonged."

The multiple linear regression assumptions were checked and verified. The data did not exhibit outliers deviated from the model as the Standardized Residuals did not exceed  $-3.29$  and  $+3.29$ . Residuals were independent as assessed by a Durbin-Watson statistic values between 1 and 3. There was no evidence of multicollinearity, as assessed by VIF values lower than 5 (for all predictors, values were less than 2) and by tolerance values greater than 0.1. Pearson's correlation was also performed and confirmed no multicollinearity among the variables, as shown in Table 7. The assumption of normality was met, as assessed by skewness and kurtosis values between  $-2$  and  $2$ . Additionally, a Q-Q plot for residuals indicated that most data points were on or close to the line, supporting normality of the data.

The initial multiple regression models demonstrated a statistically significant prediction of the total WTP score in each sample [European:  $F(10, 251) = 4.79$ ,  $p < 0.001$ ,  $adj. R^2 = 0.13$ ; Arab:  $F(10, 240) = 6.54$ ,  $p < 0.001$ ,  $adj. R^2 = 0.18$ ]. As depicted in Table 8, the results revealed that social networks use disorder ( $\beta_{European} = 0.25$ ,  $p < 0.001$ ;  $\beta_{Arab} = 0.38$ ,  $p < 0.001$ ), and need for cognition ( $\beta_{European} = 0.24$ ,  $p < 0.001$ ;  $\beta_{Arab} = 0.25$ ,  $p < 0.001$ ) were significant and positive predictors of the total WTP score in each sample. However, differences were observed in the other predictors between the samples. In the European sample, agreeableness was a significant positive predictor ( $\beta = 0.15$ ,  $p = 0.014$ ), and neuroticism was marginally significant ( $\beta = 0.13$ ,  $p = 0.068$ ). Conversely, in the Arab sample, conscientiousness was marginally significant ( $\beta = 0.11$ ,  $p = 0.089$ ).

To further explore the impact of the variables of interest on the factors of WTP that are related to monitoring or preventing prolonged usage of SNS, a series of multiple linear regressions was performed, as shown in Table 9. The initial set of multiple regression models revealed a statistically significant prediction of WTP for the "Monitoring SN Usage" in each of the European and Arab samples [European:  $F(10, 250) = 4.59$ ,  $p < 0.001$ ,  $adj. R^2 = 0.12$ ;

Arab:  $F(10, 240) = 6.22$ ,  $p < 0.001$ ,  $adj. R^2 = 0.17$ ]. Two significant predictors were identified: social networks use disorder ( $\beta_{European} = 0.31$ ,  $p < 0.001$ ;  $\beta_{Arab} = 0.41$ ,  $p < 0.001$ ) and need for cognition ( $\beta_{European} = 0.16$ ,  $p = 0.017$ ;  $\beta_{Arab} = 0.20$ ,  $p = 0.002$ ), demonstrating a positive relationship with WTP for the "Monitoring SN Usage." Conscientiousness was marginally significant in each sample ( $\beta_{European} = 0.12$ ,  $p = 0.063$ ;  $\beta_{Arab} = 0.12$ ,  $p = 0.079$ ).

Additional multiple regression models indicated a statistically significant prediction of the WTP for "Usage not Prolonged" in each of the European and Arab samples [European:  $F(10, 251) = 7.46$ ,  $p < 0.001$ ,  $adj. R^2 = 0.20$ ; Arab:  $F(10, 240) = 3.32$ ,  $p < 0.001$ ,  $adj. R^2 = 0.09$ ]. Social networks use disorder ( $\beta_{European} = 0.30$ ,  $p < 0.001$ ;  $\beta_{Arab} = 0.28$ ,  $p < 0.001$ ) and need for cognition ( $\beta_{European} = 0.29$ ,  $p < 0.001$ ;  $\beta_{Arab} = 0.19$ ,  $p = 0.006$ ) were significant and positive predictors of WTP in each of the two samples. In the European sample, neuroticism ( $\beta_{European} = 0.18$ ,  $p = 0.008$ ) was a significant positive predictor, while agreeableness ( $\beta_{European} = 0.11$ ,  $p = 0.058$ ) was marginally significant. Notably, in the European sample, having a higher level of education ( $p = 0.003$ ) significantly predicted the WTP for "Usage not Prolonged."

## 4 Discussion

The aim of this study was to explore the interests and willingness to pay (WTP) of social network sites (SNS) users for services that enhance their digital wellbeing (DWB) and mitigate the negative consequences associated with their use. Specifically, the study focused on services related to data protection, combating fake news and extremisms, controlling excessive usage, minimizing mental health issues, and fostering personal growth. To ensure the robustness of our findings, we assessed our objectives in each sample: European and Arab participants.

### 4.1 Willingness to pay for digital wellbeing services

Our study offers important theoretical contributions to the research on user demand and interest in DWB within the context of



TABLE 7 Pearson's correlation between WTP for digital wellbeing services, social networks use disorder, need for cognition, and personality traits.

	WTP total score	Safeguarding data privacy	Reducing harmful content	Monitoring SN usage	Fostering ethical and personal growth	Usage not prolonged	Mental health issues minimization	SNUD	Need for cognition
European sample									
SNUD <sup>(1)</sup>	0.25***	0.13*	0.18**	0.28***	0.15*	0.29***	0.25***	—	—
Need for cognition	0.21***	0.16*	0.18**	0.15*	0.19**	0.25***	0.11	-0.13*	—
Extraversion	0.06	0.05	0.09	0.03	0.04	0.05	0.03	0.03	0.14*
Agreeableness	0.16*	0.16**	0.11	0.09	0.156*	0.12	0.13*	0.09	-0.02
Conscientiousness	0.13*	0.13*	0.12	0.13*	0.13*	0.07	0.02	-0.13*	0.37***
Neuroticism	0.07	0.04	0.03	0.08	0.02	0.10	0.14*	0.23***	-0.27***
Openness	0.05	0.01	0.00	0.09	0.07	0.07	0.04	0.034	0.15*
Arab sample									
SNUD <sup>(1)</sup>	0.32***	0.21***	0.25***	0.34***	0.27***	0.25***	0.29***	—	—
Need for cognition	0.26***	0.26***	0.23***	0.21***	0.20**	0.18**	0.22***	-0.09	—
Extraversion	0.04	0.08	0.06	-0.05	0.03	0.05	0.03	0.06	0.00
Agreeableness	0.11	0.09	0.09	0.09	0.12	0.10	0.02	0.01	0.01
Conscientiousness	0.13*	0.10	0.13*	0.12	0.14*	0.04	0.05	-0.21***	0.22***
Neuroticism	-0.07	-0.07	-0.05	-0.05	-0.09	-0.03	-0.02	0.30***	-0.23***
Openness	0.05	0.05	0.03	0.03	0.06	0.02	0.05	0.01	0.19**

\* $p < 0.05$ , \*\* $p < 0.01$ , \*\*\* $p < 0.001$ . <sup>(1)</sup> SNUD: Social networks use disorder.

TABLE 8 Multiple regression analysis for predicting total willingness to pay for digital wellbeing services.

