



## Research article

## Integrating an information systems success model with perceived privacy, perceived security, and trust: the moderating role of Facebook addiction

Mahmoud Maqableh<sup>a,\*</sup>, Hazar Y. Hmoud<sup>a</sup>, Mais Jaradat<sup>b</sup>, Ra'ed Masa'deh<sup>a</sup><sup>a</sup> Department of Management Information Systems, School of Business, University of Jordan, Amman 11942, Jordan<sup>b</sup> Department of Civil Engineering - Engineering Project Management, School of Engineering, University of Jordan, Jordan

## ARTICLE INFO

## Keywords:

Continuance intention  
IS success model  
Facebook addiction  
Serial multiple mediations  
Moderating role

## ABSTRACT

**Purpose:** The purpose of this study is to investigate the influence of perceived security, perceived privacy, and satisfaction on Facebook user continuance intention. In addition, the serial multiple mediating effects of trust and satisfaction on the relationship between continuance intention and Facebook determinants are explored. This study also investigates the moderating role of Facebook addiction on the relationship between satisfaction and continuance intention.

**Design/methodology/approach:** To achieve the study aims, an online survey was conducted among university undergraduate students. Data were collected from 450 voluntary participants. The statistical analysis was performed using SPSS and PROCESS macro models.

**Findings:** The study results confirm that perceived privacy and satisfaction have significant impacts on Facebook continuance intention. The path analysis results confirm the full mediating roles of trust and satisfaction in the relationship between perceived security and continuance intention. Furthermore, the moderating role of Facebook addiction on the relationship between satisfaction and continuance intention is confirmed.

**Practical implications:** The results of this study offer insights to Facebook managers and policymakers regarding the treatment of and intervention in Facebook continuance intention. The results disclose the critical role of users' satisfaction and perceived privacy in influencing Facebook users' continuance intention for Facebook managers and policymakers. This confirms that Facebook managers and policymakers must maintain user privacy to increase the level of user satisfaction and continuance intention. Furthermore, they must ensure that the requisite security mechanisms are in place to increase user trust and satisfaction that influence users' continuance intention.

**Originality/value:** This research integrated perceived privacy, perceived security, and trust with an Information System (IS) success model. This is the first study to investigate the serial mediating effects of trust and satisfaction on the determinants of Facebook continuance intention. The moderating effects of Facebook addiction on the relationship between satisfaction and continuance intention are also examined. The study results make important contributions to Facebook continuance intention research and advance scholarship into aspects of undergraduate students' continuance intention in the context of Facebook.

## 1. Introduction

Many social networking sites (SNSs) have grown exponentially in recent years. Among them, Facebook has consistently been the most popular platform, as measured by active users. Statistics reveal that 59% of internet users have active Facebook accounts, 40% have YouTube accounts, 30% have WhatsApp accounts, and 15% have Instagram accounts [1]. Facebook continues to be the largest social networking site in

terms of its global reach. The United States possesses the largest number of Facebook users, followed by India [2]. In terms of active users, Facebook is the leading social network platform [3].

SNSs in general and Facebook in particular have become more popular for many reasons. First, these sites are "sticky" sites [4] in that they induce users to repeatedly visit them. For example, users can initiate and search for hashtags, read up-to-date news, and access live streams [5]. Furthermore, networking sites are accessible and can be reached via

\* Corresponding author.

E-mail address: [maqableh@ju.edu.jo](mailto:maqableh@ju.edu.jo) (M. Maqableh).

smartphones at any time and from any location. Thus, 91% of SNS users stated that they access their accounts using their smartphones [6]. In comparison to desktop PCs, smartphones are ubiquitous [7].

Moreover, social networking content includes marketing details about brands and products. For example, 54% of social networking users search for their required products via SNSs [8]. In addition, some activities promoted through SNSs have resulted in changes in political regimes [9]. Social networking platforms are also crucial for business success. For example, Facebook statistics show that 300 million users view Facebook stories daily, and over 2 million advertisers use stories to promote their products and services in January 2019 [10].

Due to the exponential development of SNSs, different studies have sought to understand the reasons behind the intention to use these sites and the benefits accrued by users who were highly engaged [11, 12, 13]. However, SNS users not only adopted platforms but also continued using them over time. This situation is referred to as continuance intention. Hence, understanding SNS continuance intention is as crucial as understanding their initial use. Researchers have emphasized the importance of this construct in understanding the value of specific technologies [14, 15, 16, 17].

The body of research into continuance usage intention for SNSs remains comparatively undeveloped. However, this study explores the continuance usage intention of Facebook as a social networking site. The critical position Facebook currently occupies and the limited research conducted in this field in the context of Jordan has led the researcher to propose redressing this gap in current knowledge by adopting the Hashemite Kingdom of Jordan as a case study. This research is distinguished from previous research by its emphasis on a user-oriented theoretical approach to the exploration and comprehension of social media use. A functional approach has been employed in this research to understand the continuance intention amongst Facebook users in Jordan. The functional approach focuses on understanding the relationship between a specific construct and its effect on the realization of specific organizational goals. It also focuses on the identification of a collection of other constructs capable of constructing a proper context in which such a relationship can be developed.

The purpose of this study is to investigate the impact of integrating essential influences on Facebook continuance intention in the context of student use. This study integrated the IS success model with perceived privacy, perceived security, and trust to investigate the Facebook continuance intention of undergraduate students. Furthermore, this study is the first to investigate the serial mediating effects of trust and satisfaction on the relationship between perceived security and continuance intention and the relationship between perceived privacy and the continuance intention gap. This research is distinguished from other articles through the introduction of the moderating variable "addiction" into the relationship between satisfaction and continuance intention. Many researchers have focused on the different relationships that shape Facebook continuance intention without paying much attention to the moderating variables. Thus, this study investigates how addiction moderates the relationship between satisfaction and Facebook continuance intention in Jordan.

## 2. Research motivation and theoretical background

### 2.1. The motivation of this research

The emergence of social media networks has created a tremendous shift in daily life activities and routines. The individual usage intention of such platforms may differ from one person to another or even between groups or businesses. Facebook is considered one of the most popular social media sites that allows its users to communicate, advertise, and conduct business. Therefore, understanding the usage depends on the purpose and the perceived benefits of a user while using the site. However, understanding the intention to use or continue using Facebook is quite complex as many factors may influence individual usage, such as

economic, social, and technological factors. This research aims to understand Facebook usage intention in Jordan. Taking Jordan as a case is appropriate. According to Yaseen (2017), Jordanian online users seem to be engaged in so-called social media e-commerce, where the main social media applications are used for the exchange of products and services [18]. The number of Jordanian Facebook users was 55% of the Jordanian population in 2020, and this number increased in the first quarter of the year to 62.2% in 2021 [19].

Investigating the factors influencing the continuous use of Facebook is, theoretically and practically, a dynamic research topic. This holds especially in developing countries such as Jordan as Facebook is viewed as a hypertechnology that is different from other technologies such as online applications and websites. In Jordan, statistics show that 82% of the Jordanian population uses Facebook, and Facebook use exceeds the use of other social networking websites [20, 21]. For example, Facebook usage in Jordan is 6 times larger than the use of the next social networking website, namely, "YouTube" [21].

Furthermore, there is limited research investigating factors in the continuous use of Facebook in the Jordanian context. Additionally, there is a need for a research framework designed specifically to examine the behavioural and technical aspects of continuous use of Facebook. The framework should explain some variables that are considered the reasons for the causal relationships that would lead to continual Facebook use and some variables that contextualize the causal relationships that would lead to continual Facebook use. Therefore, the primary aim of this research is to examine the various factors that affect continuous Facebook use, specifically in the Jordanian context. In this research, the IS success model was chosen and integrated with perceived privacy, perceived security, and trust to investigate Facebook continuance intention in Jordan. The proposed IS success model will assist in a better understanding of the various factors that can affect the perceptions of Facebook continuance intention in Jordan. This study may subsequently help Jordanian technological companies in their efforts to successfully obtain the best benefits from the continual use of Facebook within the Jordanian market. Moreover, this study may act as a benchmark for other scholars who seek to investigate Facebook within the Jordanian context or any other developing country that could be similar to the Jordanian context.

### 2.2. Theoretical background of Facebook

SNSs have already received considerable scholarly attention [12, 22, 23]. There are many examples of social media sites, including Facebook, YouTube, WhatsApp, Twitter and Instagram. The different technologies have been affected by the intensive competition between companies and continual business development [24]. This article focuses on Facebook and, more specifically, Facebook in Jordan. Facebook and YouTube are the most commonly used social media platforms in the Middle East [25]. In addition, 90% of the usage is credited to Jordan. The Jordanian population favours Facebook, YouTube and WhatsApp, among others, the most [26]. As shown in Figure 1 below, Facebook is the most used social media platform in Jordan compared to other platforms such as YouTube, Twitter and Instagram [21].

In Jordan, Facebook has been useful in many aspects. For example, Facebook positively affects self-development and information exchange and increases technical skills [27]. Facebook also enhances collaborative learning among users [28]. Moreover, Facebook supported the online learning process by facilitating the interaction between peer students and the joining of learning groups [29].

Much of the Facebook research has been based on theories such as the Technology Acceptance Model (TAM), the IS success model, the Unified Theory of Acceptance and Use of Technology (UTAUT), and the Expectancy Confirmation Model (ECM). Many studies have focused on the behavioural intentions of SNS users and explored the relationships between motivation factors and the behaviour of SNS users. Several research studies have examined the influence of integrating factors, such

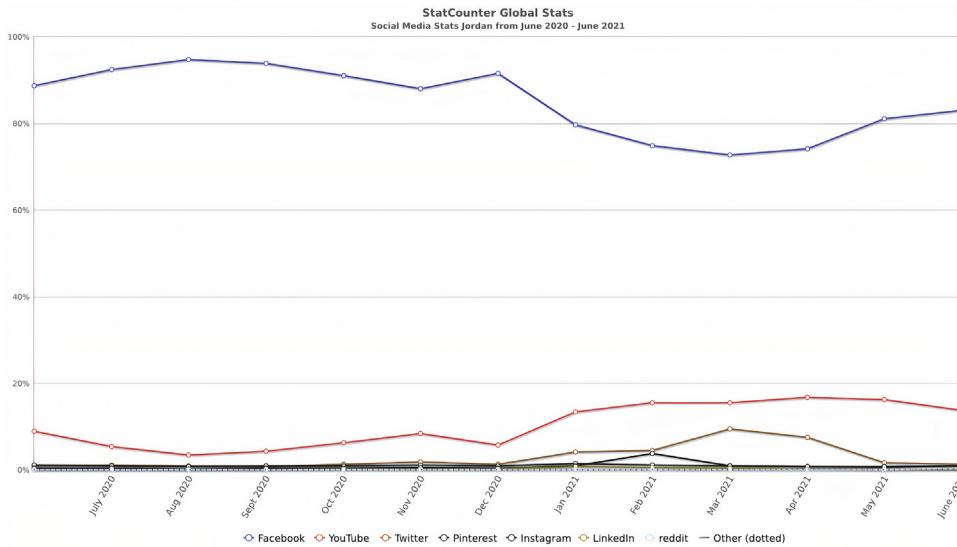


Figure 1. Social media stats for Jordan (June 2020–June 2021) [21].

as perceived privacy, perceived security, trust, and satisfaction, on online service continuance intention [14, 30, 31, 32, 33, 34, 35, 36, 37, 38, 39, 40]. In addition, the existing literature demonstrates the important role played by perceived privacy and security in electronic services [35, 41, 42, 43]. Moreover, some studies confirmed the mediating role of satisfaction between trust and continuance intention [14, 44]. Another research emphasized the importance of perceived privacy and perceived security in increasing user trust and satisfaction in the context of online services [45].