WTP total score	European sample				Arab sample			
	<i>R</i> <sup>2</sup>	Adjusted <i>R</i> <sup>2</sup>	<i>F</i>	<i>p</i>	<i>R</i> <sup>2</sup>	Adjusted <i>R</i> <sup>2</sup>	<i>F</i>	<i>p</i>
	0.16	0.13	4.79	<0.001	0.21	0.18	6.54	<0.001
Predictors	<i>β</i>	<i>t</i>	<i>p</i>		<i>β</i>	<i>t</i>	<i>p</i>	
Gender (Male)	0.00	0.04	0.965		−0.02	−0.25	0.803	
Education (Basic)	0.05	0.85	0.399		0.03	0.42	0.676	
Age	−0.02	−0.33	0.745		0.00	−0.02	0.984	
SNUD <sup>(1)</sup>	0.25	4.13	<0.001		0.38	6.27	<0.001	
Need for cognition	0.24	3.66	<0.001		0.25	3.77	<0.001	
Extraversion	0.02	0.24	0.810		0.00	0.07	0.942	
Agreeableness	0.15	2.46	0.014		0.07	1.07	0.285	
Conscientiousness	0.08	1.30	0.194		0.11	1.71	0.089	
Neuroticism	0.13	1.83	0.068		−0.07	−1.05	0.296	
Openness	−0.04	−0.63	0.530		0.01	0.20	0.841	

<sup>(1)</sup> SNUD, social networks use disorder.

TABLE 9 Multiple regression analysis for predicting usage-related factors of WTP for digital wellbeing services.

	European sample				Arab sample			
	<i>R</i> <sup>2</sup>	Adjusted <i>R</i> <sup>2</sup>	<i>F</i>	<i>p</i>	<i>R</i> <sup>2</sup>	Adjusted <i>R</i> <sup>2</sup>	<i>F</i>	<i>p</i>
Monitoring SN usage*	0.16	0.12	4.59	<0.001	0.21	0.17	6.22	<0.001
	<i>β</i>	<i>t</i>	<i>p</i>		<i>β</i>	<i>t</i>	<i>p</i>	
Gender (Male)	−0.06	−0.88	0.381		0.01	0.20	0.840	
Education (Basic)	0.05	0.77	0.442		0.00	−0.06	0.950	
Age	0.02	0.33	0.740		0.02	0.32	0.748	
SNUD	0.31	5.13	<0.001		0.41	6.65	<0.001	
Need for cognition	0.16	2.41	0.017		0.20	3.07	0.002	
Extraversion	−0.03	−0.40	0.686		−0.08	−1.37	0.173	
Agreeableness	0.08	1.35	0.179		0.05	0.73	0.467	
Conscientiousness	0.12	1.87	0.063		0.12	1.77	0.079	
Neuroticism	0.10	1.33	0.185		−0.08	−1.27	0.206	
Openness	0.05	0.76	0.448		0.02	0.31	0.758	
	<i>R</i> <sup>2</sup>	Adjusted <i>R</i> <sup>2</sup>	<i>F</i>	<i>p</i>	<i>R</i> <sup>2</sup>	Adjusted <i>R</i> <sup>2</sup>	<i>F</i>	<i>p</i>
Usage not prolonged	0.23	0.20	7.46	<0.001	0.12	0.09	3.32	<0.001
	<i>β</i>	<i>t</i>	<i>p</i>		<i>β</i>	<i>t</i>	<i>p</i>	
Gender (Male)	0.01	0.07	0.942		0.00	0.02	0.984	
Education (Basic)	0.19	3.05	0.003		0.08	1.22	0.223	
Age	0.03	0.55	0.586		−0.02	−0.28	0.778	
SNUD	0.30	5.17	<0.001		0.28	4.31	<0.001	
Need for cognition	0.29	4.53	<0.001		0.19	2.75	0.006	
Extraversion	0.02	0.26	0.794		0.02	0.37	0.709	
Agreeableness	0.11	1.90	0.058		0.09	1.31	0.192	
Conscientiousness	−0.02	−0.24	0.809		0.02	0.32	0.753	
Neuroticism	0.18	2.66	0.008		−0.03	−0.46	0.648	
Openness	−0.01	−0.22	0.829		−0.01	−0.21	0.837	

SNS platforms. In line with our first research question, we discerned that a noticeable number of people are willing to pay for social network sites in exchange for offering enhanced digital wellbeing services. Specifically, our findings indicated a noticeable proportion of participants from both Europe (24%) and Arab (30%) samples expressing their willingness to pay (in total) for such services. Although these proportions were not high, they exceeded the willingness to pay observed in a comparative study conducted by Sindermann et al. (2020). While the increase in WTP may initially suggest an emerging trend, it is crucial to approach this interpretation with caution due to possible differences in measurements, sample characteristics, and other variables between our study and Sindermann et al.'s. Nevertheless, it is an observation worth noting and potentially indicative of shifting attitudes towards the value of enhanced DWB services.

It is also noteworthy that the proportion of those not willing to pay decreased to approximately one-third, compared to Sindermann et al.'s study, in which almost half of the participants were not willing to pay. A potential explanation for this shift could be the increasing recognition of these platforms as integral components of modern life, acknowledging not only for their benefits in various domains such as education, business, and entertainment but also for their drawbacks (Greenhow et al., 2009; Fusi and Feeney, 2018). Notably, during crises such as the COVID-19 pandemic, it served as an invaluable resource for effectively disseminating information and preserving social connections (Goel and Gupta, 2020). However, parallel to this growing appreciation of social network sites' benefits, awareness of its potential risks has also increased (Pagoto et al., 2019). Concerns around privacy, misinformation, and effects on its excessive use on mental health, such as anxiety and depression have increased (Shu et al., 2019; Jain et al., 2021; Huang, 2022a).

The growing awareness of the potential risks associated with excessive use of SNS arises from both academic studies establishing a link between problematic use of SNS and mental health issues (Andreassen et al., 2016; Yoon et al., 2019), and from campaigns aimed at raising awareness about the addictive nature of SNS and their potential impact on mental health (Sedek, 2021). Furthermore, initiatives by public health organizations and SNS themselves, such as 'digital wellbeing' features that encourage users to monitor and manage their time spent on these platforms, have increased the discourse around mindful SNS use (Svensson, 2019). This heightened awareness may trigger the increased interest in DWB services, aimed at enabling a more mindful, efficient, and healthier interaction with these platforms. It also suggests users' demands for proactive approaches to safeguard their wellbeing while continuing to leverage the benefits of social networking.

## 4.2 Sociodemographic variables and willingness to pay for digital wellbeing

The second aim of our study was to explore sociodemographic differences in the willingness to pay for DWB services, specifically examining gender, age, education level and financial status in European and Arab samples. Findings from the European sample revealed gender differences in WTP, with females expressing a higher WTP for services related to "Mental Health Issues Minimization" compared to the European males. This finding suggests an increased

concern amongst European females regarding the potential mental health implications associated with SNS use. One plausible explanation for this finding could be linked to findings in the literature that indicate females are more likely to be susceptible to negative consequences associated with SNS use (Booker et al., 2018), as they tend to use SNS more frequently and excessively (Twenge and Martin, 2020). Furthermore, previous studies suggest that females are more proactive in seeking mental health services (Seidler et al., 2016). As a result, females may exhibit an increased demand for proactive services aimed to mitigate potential mental health risks associated with the use of social networking, at least in Europe.