2.3. Theoretical context

Due to its popularity in gathering people and the various features offered, Facebook has drawn the interest of individuals and businesses. Recently, there has been a significant increase in research on the acceptance and usage of Facebook. Therefore, previous studies sought to capture various aspects of Facebook using different methodologies and employing theories that can help understand specific issues related to the platform.

The TAM model comprises the largest body of IS literature explaining the initial intention to use technology by users [46]. The TAM is

comprised of two main components, “perceived usefulness (PU) and perceived ease of use (PEOU)”, which directly evaluate users’ behaviour via behavioural intention. Furthermore, the IS success model developed by DeLone and McLean (2002) is one of the most commonly used frameworks for evaluating information technology success [47]. The approach consisted of six constructs of IS success: “information quality, service quality, system quality, intention to use, user satisfaction and net benefits”. Using Innovation Diffusion Theory (IDF) and Task Technology Fit (TTF), researchers have found that constructs from different theoretical perspectives need to be integrated with the TAM to provide a better understanding of user acceptance issues and accordingly user intentions to utilize technology [48].

As illustrated in Figure 2, the researchers proposed an integrated model based on the IS success model combined with the perspectives of perceived privacy, perceived security, and trust. Specifically, the researchers proposed that perceived privacy and perceived security impact continuance intention through trust and satisfaction. The researchers used Facebook addiction as a moderating variable of the relationship between satisfaction and continuance intention.

There are several prominent research studies about social media continuance intention, as indicated in Table 1. This research makes three

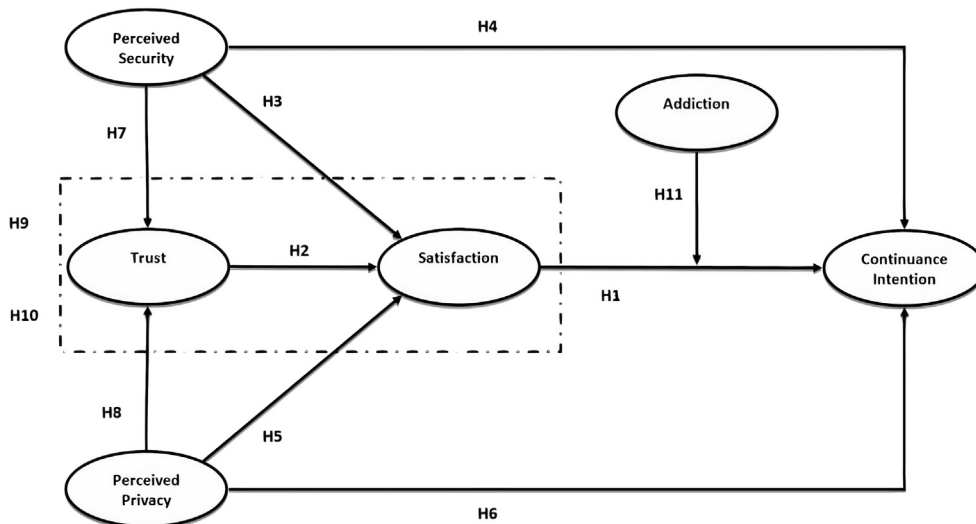


Figure 2. Research model.

**Table 1.** Prominent articles on continuance intention of social media.

Authors	Subjects	Key findings
(Ku et al., 2013) [31]	Continuance intention of SNS	Privacy concerns, subjective norms, gratifications, and perceived critical mass, and on SNS users' continuance intention.
(Yang and Lin, 2014) [40]	Facebook stickiness	Epistemic value and hedonic value had impacts on the stickiness for Facebook. Additionally, with high-trust, social value and hedonic value produced significant impacts on stickiness.
(Zhang et al., 2017) [39]	Building social media continuance intention	Social interaction mediates the effect of network externalities on the four types of perceived values. Also, social value and hedonic value influence continuance intention.
(Naqshbandi et al., 2017) [49]	Facebook usage and academic performance	All five dimensions of personality from the big five model predict academic performance. In addition, shyness predicted academic performance positively and loneliness negatively influence students' academic performance
(Moqbel and Kock, 2018) [50]	Dark side of social networking sites	SNSs has negative consequences on the personal and work environments. Moreover, SNS addiction reduces positive emotions that enhance performance and enhance health.
(Hruska and Maresova, 2020) [51]	Continuance use intention of social media	Higher educational levels increase the continual use of social media. In addition, continual use of social media improves brand awareness, customer satisfaction, quality, reach, and profit.
(Maqableh et al., 2021) [52]	Facebook stickiness	Satisfaction influences Facebook users' stickiness. In addition, hedonic value, emotional value, and social value impact Facebook users' satisfaction.

contributions to the social network continuance intention literature. First, this study examines social network continuance intention by employing the IS success model with perceived privacy, perceived security, and trust. This strategy advances our understanding of the social network continuance intention of undergraduate students. Second, this research is distinguished from previous research by its emphasis on the use of a user-oriented theoretical approach to explore and understand social media user continuance intention. Thus, the functional approach is used to explore continuance intention amongst Facebook users in Jordan and to identify constructs that can establish a proper context for the development of such a relationship. Finally, this research is distinguished from other studies by its adoption of the moderating variable of "addiction" on the relationship between satisfaction and continuance intention. Thus, this study investigates how addiction moderates the relationship between satisfaction and Facebook continuance intention among users in Jordan. Many researchers have focused on the different relationships that impact Facebook continuance intention without paying much attention to moderating variables.

### 3. Hypothesis development and literature review

#### 3.1. Continuance intention

In terms of the TAM model, there is a large body of IS literature explaining the initial intention to use technology by users [46]. Researchers stated that constructs from different theoretical perspectives need to be integrated with the TAM to provide a better understanding of user acceptance issues and accordingly user intentions to utilize technology [48]. As a result, other theories have been introduced, such as IDE, TTF, and the IS success model [53, 54, 55]. These research results were crucial to the development of a better theoretical understanding of

technology related to initial intention to use and the enhancement of different practices designed to encourage users to use technology.

However, the initial intention to use technology is insufficient. It is essential to also explore and understand the intention to continue using technology. This includes factors that encourage users to stay loyal and continue using the technology [56, 57, 58]. Companies have invested their resources in the development of technologies based on user needs and requirements. They need to protect their investments by measuring continuance intention. The literature devoted to the understanding of the continued use of technology is growing [59, 60, 61]. However, SNSs are valuable sources of data because they demonstrate high levels of interactions between users and allow researchers to better explore the different factors that shape continuance intention concerning technology use [12, 62]. Consequently, it is necessary to conduct exploratory research to identify and measure the factors impacting SNS continuance intention.

#### 3.2. Satisfaction

Satisfaction is an ancient construct with contemporary relevance that has been used by many researchers in different disciplines [63]. Satisfaction has been used in the context of work to measure job satisfaction [64, 65] and in an organizational context related to customer satisfaction [66, 67]. Satisfaction is measured in the IS literature. Furthermore, numerous theories have been deployed to evaluate it [55, 68, 69, 70]. For example, the Expectation Confirmation Model (EDM) indicates that satisfaction can be analysed to understand the relationship between satisfaction and the experience of using technology [69, 71]. Typically, customers anticipate the performance of a product or a service before its actual use. If their expectations match their experiences, they feel satisfied. Therefore, an initial positive customer experience is a crucial determinant of user satisfaction [72]. This suggests that satisfaction can also be an aggregated positive emotional state developed through several experiences with the product or the service. User IT continuance behaviour is positively influenced by satisfaction with prior IT usage [15]. The use and gratification theory also comprises a theoretical basis upon which to develop a better understanding of satisfaction and its relationship with continuance intention to use social networking systems. Scholars have revealed that user satisfaction with the contents and features of social networking systems has a positive relationship with continued use [73]. Based on the significant influence of satisfaction on continuance intention, the following hypothesis is proposed:

**H1.** Satisfaction increases Facebook continuance intention.

#### 3.3. Trust

Satisfaction is deemed a crucial construct for IS researchers because it has been shown to significantly impact user behaviours and intentions [74, 75]. Therefore, the factors influencing satisfaction, such as trust, have been widely investigated [76, 77, 78]. This generally occurs because trust is important in online transactions. Trust offers users an emotional appraisal and indicates that a company is honest [79]. Hence, the emotional evaluation of a company, or what so-called "satisfaction" comprises, would increase; and users would "stick" to the company and its products [80, 81]. For example, the perceived trust of users related to genetic technologies negatively impacts satisfaction and, accordingly, negatively influences intentions to continue using those technologies [82]. Trust was found to increase performance and, as a consequence, also increase satisfaction. Moreover, when trust confirms user expectations, satisfaction is increased; and this, in turn, positively influences reuse intention [83].

Based on the positive relationship identified between trust and satisfaction, the following hypothesis is proposed:

**H2.** Trust increases satisfaction while using Facebook.

### 3.4. The roles of perceived security and perceived privacy

Internet users create Facebook accounts for many reasons [3]. For example, they may wish to find, connect with, or contact school friends, college associates, and family members. Many users use Facebook for entertainment or to conduct job searches. In addition, people can use Facebook as an educational tool or to assimilate and disseminate knowledge.

Facebook users must willingly share their private and public information [84]. This includes personal information such as user names, email addresses, phone numbers, identity confirmation details, and financial data. According to *The Social Skimpy*, the 2.41 billion monthly active users on Facebook collectively post 510,000 comments per minute, and 293,000 statuses are updated each minute [10]. Users also frequently share their pictures and videos. Facebook statistics show that photo uploads reach 300 million per day and that video viewing is increasing daily. Moreover, users can share the locations of their favourite trips, their preferred restaurants, and their workplaces through the "check-in" and "live" features.

Some researchers shared information of the type found on Facebook, which comprises a virtual goldmine for disreputable people seeking to perpetrate fraud, attacks, or cybercrime [85]. Thus, 61% of online security risks target Facebook users while 18%, 17% and 4% of online security risks target MySpace, Twitter, and LinkedIn accounts, respectively.

Information sharing comprises the principal form of privacy and security violations for Facebook users who are vulnerable to different attacks or forms of cybercrime [86]. As a result, users must minimize the risk of these violations to maintain their intentions to use social networking platforms such as Facebook [87].