However, in the Arab sample, a gender difference emerged in the WTP for services related to "Safeguarding data privacy," with male participants demonstrating a higher WTP. This suggests a higher sensitivity or awareness about data privacy issues among Arab males. One potential explanation for this observation could be that women are more likely to trust others and less likely to perceive themselves as vulnerable, consequently reducing their perceived need for data protection services (Thompson, 2018). Nonetheless, the literature on privacy concerns between genders is inconsistent; while some studies reported higher privacy concerns among females (Van der Schyff et al., 2020), others found no gender differences (Oomen and Leenes, 2008). Privacy is a sensitive issue among Arabs, irrespective of gender (Abokhodair et al., 2017). However, the conventional gender norms within Arab societies expect men to take more responsibility for ensuring protection, which is reflected in the digital context (Abokhodair et al., 2017). In this context, within our sample, men demonstrated a higher interest in privacy protection services. It is also noteworthy that in our data, males reported a higher financial status, which might have influenced their greater WTP for privacy protection services. Despite these preliminary interpretations, the factors underlying this gender difference in WTP for data privacy services within the Arab context call for further investigation.

In examining associations of age, education level and financial status with the WTP for DWB services, it was observed that majority of our correlation findings did not reach statistical significance, indicating generally weak or non-existent associations with these sociodemographic variables. However, a few noteworthy relationships emerged. Specifically, there was a significant and inverse relationship between age and the WTP for "Mental Health Issues Minimization" within the European sample. This finding suggests that younger Europeans may prioritize the importance of mitigating the mental health implications associated with the use of SNS. Our findings align with those from previous studies, indicating that younger individuals are more likely to express concerns about potential mental health effects from social networking use (O'Reilly et al., 2018). Previous studies also showed significant association between SNS use and depression, anxiety, and psychological stress among adolescent and young adults (McCrae et al., 2017).

Correlation analyses also indicated an association between higher levels of education and higher willingness to pay for "Usage not Prolonged" among the European participants. Prior research suggested that those with higher levels of education and higher income tend to use SNS more (Hruska and Maresova, 2020). The present study also revealed a significant positive association between education level and financial status. Given these observations, it can be suggested that individuals with higher levels of education are potentially more aware of the adverse effects of prolonged social

networking use and have greater financial means. Consequently, these individuals may demonstrate a higher interest in investing in services that support them in effectively managing their use of SNS. Moreover, previous studies demonstrated that individuals with higher education levels utilize SNS more for information-seeking or work-related purposes (Van Deursen et al., 2015). While these findings suggest a possibility that those with higher education can better manage their use of social networks for essential purposes, our study suggests that they might also show a higher interest in services that provide supportive environments to prevent potential risk of prolonged use. However, given that many of our correlation results were not statistically significant, these interpretations should be considered exploratory and require further research to substantiate these potential connections.

For the European sample, the lack of gender and age difference in attitudes towards data privacy may reflect a shared understanding and awareness of the importance of personal data security. This could be a result of widespread emphasis on data protection in European legislation, such as the General Data Protection Regulation (GDPR) (Voigt and Von dem Bussche, 2017). On the other hand, for the Arab sample, the lack of significant gender and age differences in the willingness to pay for “Mental Health Issues Minimization” might be related to the growing recognition of the importance of mental wellbeing across the Arab population in recent years (Zeinoun et al., 2020).

### 4.3 Psychological factors and willingness to pay for digital wellbeing

The results of multiple regression analysis showed that social networks use disorder (SNUD) measured by the Social Media Disorder scale significantly and positively predicted the total WTP for DWB services in each of the European and Arab samples. It suggests that individuals exhibiting higher levels of SNUD are more likely to show higher WTP for DWB services. This result could be explained by the understanding that individuals experiencing SNUD are likely to recognize their problematic behavior and, as a result, demonstrate a higher interest in digital wellbeing services. A previous study investigating 41 digital wellbeing tools available on Google Play found that many users perceived their excessive usage as problematic and used such tools to mainly mitigate their usage habits of the smartphone which were mainly triggered by apps such as social media (Ko et al., 2015). However, there is still no evidence of the effectiveness of available digital wellbeing tools, which mainly provide self-monitoring and self-regulation features. The findings of the current study might suggest a demand for a broader set of features in digital wellbeing services, going beyond self-monitoring and regulation.

Furthermore, users with higher SNUD are often associated with excessive use of SNS, which makes them more exposed to other risks on SNS, such as susceptibility to fake news and privacy-related issues. For instance, a study conducted across six countries found that heavy social media users were generally more willing to engage with and disseminate misinformation online (Morosoli et al., 2022). Additionally, spending more time on SNS makes users feel overwhelmed with the amount of shared information and feeling out of control, and therefore, less motivated to check its accuracy

(Xu et al., 2022). In recent years, the spread of misinformation on social networking has become a major concern. It spreads quickly, potentially leading to negative effects on different aspects such as political, economic, and wellbeing related issues (Vosoughi et al., 2018). As a result, those who spend excessive time on SNS, potentially with a higher level of SNUD, may be aware of the potential risks of social networking and demand all potential services that could help ensure healthier and more balanced usage of SNS.

The regression analyses also revealed that NFC significantly and positively predicted the total WTP for DWB services, WTP for “Monitoring Usage,” and WTP for “Usage not Prolonged,” in each of the European and Arab samples. These findings suggest that individuals with high NFC, a tendency for intellectual information and problem-solving, are more likely to show an interest and WTP for DWB services. This could be explained through Social Cognitive Theory (SCT), positing that individuals with higher NFC are motivated to seek and process information, observe behavior, and engage in cognitive activities to make informed decisions (Bandura, 1986). These individuals are more likely to be motivated by the pursuit of positive outcomes (Oiknine et al., 2021). When considering DWB services, these individuals are likely to think critically into understanding the implications of using such services and appreciate the value and benefits of these services; they could recognize how such services could enhance their online experiences, such as personal growth opportunities, safeguard mental health, and ensuring accuracy of online information. Another possible explanation could be their awareness of the potential risks associated with SNS use. Research has shown that those high in NFC are keen on seeking information online (Curseu, 2011) and that extensive time spent on SNS consuming news can lead to cognitive fatigue (Lee et al., 2016; Zheng and Ling, 2021). In the European and Arab samples, the consistent associations between SNUD, NFC, and total WTP for DWB services suggest the potential for these trends to generalize to different cultural contexts.

Regarding personality traits, the regression model for the European sample revealed that agreeableness significantly positively correlated with the WTP for DWB services. These findings are consistent with previous research (Sindermann et al., 2020) and suggest that individuals with higher agreeableness are more interested in DWB services. Agreeable individuals are socially oriented and tend to be cooperative, friendly, trusting, and striving for harmony, a characteristic that extends to their use of SNS platforms (Seidman, 2013). For example, previous studies revealed that highly agreeable people tend to have higher privacy concerns and be protective of their own and other's private information in social media (Osatuyi, 2015).

Similarly, in the European context, the findings showed that high-neuroticism individuals indicated a willingness to pay for “Usage not Prolonged” services, potentially due to their sensitivity to the adverse impacts of excessive social networking use (Abbasi and Drouin, 2019). However, these individuals might be less inclined towards proactive “Monitoring Usage” services due to potential anxiety triggers (Tehrani and Yamini, 2020). Moreover, in each of the European and Arab samples, conscientious individuals, characterized by their self-discipline and independence (Costa and McCrae, 1995), showed a preference for services enabling the monitoring and control of social networking use, consistent with previous studies that associated conscientiousness with more frequent engagement with self-tracking apps (Maltseva and Lutz, 2018).

## 4.4 Study implications and limitations

The findings of this study have important implications for promoting DWB on SNS. By assessing people's interests and preferences for DWB services, as well as the factors influencing these interests in European and Arab contexts, researchers, policymakers, and social networking sites designers are better equipped to develop effective, user-centric, and culturally sensitive digital wellbeing interventions. Personality has been found to play role on accepting technologies and the way they are used (Alves et al., 2020). Our findings highlighted different impacts of sociodemographic and personality traits on peoples' preferences in digital wellbeing services in the European and Arab contexts, suggesting cultural factors may play a role in such different preferences; while also some generalizable results were found. Research may further explore these findings to advance our understanding of the culture factors impacting these preferences. Future research may also evaluate the effectiveness of interventions designed based on digital wellbeing features introduced in this study.

SNS designers can offer digital wellbeing services tailored to cultural contexts, taking into consideration relevant factors associated with user interest in such services. This approach aligns with the literature emphasizing the importance of cultural factors in effective Human-Computer Interaction (HCI) designs (Adnan et al., 2020). In line with our findings, services providing enhanced data privacy could be emphasized to Arab users to alleviate privacy concerns, particularly among males. Conversely, European female users may benefit from services designed to mitigate mental health issues associated with SNS use. Nonetheless, the interpretation of these results warrants caution, as the WTP for DWB services might be significantly influenced by the level of trust users place in SNS platforms (Schreiner and Hess, 2015). Trust issues could underpin a reluctance to pay, despite recognized need or interest. Therefore, while our findings provide an insightful understanding of users' preferences for DWB services, the impact of trust in SNS platforms on these preferences and willingness to pay deserves more in-depth exploration. Furthermore, data protection legislation was reported as a low priority among Arab countries (Fatafta and Samaro, 2021). Our findings could be used by policymakers in Arab countries to prioritize developing and enforcing data protection legislation to address these concerns.

The current study is subject to certain limitations, and it is important to consider them when interpreting the results. The present study is cross-sectional, and our findings do not necessarily infer causal relationships among variables. The data were collected through self-reporting methods, which may lack accurate reporting and are subject to response biases such as social desirability. Some measures were taken to mitigate the influence of self-reporting bias on the findings. Data was collected anonymously to ensure confidentiality and reduce the likelihood of social desirability bias. Attention checks were embedded in the survey to ensure data quality and assess participants' attentiveness throughout the survey. To further address limitations associated with self-report measures, future studies could benefit from integrating the Implicit Association Test (IAT) (Greenwald et al., 2009). The IAT measures automatic association between concepts in one's mind through cognitive tasks, uncovering subconscious biases and attitudes that may influence decision-making processes in ways that aren't captured by direct questioning. Such deeper insights into users' attitudes and beliefs, which individuals may

be unaware of, might not be fully captured through self-reported data. Integrating such tools alongside traditional self-report methods could offer a more robust understanding of digital wellbeing perceptions.

It is also important to note that while WTP was utilized to assess user's valuation of the DWB services, it may not be the optimal measurement to assess actual payment behavior. Research has shown that there is a significant gap between people's intention regarding a specific behavior and the actual behavior (Sheeran, 2002), meaning that individuals' stated willingness to pay does not always translate into real financial transactions. As such, the implications of this research should be treated with caution. Furthermore, future studies could also benefit from incorporating theoretical frameworks such as Protection Motivation Theory (PMT) to more precisely investigate how perceptions of risk and the efficacy of coping strategies influence individuals' WTP for DWB services (Rogers, 1983). By applying PMT, researchers can examine how the perceived severity and vulnerability to digital threats (risk appraisal), alongside the perceived benefits and self-efficacy regarding protective actions (coping appraisal), affect economic decisions related to healthy usage of technologies.

Moreover, our study focused on only two cultures, the European and Arab countries, which may limit the generalizability of the findings to other cultures. SNS use behavior may differ among countries within these cultures. For example, a prior study showed social media use and behavior differences between Egypt and UEA (Mohamed, 2010). It is essential to conduct cross-cultural and geographical studies to gain a more comprehensive understanding of the factors impacting the interest in and demands for digital wellbeing features. Future research could also explore the cultural factors underlying the impact of demographic and personality traits on users' preferences in digital wellbeing services. To gain a deeper understanding, future studies could examine whether people's interest in digital wellbeing services is specific to particular SNS, allowing for more targeted interventions and strategies to promote digital wellbeing in the context of various platforms. By addressing these limitations, future research can build upon our findings and contribute to the advancement of knowledge in the field of digital wellbeing.

## 5 Conclusion

This study sheds light on the importance of designing digital wellbeing services aiming to mitigate issues associated with the use of SNS. Research showed that SNS can be designed to foster digital wellbeing, e.g., by adding functions that help users to mitigate the problematic fear of missing out (Alutaybi et al., 2020). Users' demand for such services can be expressed through their WTP (a reasonable amount of fee) to be provided (Mohammed et al., 2023). This study investigates the extent that people are interested in and willing to pay for services that ensure healthier and balanced usage of SNS revealing that while WTP was slightly higher than previous findings, it remains moderate. Our findings also revealed that individuals with high social networks use disorder and need for cognition perceived the importance of digital wellbeing features in the European and Arab samples. However, the influence of gender, age, education level, and personality traits on the willingness to pay varied for the different digital wellbeing services in the European and Arab samples.

These insights can guide researchers, designers, and policymakers in developing effective, user-centric, and culturally sensitive digital wellbeing services. For example, SNS designers can prioritize services that promote the prevention of excessive use, and develop methods beyond self-control, more specifically tailored for users high in neuroticism. By conducting further research, researchers can explore other factors influencing people's interest in digital wellbeing services and advance our understanding of the important aspects of digital wellbeing across different individual characteristics and cultures.

## Data availability statement

The datasets presented in this study can be found in online repositories. The names of the repository/repositories and accession number(s) can be found at: <https://osf.io/r3kw2>.

## Ethics statement

The studies involving humans were approved by Institutional Review Board (IRB) of Qatar Biomedical Research Institute (QBRI) at Hamad Bin Khalifa University. The studies were conducted in accordance with the local legislation and institutional requirements. The participants provided their written informed consent to participate in this study.