Perceived security denotes the threat of discernible loss or harm to hardware, software, and data that is caused by an exploited weakness in system design, implementation, or procedures [88, 89]. Different companies have implemented different security measures to protect their hardware, software, company data, and customer data. These security measures include anti-virus software, intrusion detection and prevention systems, port scanners, and vulnerability scanners. Furthermore, practitioners have worked hard to develop cybersecurity measures [90], such as cryptography, digital certificates, and signatures, which can be implemented by companies with internet-enabled transactions [91]. As a result, customers tend to have confidence in internet services when the companies are concerned that they are vigilant regarding their cybersecurity measures. Researchers found that perceived security is an important factor that shapes customer intention to continue using technology in retail services [92], travel services [93], and web services in general [94, 95].

Scholars have reported that users perceive security as a necessary, albeit insufficient, requirement for perceived privacy [96, 97]. While customers perceive the need for security measures as a result of the harmful practices of hackers, privacy issues are regarded as a consequence of the harmful actions of companies. Perceived privacy then addresses the possibility that a company would process the personal information of its customers in an unauthorized way or sell it to other companies [98]. A qualitative study revealed that users do not use Facebook due to security and privacy issues [99].

Thus, the hypotheses that emerge from the above discussion concern the potential for security to positively impact satisfaction. The following two hypotheses are proposed:

**H3.** Perceived security increases satisfaction while using Facebook.

**H4.** Perceived security increases Facebook continuance intention.

The difference between perceived privacy and perceived security needs to be taken seriously. Some researchers have revealed that the magnitude of the impacts of perceived privacy and perceived security on technology continuance intention is altered with changes in context [33]. In addition [100], conducted a systematic review of 320 privacy articles and 128 privacy books and book sections and concluded that there are

three main flaws in current privacy research. For example, they observed that some areas of technological research are under-analysed in terms of privacy. This evaluation covered privacy at the individual level but devoted less attention to either the organizational level or the societal level. Hence, this paper proposes the following hypotheses in the context of Facebook use amongst Jordanian users:

**H5.** Perceived privacy increases satisfaction while using Facebook.

**H6.** Perceived privacy increases Facebook continuance intention.

Concerning perceived security and perceived privacy, it is worth mentioning that both have been shown to protect users from risks and uncertainties; moreover, it has been suggested that both promote user trust while using technological platforms [101]. In addition, researchers have outlined the dimensions of online trust as follows: the technology-based dimension, the security dimension, and the fulfilment dimension [102]. Trust, in this context, can be defined as a belief that the other party connecting with the user can be trusted [103]. This belief is supported by a feeling of confidence in the other party [104].

It is suggested that trust negatively impacts perceived risk while users conduct technological transactions [105]. The relationship between trust and perceived security has been extensively explored in the existing literature [33, 56, 106, 107, 108]. For example, scholars have revealed that customer faith in electronic business transactions is decreasing and risk or security issues are increasing [109]. Moreover, perceived security and perceived privacy are interrelated constructs that are both used to determine the effect on user trust [109]. For example, research has revealed that users are only comfortable sharing their information on public networks after they acknowledge the credibility of the technology vendor. As a result, perceived security and perceived privacy are increased and positively impact trust [110, 111].

Thus, the following hypotheses have been construed from this discussion:

**H7.** Perceived security increases trust.

**H8.** Perceived privacy increases trust.

### 3.5. The mediating effects of trust and satisfaction

Mediating variables are used in research to understand and interpret the mechanisms that constitute the underlying relationship between the independent variables and the dependent variable. For example, trust has been deemed to be a mediating variable in the relationship between perceived security or perceived privacy and continuance intention [33, 106]. In addition, satisfaction has been regarded as a mediating variable in the relationship between perceived security/privacy and continuance intention [62, 63]. Some researchers have proposed that satisfaction is a mediating variable for the relationship between trust and continuance intention [112]. Finally, another research group identified trust and satisfaction as two different mediating variables, each of which mediates the relationships between perceived security or perceived privacy and technology continuance intention [59].

All research in this field has studied the identification of a single mediating variable of continuance intention. No studies employed more than one mediating variable. In contrast, the current research proposes two mediating variables, namely, trust and satisfaction. Both are used to measure relationships. Hence, the following hypotheses are proposed:

**H9.** Trust and satisfaction mediate the relationship between perceived privacy and continuance intention.

**H10.** Trust and satisfaction mediate the relationship between perceived security and continuance intention.

### 3.6. The moderating role of addiction

According to Facebook Inc. (2021), there are 2.85 billion monthly active Facebook users, and 95% of these users log into Facebook daily

[113]. Facebook is an integral part of the daily routines of these users who can access their accounts easily through their smartphones. This percentage is remarkable and highlights the problems associated with extensive use of Facebook and addiction concerns. The link between internet use and technological addiction has been deemed an area worthy of research since the early 1990s [114].

Behaviours related to the continual use of social media have been studied through different constructs. For example, Salaway [115] found that 17.3% of social media users spent more than 10 hours per week on their preferred social media site, 68% regularly checked their social media feeds, and 61% of users reported that they needed to check their Facebook accounts on multiple occasions each day. Most social media users were unable to go one day without checking their social media [116]. This continual use has been studied and found to be an example of addictive behaviour, even though social media users did not interpret this as addictive behaviour [117]. The literature reveals that different types of technological addiction, including internet addiction, online auction addiction, and internet gaming addiction, have already been identified. However, social media addiction is the most recent phenomenon [50, 118]. Furthermore, Facebook has been rated as the social media platform that most profoundly harms the mental health of its users, as exemplified in addictive behaviour.

Internet addiction is typically referred to as a loss of control over personal use of the Internet [119]. [120] defined social media addiction as an attachment to different activities on social media platforms to a degree that compromises normal social functioning. Furthermore, Facebook addiction is related to the extensive use of Facebook [121]. In the beginning, researchers studied addictive behaviour overall without addressing the specific platform. However, researchers have begun to be more selective, focusing their attention on different platforms, such as Twitter, Snapchat, and Instagram [122, 123, 124, 125]. Furthermore, other research has been conducted to develop scales capable of measuring both social media addiction and Facebook addiction. These are known as the Bergen Social Media Addiction Scale and Bergen Facebook Addiction Scale, respectively. Many researchers have focused on developing a proper scale to measure Facebook addiction. For example [126], employed the Bergen Facebook Addiction Scale, which is comprised of six core components that are used to measure addiction.

Different theories can create different levels of understanding of the continual use of technology. This includes the "IS continuance model" recommended by [127]. Diverse types of research have been conducted to more effectively understand the variables that impact social media addiction. The findings vary. For example [128], identified and examined Internet addiction and higher rates of Facebook addiction. Moreover, Facebook addiction is highly related to higher levels of loneliness and social anxiety [3]. Interesting results were revealed by the study of [129]. They found that individuals with more online social ties tended to experience higher levels of Facebook addiction. Moreover, an elevated number of offline social ties correlated with lower levels of Facebook addiction [130]. found that social anxiety has a positive relationship with social media addiction amongst young adults in China. Love failures, stressful lifestyles, domestic violence, and sleep disturbances were among the other variables shaping Facebook addiction [131]. Furthermore, continual technology use was another determining variable.

Facebook addiction is interesting because the addictive behaviours linked to Facebook are related to user experiences, positive emotions, and the fulfilment of needs during initial experiences, regardless of successive experiences [132]. This means that Facebook addiction would support the continued use of Facebook despite the platform's subsequent failure to meet the needs of the users. This is because users recall the initial positive emotions they experience when using Facebook [133]. Accordingly, Facebook addiction is related to the continual use of Facebook by its users. Moreover, it has been found that the relationship between Facebook addiction and satisfaction is not universal. For example, Facebook addiction in Italy was associated with higher levels of satisfaction while Facebook addiction in the United States was associated

with lower levels of satisfaction [128]. Moreover, other results revealed that there was no direct relationship between Facebook addiction and satisfaction [134].

The previous examples revealed that there is an established body of research that focuses on Facebook addiction. In some cases, the effect of Facebook addiction is examined as either a dependent or independent variable. However, in other cases, the debate continues. Consequently, Facebook addiction remains a new area of research that requires further examination and refinement [135]. For example, the moderating effect of Facebook addiction in different relationships has been insufficiently explored. Accordingly, the following is proposed:

**H11.** Facebook addiction could have a significantly positive moderating effect on the impact of satisfaction on continuance intention.

#### 4. Research model

The current study suggests that perceived security, perceived privacy, and trust comprise important antecedents to customer satisfaction. Hence, they indirectly influence Facebook continuance intention (see Figure 2). Moreover, trust and satisfaction mediate the relationship between perceived privacy and continuance intention and between perceived security and continuance intention. Furthermore, Facebook addiction has a moderating effect on the impact of satisfaction and continuance intention.

##### 4.1. Measurement development

Six variables were measured in this research: perceived privacy, perceived security, trust, satisfaction, continuance intention, and Facebook addiction, see Table 2. These variables were operationalized from previously validated studies where standard measures were used [32, 35, 38, 40, 50, 97]. A Likert scale ranging from 1- 5 is used to measure the questionnaire items for the six variables, where one refers to "strongly disagree" and five denotes "strongly agree". The preliminary instrument was a pilot test involving ten semistructured interviews with Facebook users and five interviews with professors from the School of Business at the University of Jordan to test the completeness, relevance, clarity, and length of the questionnaire. This process led to numerous minor adjustments to the survey questions.

##### 4.2. Survey description

An online-based survey designed using Microsoft Forms was used to collect data from targeted participants with Facebook experience. Mainly, we posted the survey link with descriptions about the research purposes and details via several platforms such as Facebook pages and Microsoft Teams groups. Undergraduate business students from the University of Jordan who were interested in participating in this study were directed to the online questionnaire through the survey link. Then, they started the survey upon providing their consent to participate. The study was conducted between the 10th of January 2020 and the 15th of February 2020. A total of 468 students were randomly chosen and volunteered to complete the questionnaire. We eliminated the data of 18 respondents with significant missing data, and the data of 450 respondents were used in the analysis, which led to a response rate of 96%.

According to the University of Jordan registration unit, the study population consisted of 4,000 undergraduate students from the School of Business. The current research project was conducted by the researchers and approved by the ethical committee of the School of Business at The University of Jordan (UoJ). Additionally, the researchers explained the purpose of the study to the participants and obtained informed consent from those who participated in the survey. Hence, both the research process and questionnaire were approved appropriately.

Participants were randomly selected from the student population. However, there is uncertainty as to what constitutes an adequate sample

**Table 2.** Questionnaire items.

Construct	Item #	Measure
Facebook Addiction [50]	FA1	Using my Facebook site sometimes interfered with other activities.
	FA2	I have made unsuccessful attempts to reduce the time I interact with my Facebook site.
	FA3	Arguments have sometimes arisen at home because of the time I spend on my Facebook site.
	FA4	I think that I am addicted to Facebook site.
Continuance Intention [35, 39]	CI1	If could, I will continue using Facebook.
	CI2	I will recommend my friends and family members to use Facebook.
	CI3	I will continue using Facebook in the future.
	CI4	My intentions are to continue using Facebook service rather than any alternative.
Satisfaction [35, 38]	SA1	I was very content with Facebook
	SA2	I was very pleased with Facebook
	SA3	I felt delighted with Facebook
	SA4	Overall, I was satisfied with Facebook
Perceived Security [32, 35, 97]	PS1	I would feel secure sending sensitive information across the Facebook sites.
	PS2	I would feel totally safe providing sensitive information about myself over the Facebook sites.
	PS3	The Facebook sites are a secure means through which to send sensitive information.
	PS4	Overall, the Facebook sites is a safe place to transmit sensitive information.
Perceived Privacy [32, 35, 97]	PP1	I rethink when I post my personal information Facebook sites
	PP2	When I use Facebook sites, protecting personal privacy is an important issue
	PP3	When I use Facebook sites, it usually bothers me when other people ask me personal information
	PP4	When I use Facebook sites, I am worried about providing personal information to so many people
Trust [35, 40]	TR1	People on Facebook are trustworthy.
	TR2	I trust Facebook information to be true.
	TR3	I usually trust Facebook unless it gives me a reason not to trust it.
	TR4	Overall, Facebook are trustworthy.
	TR5	Facebook do respect and would not abuse my private information and browsing log history.
	TR6	The security guard and mechanism of Facebook are trustworthy.

size for regression analysis. Some researchers recommend that the sample size of a study that applies structural equation modelling should be either 100 participants or more than five times the number of items measured [136]. The questionnaire consisted of 32 items, suggesting that the sample size should be over 160 students. Krejcie (1970) suggested that a sample of 351 participants from a population of 4,000 was preferable, and Hair (2014) recommended a sample size of between 100 and 200 participants [137, 138]. The number of returned surveys is 450, which meets the sample size requirement for a structural equation model and shows adequate representation with the highest probability assessment.

**4.3. Respondents' demographic information**

As we mentioned before, a total of 450 responses were used in the analysis. Table 3 summarizes the respondent characteristics. The table shows that 306 participants were female (68%), and 144 participants were males (32%). Many of the participants were from 20–23 years old (347, 77.1%), followed by 17–19 years old (66, 14.7%) and 23 years old

**Table 3.** Characteristics of the research sample (n = 450).

Measure	Items	Frequency	Percentage %
Gender	Male	144	32
	Female	306	68
	Total	450	100
Age	17–19	66	14.7
	20–23	347	77.1
	23 and above	37	8.2
	Total	450	100
Academic Level (Year)	First	20	4.4
	Second	129	28.7
	Third	141	31.3
	Fourth	129	28.7
	Fifth and above	31	6.9
	Total	450	100
Students spend on Social Networking activities daily (Hour)	Less than 1	46	10.2
	1–3	180	40
	4–6	159	35.3
	More than 6	65	14.4
Total	450	100	
Weeks of Using Facebook Sites	Less than 10 weeks	43	9.6
	10–29 weeks	134	29.8
	30–50 weeks	137	30.4
	More than 50 weeks	136	30.2
	Total	450	100

and above (37, 8.2%). Furthermore, most respondents were in their first, third, or fourth years of education (399, 88.7%), followed by first- and fifth-year and above students (51, 11.3%). With respect to the number of hours spent on Facebook every day, most participants used Facebook from 1–3 hours daily (180, 40%), from 4–6 hours per day (159, 35.3%), and more than 6 hours (65, 14.4%). As for the number of weeks using Facebook, most participants had used Facebook for 30–50 weeks (137, 30.4%) or more than 50 weeks (96, 30.2%), followed by 10–29 weeks (134, 29.8%) and less than 10 weeks (43, 9.6%).

**5. Data analysis and results**

**5.1. Reliability and validity**

The data were checked for missing values, and none were found. Outlier detection was performed by using the Mahalanabis test. The test indicates the existence of (70) outliers; however, after testing the model fit with and without the outliers, the results indicated that a better model fit is found when keeping all the data. Moreover, no differences in the means were found between the two cases. Accordingly, the outliers were kept.

Since a self-reported method was used for data collection, common method variance was a potential issue. Thus, to avoid this issue, Harman's single-factor test was run, and all the items of the questionnaire were entered into exploratory factor analysis [139]. Four variables with eigenvalues higher than one were identified; and the % variances of the factors were 27.855, 17.338, 8.92, and 7.806, respectively. The highest factor accounted for less than 50% of the variance. Accordingly, since no single factor was responsible for most of the variance, common method bias was not an issue in this research.

The research variables were tested for internal consistency, and the Cronbach's alpha and composite reliability showed acceptable internal consistency with  $\alpha > 0.7$  [140, 141]. The item standardized factor

loadings are presented in Table 4, and in the table shows that all the variables had loadings above 0.55 [142]. The discriminant validity of the study variables was assessed by comparing the variance captured by the construct and the shared variance with other constructs [140]. After assessing the correlation with the square root of the average variance extracted (AVE) of all the research variables, two items had to be deleted from satisfaction and continuous intention due to high correlations and cross-loading (A26 and A22). All the values of the square root of the AVE were more substantial than the correlation of the construct with other constructs, as shown in Table 5. Hence, the discriminant validity was adequate. The model fit index cut points taken from Hair et al. (2011) and Harrington (2009) were Goodness-of-Fit Index (GFI) > 0.9, CFI > 0.9, IFI > 0.9, RMSEA < 0.08 and CIMN/df < 3 [141, 142]. In conclusion, the scales demonstrate acceptable convergent validity and reliability in addition to a good model fit.

Table 5 shows that the research variables are within normal levels (-1 to +1) [143]. The highest mean score among the research variable scores was for continuous intention (3.5068), followed by privacy concerns. Conversely, the lowest mean score was for trust (1.849). The mean score values indicate the respondents' attitudes towards the scale items. Regarding correlation values Table 5 shows that privacy concerns have an insignificant correlation with both security and trust ( $r = 0.132, p > 0.05$  and  $r = -0.029, p > 0.05$ , respectively).

5.2. Hypothesis testing

To test hypotheses H1 to H8, structural equation modelling was used, and the model was created in AMOS. The results indicated an adequate model fit:  $\chi^2/df = 2.114 < 3$ , GFI = 0.936 > 0.9, CFI = 0.957

> 0.9, IFI = 0.958 > 0.9 and RMSEA = 0.050 < 0.08 [141]. The standardized regression weights are illustrated in Figure 3, and the regression weights are shown in Table 6. The results confirm that hypotheses 1, 2, 5, 6 and 7 were supported while hypotheses 3, 4 and 8 were not supported.

5.3. The mediation paths

To test the mediation paths, two models were created in AMOS. The first model tested the path privacy concerns-trust-satisfaction-continuous intention. The model demonstrated an adequate fit:  $\chi^2/df = 2.791 < 3$ , GFI = 0.942 > 0.9, CFI = 0.937 > 0.9, RMSEA = 0.063 < 0.08 [141]. The total effect of privacy on continuous intention was significant (B = 0.198,  $p = 0.006 < 0.05$ ), and the direct effect of privacy on continuous intention was significant (B = 0.197,  $p = 0.004 < 0.05$ ). However, the indirect path showed an insignificant effect (B = 0.002,  $p = 0.989 > 0.05$ ). This indicates that the effect of privacy concerns that passes through both trust and satisfaction does not affect continuous intentions. The results are presented in Table 7 and Figure 4.

The second model tests the path security-trust-satisfaction-continuous intention. The model demonstrated an adequate fit:  $\chi^2/df = 2.463 < 3$ , GFI = 0.945 > 0.9, CFI = 0.963 > 0.9, RMSEA = 0.057 < 0.08 [141]. The total effect of privacy on continuous intention was significant (B = 0.156,  $p = 0.014 < 0.05$ ), and the direct effect of security on continuous intention was insignificant (B = 0.043,  $p = 0.506 > 0.05$ ). However, the indirect path showed a significant positive effect (B = 0.113,  $p = 0.007 < 0.05$ ). This result indicates that the security effect that passes through both trust and satisfaction affects continuous intentions significantly. The results are presented in Table 7 and Figure 5.

Table 4. Validity and reliability.

Variables	Standardized Factor Loading	Estimate	S.E.	C.R.	P	AVE	CR	Cronbach- $\alpha$
Trust						0.500	0.765	0.763
Trust 4	.639	1.000						
Trust 3	.654	1.102	.105	10.532	<0.001			
Trust 2	.727	1.147	.103	11.175	<0.001			
Trust 1	.659	1.027	.097	10.576	<0.001			
Privacy						0.500	0.767	0.765
Privacy 1	.726	1.000						
Privacy 2	.748	1.002	.080	12.518	<0.001			
Privacy 3	.642	.805	.071	11.384	<0.001			
Privacy 4	.565	.739	.073	10.195	<0.001			
Security						0.640	0.877	0.875
Security 1	.806	1.000						
Security 2	.862	1.066	.054	19.875	<0.001			
Security 3	.837	1.058	.055	19.293	<0.001			
Security 4	.691	.880	.058	15.283	<0.001			
Satisfaction						0.626 $\downarrow$	0.855	0.851
Satisfaction 1	.800	1.000						
Satisfaction 2	.812	1.027	.056	18.459	<0.001			
Satisfaction 3	.810	1.006	.055	18.416	<0.001			
Satisfaction 4	.657	.843	.059	14.305	<0.001			Removed
Continuous Intention						0.603 $\downarrow$	0.828	0.824
Continuous Intention 1	.850	1.000						
Continuous Intention 2	.704	.858	.054	16.027	<0.001			
Continuous Intention 3	.761	.877	.050	17.686	<0.001			
Continuous Intention 4	.630	.734	.053	13.943	<0.001			Removed
Model fit indices: GFI = 0.901, CFI = 0.926, IFI = 0.926, RMSEA = 0.057, CMIN/df = 2.409								

$\downarrow$  AVE values for both satisfaction and continuous intentions were calculated with the exclusion of the removed items. The original AVE values were (0.597 and 0.549).  
 \*Although the AVE is less than 0.5, according to Fornell & Larcker (1981, p.46), AVE is more conservative criteria than C.R. Accordingly, if the C.R. is higher than 0.7, an AVE less than 0.5 can be accepted.