## Author contributions

SA: Conceptualization, Formal analysis, Investigation, Methodology, Visualization, Writing – original draft, Writing – review & editing. AB: Validation, Writing – review & editing. CS: Methodology, Writing – review & editing. DA-T: Writing – review & editing. CM: Methodology, Writing – review & editing. RA: Conceptualization, Investigation, Methodology, Supervision, Writing – review & editing, Validation.

## Funding

The author(s) declare that financial support was received for the research, authorship, and/or publication of this article. This

## References

- Abbasi, I., and Drouin, M. (2019). The American journal of family therapy neuroticism and Facebook addiction: how social media can affect mood? *Am. J. Fam. Ther.* 47, 199–215. doi: 10.1080/01926187.2019.1624223
- Abokhodair, N., Abbar, S., Vieweg, S., and Mejova, Y. (2017). Privacy and social media use in the Arabian gulf: Saudi Arabian & Qatari traditional values in the digital world. *J. Web Sci.* 3. doi: 10.34962/jws-38
- Abreu, C., and Campos, P. F. (2022). Raising awareness of smartphone overuse among university students: a persuasive systems approach. *Informatics* 9:15. doi: 10.3390/INFORMATICS9010015
- Adnan, M., Wei, W. C., and Ghazali, M. (2020). Localization and globalization of website design: a pilot study focuses on comparison of government websites. *Emerg. Res. from Asia Asian Context. Cult.* 2. doi: 10.1145/3391203.3391212
- Aguirre, E., Mahr, D., Grewal, D., De Ruyter, K., and Wetzels, M. (2015). Unraveling the personalization paradox: the effect of information collection and trust-building strategies on online advertisement effectiveness. *J. Retail.* 91, 34–49. doi: 10.1016/j.jretai.2014.09.005
- Ali, R., Jiang, N., Phalp, K., Muir, S., and McAlaney, J. (2015). “The emerging requirement for digital addiction labels,” in *Requirements Engineering: Foundation for Software Quality. REFSQ 2015. Lecture Notes in Computer Science*, (eds.) S. Fricker and K. Schneider, vol 9013. Cham: Springer.
- Alrobai, A., Phalp, K., and Ali, R. (2014). “Digital addiction: a requirements engineering perspective” *Requirements Engineering: Foundation for Software Quality. REFSQ 2014. Lecture Notes in Computer Science*, (eds.) C. Salinesi and I. van de Weerd Cham: Springer. 8396, 112–118.
- Alutaybi, A., Al-Thani, D., McAlaney, J., and Ali, R. (2020). Combating fear of missing out (FoMO) on social media: the FoMO-R method. *Int. J. Environ. Res. Public Health* 17, 1–28. doi: 10.3390/ijerph17176128
- Alves, T., Natálio, J., Henriques-Calado, J., and Gama, S. (2020). Incorporating personality in user interface design: a review. *Pers. Individ. Dif.* 155:109709. doi: 10.1016/j.paid.2019.109709
- Andreassen, C. S., Billieux, J., Griffiths, M. D., Kuss, D. J., Demetrovics, Z., Mazzoni, E., et al. (2016). The relationship between addictive use of social media and video games

publication was supported by NPRP 14 Cluster grant # NPRP 14C-0916–210015 from the Qatar National Research Fund (a member of Qatar Foundation). The findings herein reflect the work and are solely the responsibility of the authors.

## Acknowledgments

We acknowledge the support of the Ministerium für Wissenschaft, Forschung und Kunst Baden-Württemberg (MWK, Ministry of Science, Research and the Arts Baden-Württemberg under Az. 33-7533-9-19/54/5) in “Künstliche Intelligenz & Gesellschaft: Reflecting Intelligent Systems for Diversity, Demography and Democracy (IRIS3D)” and the support by the “Interchange Forum for Reflecting on Intelligent Systems” (IRIS) at the University of Stuttgart. Further, we acknowledge the support by the Stuttgart Center for Simulation Science (SimTech).

## Conflict of interest

The authors declare that the research was conducted in the absence of any commercial or financial relationships that could be construed as a potential conflict of interest.

## Publisher's note

All claims expressed in this article are solely those of the authors and do not necessarily represent those of their affiliated organizations, or those of the publisher, the editors and the reviewers. Any product that may be evaluated in this article, or claim that may be made by its manufacturer, is not guaranteed or endorsed by the publisher.

## Supplementary material

The Supplementary material for this article can be found online at: <https://www.frontiersin.org/articles/10.3389/fcomp.2024.1387681/full#supplementary-material>