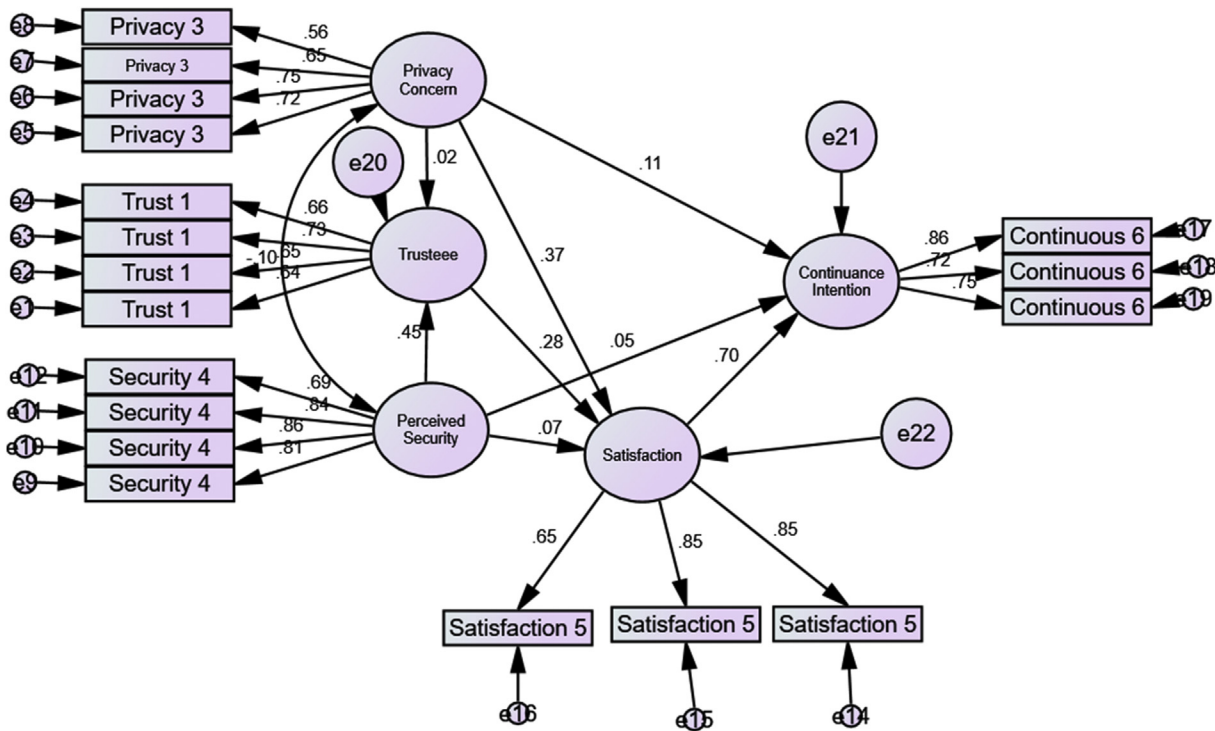
**Table 5.** Correlations and descriptive statistics.

Variable	2	3	4	5	6	Mean	SD	Skewness	Kurtosis
1 Continuanace Intention	<b>0.777</b>					3.5068	.84496	-.699	.446
2 Satisfaction	0.747**	<b>0.791</b>				3.3206	0.7951	-.601	.535
3 Perceived Security	0.155*	0.149**	<b>0.8006</b>			2.172	0.8764	0.218	-0.828
4 Privacy Concern	0.356**	0.399**	-0.101	<b>0.7416</b>		3.385	0.7946	-0.722	0.188
5 Trust	0.266*	0.312*	0.447*	-0.029	<b>0.7416</b>	1.849	0.5632	0.209	-0.091

Bold Italic diagonal values represent the square root of the AVE values.

\*\* Correlation is significant at the 0.01 level (2-tailed).

\* Correlation is significant at the 0.05 level (2-tailed).



**Figure 3.** Standardized loadings for the path analysis.

**Table 6.** Regression weights (H1 to H8).

Hypothesis	Estimate	S.E.	C.R.	P	Result
H1	0.75	0.06	12.597	<0.001	Sig.
H2	0.379	0.087	4.345	<0.001	Sig.
H3	0.064	0.054	1.193	0.233	Insig.
H4	0.053	0.043	1.222	0.222	Insig.
H5	0.355	0.055	6.409	<0.001	Sig.
H6	0.114	0.052	2.179	0.029	Sig.
H7	0.307	0.042	7.228	<0.001	Sig.
H8	0.012	0.041	0.286	0.775	Insig.

**5.4. The moderating effect**

To calculate the moderating effect of addiction on the direct relation between satisfaction and continuous intention, aggregated variables were created based on the weighted average of the variables. The test was conducted using the PROCESS macro (v 3.3) by Hayes et al. (2017) [144]. The analysis was performed in this way since the PROCESS macro conducts focal predictor analysis of the moderators and data at different

**Table 7.** Mediation analysis (H9 and H10).

	Total effect	Direct effect	Indirect effect	Result
H9:Privacy-Trust-Satisfaction-Continuous Intention (path)	0.198 (p = 0.006 < 0.05)	0.197 (p = 0.004 < 0.05)	0.002 (p = 0.989 > 0.05)	The mediation path is insignificant
H10:Security-Trust-Satisfaction-Continuous Intention (path)	0.156 (p = 0.014 < 0.05)	0.043 (p = 0.506 > 0.05)	0.113 (p = 0.007 < 0.05)	The mediation path is significant (Full mediation)

levels to provide a graphical representation. According to Hayes et al. (2017), some differences between the results obtained from the SEM and PROCESS may appear, mainly when the SEM uses observed items and latent variables rather than depending on latent variables alone. However, since the moderation test will need aggregated variables (i.e., latent), regardless of whether we are use the SEM or PROCESS, trivial differences should appear. We decided to use the PROCESS macro by Hayes due to its advantages regarding the focal prediction and the graphical representation mentioned above.

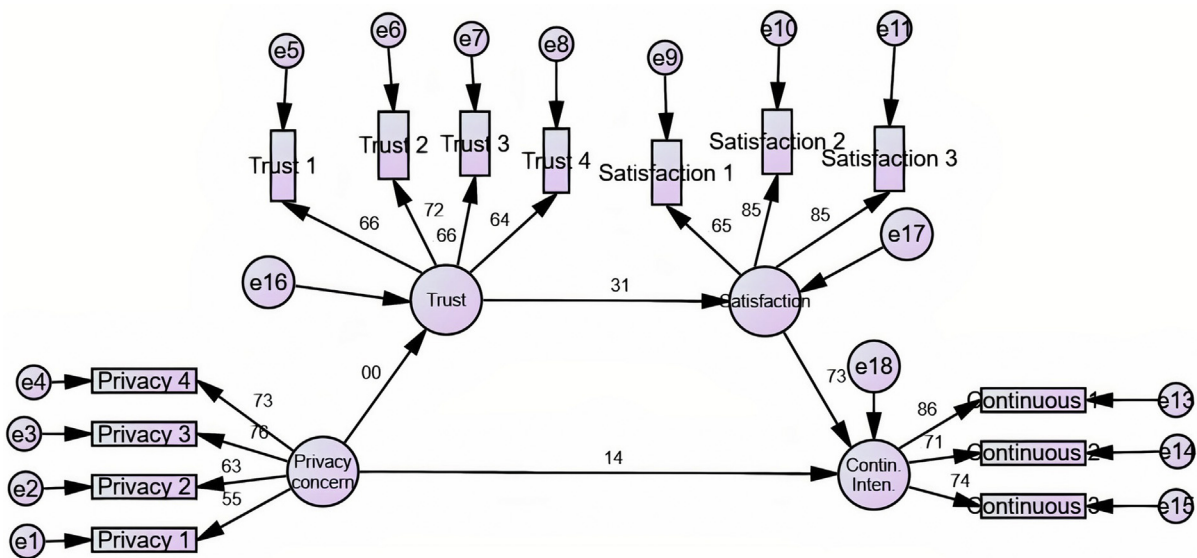


Figure 4. Mediation path H9.

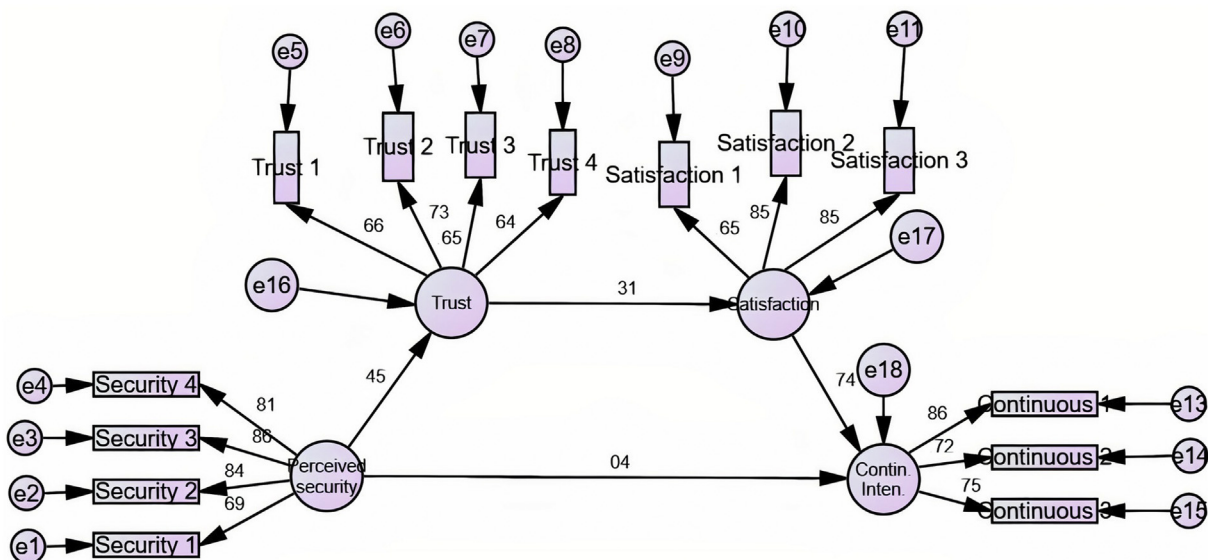


Figure 5. Mediation path H10.

The variables were standardized, and then the interaction effect was calculated by multiplying the Z-value of addiction with the Z-value of satisfaction. Then, a regression path was created. In this study, the moderating influence of addiction on the relationship between satisfaction and continuance intention (H11) is revealed. High addiction values decrease the effect of satisfaction on continuance intention. However, when addiction is low, satisfaction will exert a strong influence on continuance intention. Table 8 indicates that the interaction term is negative and significant ( $B = -.093, p < 0.0000$ ). The conditional effects indicate that when addiction increases, the effect of satisfaction on continuous intention decreases. Figure (6) shows the nature of the interaction effect between satisfaction and addiction on continuous intention.

## 6. Discussion

With the growing popularity of SNSs in educational contexts, understanding student SNS continuance intention has become an essential topic for both practitioners and academics. This study investigates the

factors that influence the SNS continuance intention of students through the integration of the IS success model with perceived privacy, perceived security, and trust. Moreover, this research investigates the serial multiple mediating roles of trust and satisfaction on the relationship between perceived security and continuance intention and the relationship between perceived privacy and continuance intention. This research also investigates the moderating role of Facebook addiction on the relationship between satisfaction and continuance intention. The results reveal that most of the proposed hypotheses are confirmed. Only four of the proposed hypotheses are not accepted (H3, H4, H8, and H9).

In discussing the first hypothesis (H1), which proposed that satisfaction positively influences continuance intention, the results showed ample support for this hypothesis. The findings confirm that satisfaction is the key determinant of Facebook user continuance intention. Thus, Facebook managers should enhance user satisfaction to increase continuance intention by providing new services and tools to guarantee user satisfaction. This result is consistent with [15] that found that IT user continuance behaviour is positively influenced by satisfaction with prior IT usage [15]. This finding was also supported by previous research that

**Table 8.** Moderation analysis (H11).

Independent	Effect	S.E.	LLCI	ULCI	Result
Z score-Addiction	0.0508	0.0306	-.0106	.1086	
Z score-Satisfaction	0.7685	0.0302	.7102	.8287	
Interaction term	-0.0932	0.0184	-.1307	-.0586	Significant moderation
Conditional effects of the focal predictor at values of the moderator					
Level of moderator	Effect of Sat → Cont. Int.	S.E.	t	p	(ULCI, LLCI)
(-1SD)	0.9156	0.0345	26.554	0.000	(0.8479, 0.9834)
(Mean)	0.8167	0.0324	25.1844	0.000	(0.7529, 0.8804)
(+1 SD)	0.7177	0.0447	16.0683	0.000	(0.6299, 0.8054)
Dependent: Z score-Continuous intention					
The analysis was bootstrapped 5000					

reported that user satisfaction with social networking system contents and features had a positive relationship with continued use [73]. Consequently, the empirical results suggest that the most essential antecedent of Facebook continuance intention is satisfaction, which is also consistent with the findings of [68, 69, 70]. Therefore, higher Facebook user satisfaction leads to higher continuance intention to use the platform. Thus, Facebook managers should enhance user satisfaction to increase continuance intention by providing new mechanisms and tools to guarantee the privacy of Facebook and user satisfaction.

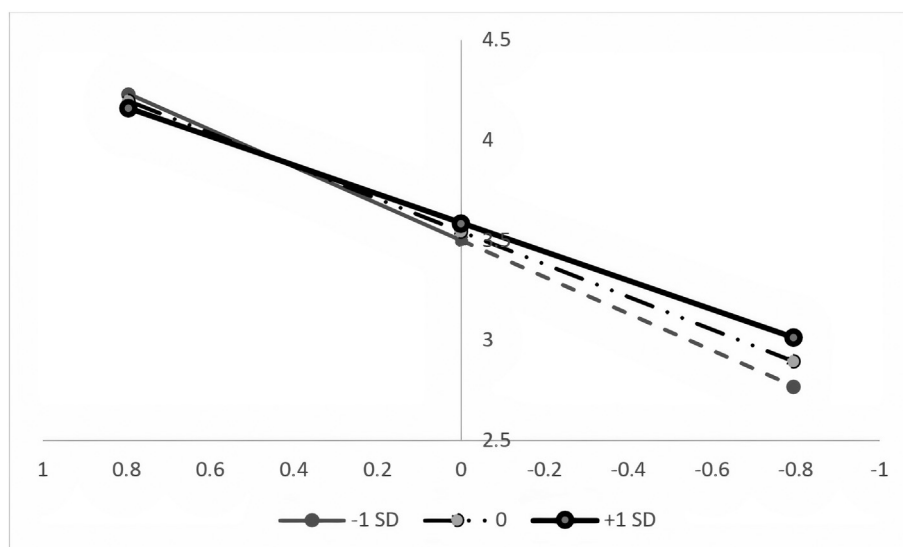
The second hypothesis (H2) proposed that trust positively influences user satisfaction, and the analysis results supported this hypothesis. This result also agrees with previous studies [83]. They found that trust increased user satisfaction and that this, in turn, positively influenced reuse intention [83]. Consequently, this finding demonstrates the positive impact of trust as a determinant of Facebook users' satisfaction. Thus, the results also indicated that trust is the main factor that positively influences Facebook user satisfaction.

H3 proposed that perceived security increases satisfaction while using Facebook, and H4 proposed that perceived security increases continuous intentions to use Facebook. The analysis results confirmed that neither hypothesis is supported in the context of Facebook continuance

intention. The analysis results showed that perceived security did not influence student satisfaction or Facebook continuance intention. Consequently, perceived security did not appear to be an important motivation behind the satisfaction or continuance intention to use Facebook. This result is inconsistent with the results of previous findings [96, 99]. A possible explanation for this is that Facebook users lack knowledge regarding security issues and are satisfied with the Facebook cybersecurity system. Another explanation is that Facebook users did not face any serious security issues, and they obtained the services smoothly without any security issues.

Hypothesis H5 proposed that perceived privacy increases users' satisfaction, and hypothesis H6 proposed that perceived privacy increases Facebook continuance intention. The findings of this research supported both of these hypotheses. This finding confirmed the significant positive impact of perceived privacy on user satisfaction and Facebook continuance intention, and the results were supported by previous research studies [87, 96, 98]. Thus, perceived privacy is a key determinant of Facebook satisfaction and continuance intention. These results indicate that perceived privacy in the services provided by the website positively impacts users' satisfaction and their Facebook continuance intention. Facebook users can be satisfied if they are pleased with the information, contents, and services provided on the platform. As a result, while Facebook provides users with the intended services with minimum privacy risk and violations, users will maintain their intentions to use the Facebook platform.

Hypothesis (H7) proposes that perceived security positively impacts users' trust. The analysis results also showed that perceived security positively influences student trust in Facebook. This finding is consistent with previous research in this field [33, 75]. This demonstrates that the perception of higher control of Facebook and its service strongly influence student confidence in the website. If students are less concerned about their personal information being accessed by unauthorized or illegal users, this will strongly increase students' trust in Facebook. In contrast, the analysis result of H8, which proposed that perceived privacy positively influences users' trust, showed that perceived privacy is not a determinant of perceived trust. The significance of perceived privacy compared with perceived security for trust is considered low because Facebook guarantees almost total privacy through its security characteristics. Another possible explanation is that regarding users' trust, Facebook users may be more aware of its security than its privacy. This finding is consistent with [43, 75, 89]. Empirical research has effectively demonstrated that perceived security has a stronger impact on trust than perceived privacy [89]. Moreover, existing research has found that



**Figure 6.** Moderating effect of addiction on the relation between satisfaction (X-axis) and continuance intention (Y-axis).

unauthorized access to some personal healthcare information is not regarded as a critical issue for many users because younger users are less likely to consider privacy than older users [107]. Other research has shown that while users are concerned about their privacy, many are prepared to trade their privacy for rewards [108]. Therefore, the need for guarantees regarding total privacy through security characteristics and the importance of privacy were lower for these users. Thus, Facebook managers should improve users' perception of web security to enhance user trust.

H9 proposed that trust and satisfaction mediate the relationship between perceived privacy and continuance intention. H9 tests the indirect effect of perceived security on Facebook continuance intention through serial multiple full mediating effects of trust and satisfaction, and the results of this study support the hypothesis. This result confirmed that perceived security has an indirect effect on Facebook continuance intention through the positive serial multiple mediating effects of trust and satisfaction on the relationship. Thus, the fully mediating effects of trust and satisfaction on the relationship between perceived security and continuance intention corresponds to their very important roles in continuance intention. This indicates that trust and satisfaction are essential for the mediation of the relationship between perceived security and continuance intention. Consequently, Facebook managers must introduce new procedures to encourage users to provide and share authentic data with other users.

H10 proposed that trust and satisfaction mediate the relationship between perceived security and continuance intention. The empirical results show that the indirect effect of perceived privacy on Facebook continuance usage intention through serial multiple mediating effects of trust and satisfaction was nonsignificant. One explanation for this finding might be the age of the study participants. Most participants (77%) were aged 17 to 23. Individuals in this age category might be unaware of the risks of using social media platforms.

Finally, the last hypothesis (H11) proposed that Facebook addiction could have a significantly negative moderating effect on the impact of satisfaction on continuance intention. The results confirm the moderating role of Facebook addiction on satisfaction and continuance intention. This verified the negative significant moderating role of addiction on the relationship between satisfaction and continuance intention. The analysis showed that a high level of addiction would reduce the effect of satisfaction on continuance intention. However, when addiction is low, satisfaction will exert a strong influence on continuance intention. Furthermore, the conditional effect indicates that whenever addiction increases, the effect of satisfaction on continuous intention decreases. In contrast, the impact of satisfaction on continuance usage intention is low because Facebook addiction is high. To conclude, there is a negative relationship between the impacts of satisfaction and continuance intention and the level of user addiction. Thus, future research might explore other factors that positively influence continuance usage intention with high levels of addiction.

## 7. Implications

### 7.1. Theoretical implications

The researchers developed the proposed model of continuance usage intention to test and validate the impact of integrating important factors, namely, satisfaction, trust, perceived privacy, and perceived security. The design of this model is based on an extension of the IS success model with trust, perceived privacy, and perceived security as antecedents. The empirical results confirmed the significant impact of perceived privacy and trust on Facebook user satisfaction. Additionally, the analysis results confirmed that trust and satisfaction fully mediate the relationship between perceived security and continuance intention. Finally, the negative moderating effect of Facebook addiction on the impact of satisfaction and the continued intention to use Facebook services is confirmed as the level of Facebook user addiction is high and the impact of satisfaction on

continuance intention is low. To conclude, this research has strengthened the current understanding of Facebook continuance intention among university students by confirming the essential roles of perceived privacy and satisfaction in Facebook continuance intention and confirming the full mediation of the relationship between perceived security and continuance intention. Additionally, the proposed model adds to the present state of knowledge regarding the negative influence of Facebook addiction as a moderator on the relationship between satisfaction and continuance intention.

### 7.2. Practical implications

For Facebook managers, this research discloses important factors influencing user continuance intention once Facebook services have been experienced. When Facebook managers strategize to increase the user continuance intention rate of Facebook use, they must consider these determinants. This study confirms that user satisfaction is a crucial determinant of increased continuance intention use. Thus, Facebook managers must improve user satisfaction by ensuring that user requirements and desires are satisfied through efficient and effective actions. The results show that user concerns about the provision of personal information through Facebook is often minimal. Furthermore, satisfying the need to maintain user privacy increases Facebook user satisfaction, which influences continuance intention. Therefore, Facebook managers must maintain user privacy to increase the levels of user satisfaction and continuance intention. This involves protecting private information and preventing unauthorized information disclosures. Moreover, the analysis indicates that perceived security impacts Facebook user trust. Consequently, Facebook managers must ensure that the requisite security mechanisms are in place to increase user trust.

The impact of perceived privacy on trust concerns was not evident in the Jordanian context. Therefore, conducting further research to explain this finding, which differs from the research conducted in westernized countries, represents a valuable direction for future research. Moreover, this finding has professional implications. Initially, increasing awareness amongst Facebook users regarding Facebook privacy issues in Jordan appeared to be essential for both professionals and policymakers. Specifically, it was assumed that professionals and policymakers could capitalize on this and develop campaigns, training programmes, workshops and seminars targeting social media users to develop best practice responses to privacy and security concerns. Increasing this awareness will improve user satisfaction and continuance intention. Second, the recent Cambridge Analytics data scandal involving the collection of the information of up to 87 million Facebook users raises many concerns about security breaches amongst Facebook users. The seriousness of this issue has resulted in the company's CEO being questioned by a US Congress panel. Each country should take measures to confront any similar threats to safeguard the data of its citizens. Moreover, there is ample opportunity for policymakers to craft more effective preventative policies covering procedures, measures, and countermeasures to support safe and effective online social transactions and practices. The perception of high levels of security increases student trust and indirectly influences continuance intention. Thus, Facebook managers and stakeholders must focus on the maintenance of high levels of security by improving security features and controlling the authorized access to the personal information of users.