- and symptoms of psychiatric disorders: a large-scale cross-sectional study. *Psychol. Addict. Behav.* 30, 252–262. doi: 10.1037/adb0000160
- Bandura, A. (1986). *Social foundations of thought and action*. Englewood Cliffs, NJ: Prentice-Hall, Inc.
- Bartlett, M. S. (1954). A further note on the multiplying factors for various X2 approximations in factor analysis. *J. R. Stat. Soc.* 16, 296–298. doi: 10.1111/j.2517-6161.1954.tb00174.x
- Beauvais, C. (2022). Fake news: why do we believe it? *Jt. Bone Spine.* 89:105371. doi: 10.1016/j.jbspin.2022.105371
- Booker, C. L., Kelly, Y. J., and Sacker, A. (2018). Gender differences in the associations between age trends of social media interaction and well-being among 10–15 year olds in the UK. *BMC Public Health* 18, 1–12. doi: 10.1186/s12889-018-5220-4/TABLES/3
- Boyd, D. M., and Ellison, N. B. (2007). Social network sites: definition, history, and scholarship. *J. Comput. Commun.* 13, 210–230. doi: 10.1111/j.1083-6101.2007.00393.x
- Bozdag, E., and van den Hoven, J. (2015). Breaking the filter bubble: democracy and design. *Ethics Inf. Technol.* 17, 249–265. doi: 10.1007/s10676-015-9380-y
- Brislin, R. W. (1970). Back-translation for cross-cultural research. *J. Cross-Cult. Psychol.* 1, 185–216. doi: 10.1177/135910457000100301
- Brynjolfsson, E., Collis, A., and Eggers, F. (2019). Using massive online choice experiments to measure changes in well-being. *Proc. Natl. Acad. Sci.* 116, 7250–7255. doi: 10.1073/pnas.1815663116
- Büchi, M. (2021). Digital well-being theory and research. *New Media Soc.* 26, 172–189. doi: 10.1177/14614448211056851
- Cacioppo, J. T., and Petty, R. E. (1982). The need for cognition. *J. Pers. Soc. Psychol.* 42, 116–131. doi: 10.1037/0022-3514.42.1.116
- Cacioppo, J. T., Petty, R. E., Feinstein, J. A., and Jarvis, W. B. G. (1996). Dispositional differences in cognitive motivation: the life and times of individuals varying in need for cognition. *Psychol. Bull.* 119, 197–253. doi: 10.1037/0033-2909.119.2.197
- Cao, X., and Yu, L. (2019). Exploring the influence of excessive social media use at work: a three-dimension usage perspective. *Int. J. Inf. Manag.* 46, 83–92. doi: 10.1016/j.ijinfomgt.2018.11.019
- Carrieri, V., Madio, L., and Principe, F. (2019). Vaccine hesitancy and (fake) news: quasi-experimental evidence from Italy. *Health Econ.* 28, 1377–1382. doi: 10.1002/hec.3937
- Cemiloglu, D., Naiseh, M., Catania, M., Oinas-Kukkonen, H., and Ali, R. (2021). The fine line between persuasion and digital addiction. *Int. Conf. Persuas. Technol.* 12684, 289–307. doi: 10.1007/978-3-030-79460-6\_23
- Costa, P. T., and McCrae, R. R. (1995). Domains and facets: hierarchical personality assessment using the revised NEO personality inventory. *J. Pers. Assess.* 64, 21–50. doi: 10.1207/s15327752jpa6401\_2
- Costello, M., Hawdon, J., Ratliff, T., and Grantham, T. (2016). Who views online extremism? Individual attributes leading to exposure. *Comput. Human Behav.* 63, 311–320. doi: 10.1016/j.chb.2016.05.033
- Curseu, P. L. (2011). Need for cognition and active information search in small student groups. *Learn. Individ. Differ.* 21, 415–418. doi: 10.1016/j.lindif.2011.02.005
- Davis, F. D. (1993). User acceptance of information technology: system characteristics, user perceptions and behavioral impacts. *Int. J. Man. Mach. Stud.* 38, 475–487. doi: 10.1006/IMMS.1993.1022
- de Holanda Coelho, G. L., Hanel, P. H. P., and Wolf, L. J. (2020). The very efficient assessment of need for cognition: developing a six-item version. *Assessment* 27, 1870–1885. doi: 10.1177/1073191118793208
- Deley, T., and Dubois, E. (2020). Assessing trust versus reliance for technology platforms by systematic literature review. *Soc. Media + Soc.* 6:205630512091388. doi: 10.1177/2056305120913883
- Dhawan, S., Hegelich, S., Sindermann, C., and Montag, C. (2022). Re-start social media, but how? *Telemat. Inform. Rep.* 8:100017. doi: 10.1016/j.teler.2022.100017
- Eikelboom, R. (2017). The rise of addictive technology and the business of keeping us hooked. *Perspect. Sci. Christ. Faith.* 69, 253–256.
- Elhai, J. D., Chai, S., Amialchuk, A., and Hall, B. J. (2017). Cross-cultural and gender associations with anxiety about electronic data hacking. *Comput. Human Behav.* 70, 161–167. doi: 10.1016/j.chb.2017.01.002
- Elhai, J. D., and Hall, B. J. (2015). Anxiety about internet hacking: results from a community sample. *Comput. Human Behav.* 54, 180–185. doi: 10.1016/j.chb.2015.07.057
- Extremera, N., Ruiz-Aranda, D., Pineda-Galán, C., and Salguero, J. M. (2011). Emotional intelligence and its relation with hedonic and eudaimonic well-being: a prospective study. *Pers. Individ. Dif.* 51, 11–16. doi: 10.1016/j.paid.2011.02.029
- Fatafta, M., and Samaro, D., Exposed and exploited: Data protection in the Middle East and North Africa. Available at: <https://now.org/>. (2021).
- Fuentes, A., and Peterson, J. V. (2021). Social media and public perception as core aspect of public health: the cautionary case of @realdonaldtrump and COVID-19. *PLoS One* 16:e0251179. doi: 10.1371/journal.pone.0251179
- Fusi, F., and Feeney, M. K. (2018). Social media in the workplace: information exchange, productivity, or waste? *Am. Rev. Public Adm.* 48, 395–412. doi: 10.1177/0275074016675722