## 8. Conclusion

One way in which social networks can ensure that their services are continuously used is by ensuring the quality of initial experiences. This study has verified the integrated factors essential to Facebook continuance intention. The proposed model employed in this study is based on the integration of the IS success model with perceived privacy, perceived security, and trust. The results confirmed that perceived privacy and satisfaction play important roles in influencing Facebook user

continuance intention. In other words, the research verified the existence of significant positive impacts of satisfaction and perceived privacy on Facebook continuance intention. It also confirmed the positive influence of trust and perceived privacy on satisfaction.

Moreover, the study findings showed that satisfaction is the key determinant of Facebook users' continuance intention. The empirical results confirmed the significant serial multiple mediating effect of trust and satisfaction on the relationship between perceived security and increased continuance intention. Finally, this study also confirmed the negative influence of Facebook addiction as a moderator on the relationship between satisfaction and continuance intention. Finally, current conditions indicate that Facebook managers and stakeholders must utilize all possible sources and approaches to increase user perceptions of security, privacy, trust, and satisfaction.

## 9. Limitations and future research

In this study, the data were collected from undergraduate students from one university in Jordan (the University of Jordan). This limits our ability to generalise the results to other contexts and to conclude on the causal relations between the examined variables of the proposed research model of this study with more confidence. Further research can test the proposed model in different contexts and cultures. Thus, the antecedents and outcomes of Facebook continuance intention in different national cultures can be determined by testing this model in new settings and countries. Additionally, an online survey was used to collect data, which may have created common method variance/bias. Thus, we suggest that future research can employ different data collection methods (i.e., qualitative). Additionally, the proposed model in this study can be tested with a new data set collected from other age categories, other universities, and other contexts and develop more generalizable results.

The model employed in this research to test the Facebook platform could also be utilized in future research to test other social network platforms and other user groups of users. Moreover, future research could apply the model to developed countries to compare the results with those of developing countries. Other studies can explore other factors that potentially have positive influences on continuance intention. Finally, this study tested the moderating role of addiction on the relationship between satisfaction and continuance intention. Thus, future research might explore other factors that positively or negatively influence the relationship between satisfaction and continuance intention as moderating factors. To conclude, the findings of this research are of utmost significance to the literature on this topic and hope to be followed by further crucial research to shed more light on their importance.

## Declarations

### Author contribution statement

Mahmoud Maqableh: Conceived and designed the experiments; Performed the experiments; Contributed reagents, materials, analysis tools or data; Wrote the paper.

Hazar Y. Hmoud: Contributed reagents, materials, analysis tools or data; Wrote the paper.

Mais Jaradat, Ra'ed Masa'deh: Analyzed and interpreted the data; Wrote the paper.

### Funding statement

This research did not receive any specific grant from funding agencies in the public, commercial, or not-for-profit sectors.

### Data availability statement

Data will be made available on request.

## Declaration of interests statement

The authors declare no conflict of interest.

## Additional information

No additional information is available for this paper.

## References

- [1] H. Tankovska, Most Popular Social Networks Worldwide as of January 2021, Ranked by Number of Active Users, Glob. Soc. Networks Rank. By Number Users 2021, 2021. <https://www.statista.com/statistics/272014/global-social-networks-ranked-by-number-of-users/>.
- [2] J. Clement, Facebook Usage in the United States - Statistics & Facts, Statista, 2020. <https://www.statista.com/topics/5323/facebook-usag>. <https://www-statista-com.esc-web.lib.cbs.dk:8443/study/63766/facebook-usage-in-the-united-states/>.
- [3] D. Marengo, I. Poletti, M. Settanni, The interplay between neuroticism, extraversion, and social media addiction in young adult Facebook users: testing the mediating role of online activity using objective data, *Addict, Beyond Behav.* 102 (2020) 106150.
- [4] Z. Bao, Exploring continuance intention of social networking sites: an empirical study integrating social support and network externalities, *Aslib J. Inf. Manag.* 68 (2016) 736–755.
- [5] K. Alaslani, M. Alandejani, Identifying factors that influence students' performance through social networking sites: an exploratory case study, *Heliyon* 6 (2020), e03686.
- [6] Lyfemarketing, 30 Social media Marketing Statistics that Will Change Your Thinking, 2018. <https://www.lyfemarketing.com/blog/social-media-marketing-statistics/>. (Accessed 16 July 2020).
- [7] A. Oulasvirta, T. Rattenbury, L. Ma, E. Raita, Habits make smartphone use more pervasive, *Pers, Ubiquitous Comput.* 16 (2012) 105–114.
- [8] F. Report, GlobalWebIndex's Flagship Report on the Latest Trends in Entertainment, 2018. [https://insight.globalwebindex.net/hubfs/GWI\\_Social\\_Summary\\_Q3\\_2017.pdf](https://insight.globalwebindex.net/hubfs/GWI_Social_Summary_Q3_2017.pdf).
- [9] L. Pérez-altable, The Arab Spring before the Arab Spring: a case study of digital activism in Tunisia, *Global Media J.* 4 (2016) 19–32.
- [10] Zephoria.com, The Top 20 Valuable Facebook Statistics, Zephoria Digit. Mark., 2020. <https://zephoria.com/top-15-valuable-facebook-statistics/>.
- [11] E. Yeboah-asiamah, B. Narteh, M.A. Mahmoud, E. Yeboah-asiamah, B. Narteh, M.A. Mahmoud, Preventing customer churn in the mobile telecommunication industry: is mobile money usage the missing link? *J. Afr. Bus.* 19 (2018) 174–194.
- [12] L. Fang, Q. Liu, Mobile SNS addiction and user continuance: an empirical investigation of wechat, *Teh. Vjesn.* 26 (2019) 1104–1111.
- [13] C. Wang, T.S.H.H. Teo, L. Liu, Perceived value and continuance intention in mobile government service in China, *Telemat, Informatics* 48 (2020) 101348.
- [14] T. Zhou, An empirical examination of continuance intention of mobile payment services, *Decis. Support Syst.* 54 (2013) 1085–1091.
- [15] A. Bhattacharjee, C.P. Lin, A unified model of IT continuance: three complementary perspectives and crossover effects, *Eur. J. Inf. Syst.* 24 (2015) 364–373.
- [16] W. Zong, J. Yang, Z. Bao, Social network fatigue affecting continuance intention of social networking services: the case of WeChat users in China's universities, *Data Technol, Appl* 53 (2019) 123–139.
- [17] M.C. Bölen, Exploring the determinants of users' continuance intention in smartwatches, *Technol. Soc.* 60 (2020).
- [18] H. Yaseen, M. Alhusban, A. Alhosban, K. Dingley, Making sense of E-commerce customers awareness in a developing country Context: a framework for evaluation, *Electron. J. Inf. Syst. Eval.* 20 (2017) 102–115.
- [19] Internet world stats, Middle East Internet Users, Population and Facebook Statistics 2021, 2021. <https://www.internetworldstats.com/middle.htm>.
- [20] J. Degenhard, Forecast of the Number of Facebook Users in Jordan from 2017 to 2025, Statista, 2021. <https://www.statista.com/forecasts/1136415/facebook-users-in-jordan>.
- [21] statcounter.com, Social Media Stats Jordan (June 2020 - June 2021), Glob. Stats, 2021. <https://gs.statcounter.com/social-media-stats/all/jordan>. (Accessed 7 June 2021).
- [22] S.E. Chang, A.Y. Liu, W.C. Shen, User trust in social networking services: a comparison of Facebook and LinkedIn, *Comput. Hum. Behav.* 69 (2017) 207–217.
- [23] Z. Meng, H. Shen, H. Huang, W. Liu, J. Wang, A.K. Sangaiah, Search result diversification on attributed networks via nonnegative matrix factorization, *Inf. Process. Manag.* 54 (2018) 1277–1291.
- [24] K. Naveed, C. Watanabe, P. Neittaanmäki, The transformative direction of innovation toward an IoT-based society - increasing dependency on uncaptured GDP in global ICT firms, *Technol. Soc.* 53 (2018) 23–46.
- [25] M. Habes, S.A. Salloum, M. Alghizzawi, C. Mhamdi, The relation between social media and students' academic performance in Jordan: YouTube perspective, *Adv. Intell. Syst. Comput.* 1058 (2020) 382–392.
- [26] S.A. Salloum, M. Al-Emran, K. Shaalan, The impact of knowledge sharing on information systems: a review, *Commun. Comput. Inf. Sci.* 877 (2018) 94–106.
- [27] M. Habes, M. Alghizzawi, R.S. Khalaf, S.A. Salloum, R. Khalaf, M.A. Ghani, The relationship between social media and academic performance: facebook