- Goel, A., and Gupta, L. (2020). Social media in the times of COVID-19. *J. Clin. Rheumatol.* 26, 220–223. doi: 10.1097/RHU.0000000000001508
- Greenhow, C., Robelia, B., and Hughes, J. E. (2009). Learning, teaching, and scholarship in a digital age: web 2.0 and classroom research: what path should we take now? *Educ. Res.* 38, 246–259. doi: 10.3102/0013189X09336671
- Greenwald, A. G., Poehlman, T. A., Uhlmann, E. L., Banaji, M. R., Akalis, S., Bargh, J., et al. (2009). Understanding and using the implicit association test: III meta-analysis of predictive validity. *Association* 97, 17–41. doi: 10.1037/a0015575
- Grover, P., Kar, A. K., and Dwivedi, Y. (2022). The evolution of social media influence - a literature review and research agenda. *Int. J. Inf. Manag. Data Insights.* 2:100116. doi: 10.1016/J.JJIMEI.2022.100116
- Gui, M., Fasoli, M., and Carradore, R. (2017). Digital well-being. Developing a new theoretical tool for media literacy research. *Ital. J. Sociol. Educ.* 9, 155–173. doi: 10.14658/pupj-ijse-2017-1-8
- Haley, U. C. V., and Stumpf, S. A. (1989). Cognitive trails in strategic decision-making: linking theories of personalities and cognitions. *J. Manag. Stud.* 26, 477–497. doi: 10.1111/j.1467-6486.1989.tb00740.x
- Henrich, J., Heine, S. J., and Norenzayan, A. (2010). Most people are not WEIRD. *Nature* 466:29. doi: 10.1038/466029a
- Henson, R. K., and Roberts, J. K. (2006). Use of exploratory factor analysis in published research common errors and some comment on improved practice. *Educ. Psychol. Meas.* 66, 393–416. doi: 10.1177/0013164405282485
- Hruska, J., and Maresova, P. (2020). Use of social media platforms among adults in the United States. *Behavior Soc. Media, Soc.* 10:27. doi: 10.3390/SOC10010027
- Huang, C. (2022a). A meta-analysis of the problematic social media use and mental health. *Int. J. Soc. Psychiatry* 68, 12–33. doi: 10.1177/0020764020978434
- Huang, C. (2022b). Social media addiction and personality: a meta-analysis. *Asian. J. Soc. Psychol.* 25, 747–761. doi: 10.1111/ajsp.12531
- Inglehart, R., Haerpfer, A., Moreno, W., Welzel, C., Kizilova, K., Diez-Medrano, J., Lagos, M., et al. (2022). WVS database, world values Surv. Proj. Pages. Available at: [www.Worldvaluessurvey.org/WVSContents.jsp?CMSID=Findings](http://www.Worldvaluessurvey.org/WVSContents.jsp?CMSID=Findings)
- Jain, A. K., Sahoo, S. R., and Kaubiyal, J. (2021). Online social networks security and privacy: comprehensive review and analysis. *Complex Intell. Syst.* 7, 2157–2177. doi: 10.1007/s40747-021-00409-7
- JASP Team, JASP - a fresh way to do statistics, JASP. (2022). Available at: <https://jasp-stats.org/> (Accessed February 16, 2022).
- Kaiser, H. F. (1974). An index of factorial simplicity. *Psychometrika* 39, 31–36. doi: 10.1007/BF02291575
- Kannen, C., Sindermann, C., and Montag, C. (2024). On the Willingness to Pay for social media/messenger services taking into account personality and sent/received messages among WhatsApp users. *Heliyon* 10. doi: 10.1016/j.heliyon.2024.e28840
- Ko, M., Yang, S., Lee, J., Heizmann, C., Jeong, J., Lee, U., et al. NUGU: a group-based intervention app for improving self-regulation of limiting smartphone use, In Proceedings of the 2015 ACM International Conference on Computer-Supported Cooperative Work and Social Computing, (2015) 1235–1245.
- Krasnova, H., Günther, O., Spiekermann, S., and Koroleva, K. (2009). Privacy concerns and identity in online social networks, identity. *Inf. Soc.* 2, 39–63. doi: 10.1007/s12394-009-0019-1
- Lee, C. S., and Ma, L. (2012). News sharing in social media: the effect of gratifications and prior experience. *Comput. Human Behav.* 28, 331–339. doi: 10.1016/j.chb.2011.10.002
- Lee, A. R., Son, S.-M., and Kim, K. K. (2016). Information and communication technology overload and social networking service fatigue: a stress perspective. *Comput. Human Behav.* 55, 51–61. doi: 10.1016/j.chb.2015.08.011
- Maltseva, K., and Lutz, C. (2018). A quantum of self: a study on self-quantification and self-disclosure. *Comput. Human Behav.* 81, 102–114. doi: 10.1016/j.chb.2017.12.006
- Martoukou, K., Fulton, C., Kostagiolas, P., and Lavranos, C. (2020). A study of higher education students' self-perceived digital competences for learning and everyday life online participation. *Journal of Documentation.* 76, 1413–1458. doi: 10.1108/JD-03-2020-0041
- Matsunaga, M. (2010). How to factor-analyze your data right: do's, don'ts, and how-to's. *Int. J. Psychol. Res.* 3, 97–110. doi: 10.21500/20112084.854
- Matz, S. C., Kosinski, M., Nave, G., and Stillwell, D. J. (2017). Psychological targeting as an effective approach to digital mass persuasion. *Proc. Natl. Acad. Sci. USA* 114, 12714–12719. doi: 10.1073/pnas.1710966114 (accessed November 24, 2021)
- McCrae, N., Gettings, S., and Pursell, E. (2017). Social media and depressive symptoms in childhood and adolescence: a systematic review. *Adolesc. Res. Rev.* 2, 315–330. doi: 10.1007/s40894-017-0053-4
- Mohamed, A. A.-A. (2010). Online privacy concerns among social networks' users/ question concernant les affaires personnelles des utilisateurs de réseaux sociaux en ligne. *Cross-Cultural Commun.* 6:74. doi: 10.3968/j.ccc.1923670020100604.015

- Mohammed, F., Al-Kumaim, N. H., Alzahrani, A. I., and Fazea, Y. (2023). The impact of social media shared health content on protective behavior against COVID-19. *Int. J. Environ. Res. Public Health* 20:1775. doi: 10.3390/ijerph20031775
- Montag, C., and Hegelich, S. (2020). Understanding detrimental aspects of social media use: will the real culprits please stand up? *Front. Sociol.* 5:94. doi: 10.3389/fsoc.2020.599270
- Morosoli, S., Van Aelst, P., Humprecht, E., Staender, A., and Esser, F. (2022). Identifying the drivers behind the dissemination of online misinformation: a study on political attitudes and individual characteristics in the context of engaging with misinformation on social media. *Am. Behav. Sci.*:000276422211183. doi: 10.1177/00027642221118300
- Nam, S. J., and Hwang, H. (2021). Consumers' participation in information-related activities on social media. *PLoS One* 16:e0250248. doi: 10.1371/JOURNAL.PONE.0250248
- Nansen, B., Chakraborty, K., Gibbs, L., MacDougall, C., and Vetere, F. (2012). Children and Digital wellbeing in Australia: online regulation, conduct and competence. *J. Child. Media* 6, 237–254. doi: 10.1080/17482798.2011.619548
- O'Reilly, M., Dogra, N., Whiteman, N., Hughes, J., Eruyar, S., and Reilly, P. (2018). Is social media bad for mental health and wellbeing? Exploring the perspectives of adolescents. *Clin. Child Psychol. Psychiatry* 23, 601–613. doi: 10.1177/1359104518775154
- Oiknine, A. H., Pollard, K. A., Khooshabeh, P., and Files, B. T. (2021). Need for cognition is positively related to promotion focus and negatively related to prevention focus. *Front. Psychol.* 12:606847. doi: 10.3389/fpsyg.2021.606847
- Oomen, I., and Leenes, R. (2008). *Privacy risk perceptions and privacy protection strategies*. RSM Erasmus Univ. Rotterdam, Netherlands: Springer, 121–138.
- Orchard, L. J., Fullwood, C., Galbraith, N., and Morris, N. (2014). Individual differences as predictors of social networking. *J. Comput. Commun.* 19, 388–402. doi: 10.1111/jcc4.12068
- Osatuyi, B. (2015). Personality traits and information privacy concern on social media platforms. *J. Comput. Inf. Syst.* 55, 11–19. doi: 10.1080/08874417.2015.11645782
- Ouardi, Y., Goyal, T., Graf-Vlachy, L., Mammen, J., König, A., and Saunders, C. (2016). The cost of sharing: the effect of sharing inclination on information overload. *Eur. Conf. Inf. Syst.*
- Pagoto, S., Waring, M. E., and Xu, R. (2019). A call for a public health agenda for social media research. *J. Med. Internet Res.* 21:e16661. doi: 10.2196/16661
- Pariser, E., *The filter bubble: What the internet is hiding from you*, penguin UK. Penguin Group. (2011)
- Pennycook, G., Cannon, T. D., and Rand, D. G. (2018). Prior exposure increases perceived accuracy of fake news. *J. Exp. Psychol. Gen.* 147, 1865–1880. doi: 10.1037/xge0000465
- Piazza, J. A. (2022). Fake news: the effects of social media disinformation on domestic terrorism. *Dyn. Asymmetric Confl.* 15, 55–77. doi: 10.1080/17467586.2021.1895263
- Rammstedt, B., and John, O. P. (2007). Measuring personality in one minute or less: a 10-item short version of the big five inventory in English and German. *J. Res. Pers.* 41, 203–212. doi: 10.1016/j.jrp.2006.02.001
- Rogers, R. W. (1983). Cognitive and physiological processes in fear appeals and attitude change: a revised theory of protection motivation. *Soc. Psychol. A Source B.* 153–176.
- Schreiner, M., and Hess, T. (2015). Why are consumers willing to pay for privacy? An application of the privacy-freemium model to media companies. *Res. Pap.*:164 doi: 10.18151/7217470
- Sedek, S. S. S. (2021). Innovative solutions for awareness campaign of social media addiction and its consequences. *Int. Des. J.* 11, 131–156. doi: 10.21608/idx.2021.152344
- Seidler, Z. E., Dawes, A. J., Rice, S. M., Oliffe, J. L., and Dhillon, H. M. (2016). The role of masculinity in men's help-seeking for depression: a systematic review. *Clin. Psychol. Rev.* 49, 106–118. doi: 10.1016/j.cpr.2016.09.002
- Seidman, G. (2013). Self-presentation and belonging on Facebook: how personality influences social media use and motivations. *Pers. Individ. Dif.* 54, 402–407. doi: 10.1016/J.PAID.2012.10.009
- Sharma, R., and Bollavarapu, S. (2015). Data security using compression and cryptography techniques. *Int. J. Comput. Appl.* 117, 975–8887. doi: 10.5120/20621-3342
- Sheeran, P. (2002). Intention—behavior relations: a conceptual and empirical review. *Eur. Rev. Soc. Psychol.* 12, 1–36. doi: 10.1080/14792772143000003
- Shu, K., Mahudeswaran, D., and Liu, H. (2019). FakeNewsTracker: a tool for fake news collection, detection, and visualization. *Comput. Math. Organ. Theory.* 25, 60–71. doi: 10.1007/s10588-018-09280-3
- Sindermann, C., Kannen, C., and Montag, C. (2022). The degree of heterogeneity of news consumption in Germany—descriptive statistics and relations with individual differences in personality, ideological attitudes, and voting intentions. *New Media Soc.* 26, 711–731. doi: 10.1177/14614448211061729
- Sindermann, C., Kuss, D. J., Throuvala, M. A., Griffiths, M. D., and Montag, C. (2020). Should we pay for our social media/messenger applications? Preliminary data on the acceptance of an alternative to the current prevailing data business model. *Front. Psychol.* 11:1415. doi: 10.3389/fpsyg.2020.01415
- Sindermann, C., Montag, C., and Elhai, J. D. (2022). The design of social media platforms—initial evidence on relations between personality, fear of missing out, design element-driven increased social media use, and problematic social media use. *Technology, Mind and Behavior*, 3. doi: 10.1037/tmb0000096
- Sindermann, C., Yang, H., Yang, S., Elhai, J. D., and Montag, C. (2022). Willingness to accept (WTA), willingness to pay (WTP), and the WTA/WTP disparity in Chinese social media platforms: descriptive statistics and associations with personality and social media use. *Acta Psychol.* 223:103462. doi: 10.1016/j.actpsy.2021.103462
- Steinert, S., and Dennis, M. J. (2022). Emotions and Digital well-being: on social Media's emotional affordances. *Philos. Technol.* 35, 1–21. doi: 10.1007/S13347-022-00530-6/METRICS
- Su, W., Han, X., Yu, H., Wu, Y., and Potenza, M. N. (2020). Do men become addicted to internet gaming and women to social media? A meta-analysis examining gender-related differences in specific internet addiction. *Comput. Human Behav.* 113:106480. doi: 10.1016/J.CHB.2020.106480
- Sunstein, C. R. (2020). Valuing Facebook, Behav. *Public Policy* 4, 370–381. doi: 10.1017/bpp.2018.34
- Svensson, D., *Digital wellbeing, according to Google*, (2019).
- Tehrani, H. D., and Yamini, S. (2020). Personality traits and conflict resolution styles: a meta-analysis. *Pers. Individ. Dif.* 157:109794. doi: 10.1016/J.PAID.2019.109794
- Thompson, R. (2011). Radicalization and the use of social media. *J. Strateg. Secur.* 4, 167–190. doi: 10.5038/1944-0472.4.4.8
- Thompson, N. (2018). “Gender differences in information security perceptions and behaviour” in *Australasian Conference on Information Systems*. Sydney: UTS ePRESS.
- Twenge, J. M., and Martin, G. N. (2020). Gender differences in associations between digital media use and psychological well-being: evidence from three large datasets. *J. Adolesc.* 79, 91–102. doi: 10.1016/J.ADOLESCENCE.2019.12.018
- Van Den Eijnden, R. J. J. M., Lemmens, J. S., and Valkenburg, P. M. (2016). The social media disorder scale. *Comput. Human Behav.* 61, 478–487. doi: 10.1016/J.CHB.2016.03.038
- Van der Schyff, K., Flowerday, S., and Furnell, S. (2020). Privacy risk and the use of Facebook apps: a gender-focused vulnerability assessment. *Comput. Secur.* 96:101866. doi: 10.1016/j.cose.2020.101866
- Van Deursen, A. J. A. M., Bolle, C. L., Hegner, S. M., and Kommers, P. A. M. (2015). Modeling habitual and addictive smartphone behavior: the role of smartphone usage types, emotional intelligence, social stress, self-regulation, age, and gender. *Comput. Human Behav.* 45, 411–420. doi: 10.1016/J.CHB.2014.12.039
- Van Duyn, E., and Collier, J. (2019). Priming and fake news: the effects of elite discourse on evaluations of news media, mass. *Commun. Soc.* 22, 29–48. doi: 10.1080/15205436.2018.1511807
- Vanden Abeele, M. M. P. (2020). Digital wellbeing as a dynamic construct. *Commun. Theory* 31, 932–955. doi: 10.1093/ct/ctaa024
- Voigt, P., and Von dem Bussche, A. (2017). *The EU general data protection regulation (GDPR)*. Cham: Springer.
- Vosoughi, S., Roy, D., and Aral, S. (2018). The spread of true and false news online. *Science* 359, 1146–1151. doi: 10.1126/science.aap9559
- Ward, K. (2018). Social networks, the 2016 US presidential election, and Kantian ethics: applying the categorical imperative to Cambridge Analytica's behavioral microtargeting. *J. media Ethics.* 33, 133–148. doi: 10.1080/23736992.2018.1477047
- Widjaja, S. P., and Baek, J. S. (2023). Visualizing the complex problem of Children's Digital wellbeing in South Korea: a systems thinking approach. *Proc. Int. Conf. Eng. Des.* 3, 3841–3850. doi: 10.1017/pds.2023.385
- Winder, D. (2019). *Data breaches expose 4.1 billion records in first six months of 2019*: Forbes.
- Winter, S., Maslowska, E., and Vos, A. L. (2021). The effects of trait-based personalization in social media advertising. *Comput. Human Behav.* 114:106525. doi: 10.1016/J.CHB.2020.106525
- Xu, Y., Li, Y., Zhang, Q., Yue, X., and Ye, Y. (2022). Effect of social media overload on college students' academic performance under the COVID-19 quarantine. *Front. Psychol.* 13:890317. doi: 10.3389/fpsyg.2022.890317
- Yoon, S., Kleinman, M., Mertz, J., and Brannick, M. (2019). Is social network site usage related to depression? A meta-analysis of Facebook–depression relations. *J. Affect. Disord.* 248, 65–72. doi: 10.1016/j.jad.2019.01.026
- Zeinoun, P., Akl, E. A., Maalouf, F. T., and Meho, L. I. (2020). The Arab region's contribution to global mental health research (2009–2018): a bibliometric analysis. *Front. Psych.* 11:492279. doi: 10.3389/fpsyg.2020.00182
- Zheng, H., and Ling, R. (2021). Drivers of social media fatigue: a systematic review. *Telemat. Informatics.* 64:101696. doi: 10.1016/J.TELE.2021.101696