- perspective, *Int. J. Inf. Technol. Lang. Stud.* 2 (2018) 12–18. <http://journals.sfu.ca/jitls>.
- [28] A. Raikos, P. Waidyasekara, How useful is YouTube in learning heart anatomy? *Anat. Sci. Educ.* 7 (2014) 12–18.
- [29] J. Colwell, K. Gregory, Exploring how secondary pre-service teachers' use online social bookmarking to envision literacy in the disciplines, read, *Horizons* 55 (2016) 62–97. [http://search.ebscohost.com/login.aspx?direct=true&db=eric&AN=EJ1117101&site=ehost-live%0Ahttp://scholarworks.wmich.edu/reading\\_horizons/vol55/iss3/3](http://search.ebscohost.com/login.aspx?direct=true&db=eric&AN=EJ1117101&site=ehost-live%0Ahttp://scholarworks.wmich.edu/reading_horizons/vol55/iss3/3).
- [30] T. Pikkarainen, K. Pikkarainen, H. Karjaluoto, S. Pahnla, Consumer acceptance of online banking: an extension of the technology acceptance model, *Internet Res.* 14 (2004) 224–235.
- [31] Y.C. Ku, R. Chen, H. Zhang, Why do users continue using social networking sites? An exploratory study of members in the United States and Taiwan, *Inf. Manag.* 50 (2013) 571–581.
- [32] A. Balapour, H.R. Nikkhal, R. Sabherwal, Mobile application security: role of perceived privacy as the predictor of security perceptions, *Int. J. Inf. Manag.* 52 (2020) 102063.
- [33] J.C. Roca, J.J. García, J.J. de la Vega, J. José, D. Vega, J.C. Roca, J. Jose, J.J. de la Vega, The importance of perceived trust, security and privacy in online trading systems, *Inf. Manag. Comput. Secur.* 17 (2009) 96–113.
- [34] J. Gao, R. Huang, H. Li, Sub-domain adaptation learning methodology, *Inf. Sci.* 298 (2015) 237–256.
- [35] A. Susanto, Y. Chang, Y. Ha, Determinants of continuance intention to use the smartphone banking services: an extension to the expectation-confirmation model, *Ind. Manag. Data Syst.* 116 (2016) 508–525.
- [36] I. Ahmed, A. Ali, Determinants of continuance intention to use mobile money transfer: an integrated model, *J. Internet Bank. Commer.* 22 (2017) 1–24. <http://www.icommercenral.com>.
- [37] K.L. Hsiao, K.Y. Lin, Y.T. Wang, C.H. Lee, Z.M. Zhang, Continued use intention of lifestyle mobile applications: the Starbucks app in Taiwan, *Electron. Libr.* 37 (2019) 893–913.
- [38] S. Camacho, K. Hassanein, M. Head, Cyberbullying impacts on victims' satisfaction with information and communication technologies: the role of Perceived Cyberbullying Severity, *Inf. Manag.* 55 (2018) 494–507.
- [39] C.B. Zhang, Y.N. Li, B. Wu, D.J. Li, How WeChat can retain users: roles of network externalities, social interaction ties, and perceived values in building continuance intention, *Comput. Hum. Behav.* 69 (2017) 284–293.
- [40] H.-L. Yang, C.-L. Lin, Why do people stick to Facebook web site? A value theory-based view, *Inf. Technol. People* 27 (2014) 21–37.
- [41] L.V. Casalo, C. Flavián, M. Guinaliu, The role of security, privacy, usability and reputation in the development of online banking, *Online Inf. Rev.* 31 (2007) 583–603.
- [42] P. Hanafizadeh, B.W. Keating, H.R. Khedmatgozar, A systematic review of Internet banking adoption, *Telematics Inf.* 31 (2014) 492–510.
- [43] D. Kim, C. Steinfield, Y.-J. Lai, Revisiting the role of web assurance seals in business-to-consumer electronic commerce, *Decis. Support Syst.* 44 (2008).
- [44] B. Kim, J. Min, The distinct roles of dedication-based and constraint-based mechanisms in social networking sites, *Internet Res.* 25 (2015) 30–51.
- [45] S.C. Chen, To use or not to use: understanding the factors affecting continuance intention of mobile banking, *Int. J. Mobile Commun.* 10 (2012) 490–507.
- [46] P.G. Schierz, O. Schilke, B.W. Wirtz, Understanding consumer acceptance of mobile payment services: an empirical analysis, *Electron. Commer. Res. Appl.* 9 (2010) 209–216.
- [47] W.H. DeLone, E.R. McLean, Information systems success revisited, *Proc. Annu. Hawaii Int. Conf. Syst. Sci.* (2002) 2966–2976.
- [48] H. Nysveen, P.E. Pedersen, H. Thorbjørnsen, Intentions to use mobile services: antecedents and cross-service comparisons, *J. Acad. Market. Sci.* 33 (2005) 330–346.
- [49] M.M. Naqshbandi, S. Ainin, N.I. Jaafar, N.L. Mohd Shuib, To Facebook or to Face Book? An investigation of how academic performance of different personalities is affected through the intervention of Facebook usage, *Comput. Hum. Behav.* 75 (2017) 167–176.
- [50] M. Moqbel, N. Kock, Unveiling the dark side of social networking sites: personal and work-related consequences of social networking site addiction, *Inf. Manag.* 55 (2018) 109–119.
- [51] J. Hruska, P. Maresova, Use of social media platforms among adults in the United States—behavior on social media, *Societies* 10 (2020) 27.
- [52] M. Maqableh, M. Abuhashesh, L. Dahabiyeh, M.K. Al Nawayseh, R. Masa'deh, The effect of Facebook users' satisfaction and trust on stickiness: the role of perceived values, *Int. J. Data Netw. Sci.* 5 (2021) 245–256.
- [53] I. Junglas, C. Abraham, R.T. Watson, Task-technology fit for mobile locatable information systems, *Decis. Support Syst.* 45 (2008) 1046–1057.
- [54] Y.M. Shin, S.C. Lee, B. Shin, H.G. Lee, Examining influencing factors of post-adoption usage of mobile internet: focus on the user perception of supplier-side attributes, *Inf. Syst. Front* 12 (2010) 595–606.
- [55] M.R. Al Mamun, W.D. Senn, D.A. Peak, V.R. Prybutok, R.A. Torres, Emotional satisfaction and IS continuance behavior: reshaping the expectation-confirmation model, *Int. J. Hum. Comput. Interact.* 36 (2020) 1437–1446.
- [56] C. Kim, W. Tao, N. Shin, K.-S. Kim, An empirical study of customers' perceptions of security and trust in e-payment systems, *Electron. Commer. Res. Appl.* 9 (2010) 84–95.
- [57] M. Kang, Dual paths to continuous online knowledge sharing: a repetitive behavior perspective, *Aslib J. Inf. Manag.* 72 (2019) 159–178.
- [58] X. Wang, D.H.L. Goh, E.P. Lim, Understanding continuance intention toward crowdsourcing games: a longitudinal investigation, *Int. J. Hum. Comput. Interact.* 36 (2020) 1168–1177.
- [59] F. Authors, A. Susanto, Y. Chang, Y. Ha, Determinants of continuance intention to use the smartphone banking services, *Ind. Manag. Data Syst.* (2016).
- [60] M. Kang, Active users' knowledge-sharing continuance on social Q&A sites: motivators and hygiene factors, *Aslib J. Inf. Manag.* 70 (2018) 214–232.
- [61] C.K. Pai, T.W. Wang, S.H. Chen, K.Y. Cai, Empirical study on Chinese tourists' perceived trust and intention to use biometric technology, *Asia Pacific, J. Tour. Res.* 23 (2018) 880–895.
- [62] L. Gao, X. Bai, F. Authors, An empirical study on continuance intention of mobile social networking services: integrating the IS success model, network externalities and flow theory, *Asia Pacific, J. Mark. Logist.* 26 (2014) 168–189.
- [63] K.H. Kim, K.J. Kim, D.H. Lee, M.G. Kim, Identification of critical quality dimensions for continuance intention in mHealth services: case study of one care service, *Int. J. Inf. Manag.* 46 (2019) 187–197.
- [64] E.A. Locke, The nature and causes of job satisfaction, *Handb. Ind. Organ. Psychol.* (1976) 1297–1349.
- [65] L.M. Saari, T.A. Judge, Employee attitudes and job satisfaction, *Hum. Resour. Manag.* 43 (2004) 395–407.
- [66] R.L. Oliver, L. Gerald, Effect of satisfaction and its antecedents on consumer preference and intention, *Adv. Consum. Res.* 8 (1981) 88–93.
- [67] J.D. Barrett, Quality from customer needs to customer satisfaction, *Technometrics* 46 (2004), 118–118.
- [68] C.S. Lin, S. Wu, R.J. Tsai, Integrating perceived playfulness into expectation-confirmation model for web portal context, *Inf. Manag.* 42 (2005) 683–693.
- [69] A. Bhattacharjee, Understanding information systems continuance: an expectation-confirmation model, *MIS Q.* 25 (2014) 351–370.
- [70] Y.M. Huang, Students' continuance intention toward programming games: hedonic and utilitarian aspects, *Int. J. Hum. Comput. Interact.* 36 (2020) 393–402.
- [71] N.P. Melone, A theoretical assessment of the user-satisfaction construct in information systems research, *Manag. Sci.* 36 (1990) 76–91.
- [72] Y.F. Kuo, C.M. Wu, W.J. Deng, The relationships among service quality, perceived value, customer satisfaction, and post-purchase intention in mobile value-added services, *Comput. Hum. Behav.* 25 (2009) 887–896.
- [73] C.M. Chiu, H.Y. Huang, Examining the antecedents of user gratification and its effects on individuals' social network services usage: the moderating role of habit, *Eur. J. Inf. Syst.* 24 (2015) 411–430.
- [74] D. Jani, H. Han, Testing the moderation effect of hotel ambience on the relationships among social comparison, affect, satisfaction, and behavioral intentions, *J. Travel Tour. Mark.* 31 (2014) 731–746.
- [75] M. Koufaris, W. Hampton-Sosa, The development of initial trust in an online company by new customers, *Inf. Manag.* 41 (2004) 377–397.
- [76] K.E. Flaherty, J.M. Pappas, The role of trust in salesperson—sales manager relationships, *J. Pers. Sell. Sales Manag.* 20 (2000) 271–278.
- [77] D.J. Kim, An investigation of the effect of online consumer trust on expectation, satisfaction, and post-expectation, *Inf. Syst. E-Bus. Manag.* 10 (2012) 219–240.
- [78] A. Al-Ansi, H.G.T. Olya, H. Han, Effect of general risk on trust, satisfaction, and recommendation intention for halal food, *Int. J. Hospit. Manag.* 83 (2019) 210–219.
- [79] A. Gustafsson, M.D. Johnson, I. Roos, The effects of customer satisfaction, relationship commitment dimensions, and triggers on customer retention, *J. Mark.* 69 (2005) 210–218.
- [80] J. Chen, C. Zhang, Y. Xu, The role of mutual trust in building members' loyalty to a C2C platform provider, *Int. J. Electron. Commer.* 14 (2009) 147–171.
- [81] S.-M. Chen, P.-J. Sue, Constructing concept maps for adaptive learning systems based on data mining techniques, *Expert Syst. Appl.* 40 (2013) 2746–2755.
- [82] M.F. Chen, H.L. Li, The consumer's attitude toward genetically modified foods in Taiwan, *Food Qual. Prefer.* 18 (2007) 662–674.
- [83] J. Lee, D.-G. Kim, Adaptive learning system applied bruner' EIS theory, *IERI Procedia* 2 (2012) 794–801.
- [84] P. van Schaik, J. Jansen, J. Onibokun, J. Camp, P. Kusev, Security and privacy in online social networking: risk perceptions and precautionary behaviour, *Comput. Hum. Behav.* 78 (2018) 283–297.
- [85] Sophos, Security Threat Report 2011, 2011.
- [86] V. Benson, G. Saridakis, H. Tennakoon, Information disclosure of social media users: does control over personal information, user awareness and security notices matter? *Inf. Technol. People* 28 (2015) 426–441.
- [87] V. Garg, L. Jean, Camp, cars, condoms, and facebook, in: *Inf. Secur.*, Springer, 2015, pp. 280–289.
- [88] H.J. Highland, Security in Computing, Prentice Hall Professional Technical Reference, 1997.
- [89] R.K. Chellappa, P.A. Pavlou, Perceived information security, financial liability and consumer trust in electronic commerce transactions, *Logist. Inf. Manag.* 15 (2002) 358–368.
- [90] C. Michael, Methods and Systems for Enhancing Cyber Security in Networks, 2019. <http://www.freepatentsonline.com/y2019/0245892.html>.
- [91] R. Jaamour, Securing web services, *J. Inf. Syst. Secur.* 14 (2005) 36–44.
- [92] Z. Liao, X. Shi, Consumer perceptions of internet-based e-retailing: an empirical research in Hong Kong, *J. Serv. Market.* 23 (2009) 24–30.
- [93] H. Li, Y. Liu, Understanding post-adoption behaviors of e-service users in the context of online travel services, *Inf. Manag.* 51 (2014) 1043–1052.
- [94] N.J. Lightner, Evaluating e-commerce functionality with a focus on customer service, *Commun. ACM* 47 (2004) 88–92.
- [95] Z. Liao, X. Shi, Web functionality, web content, information security, and online tourism service continuance, *J. Retailing Consum. Serv.* 39 (2017) 258–263.
- [96] A. Morton, M.A. Sasse, Privacy is a process, not a PET a theory for effective privacy practice, in: *Proc. New Secur. Paradigm. Work.*, ACM, 2012, pp. 87–104.

- [97] M.V. Nepomuceno, M. Laroche, M.O. Richard, How to reduce perceived risk when buying online: the interactions between intangibility, product knowledge, brand familiarity, privacy and security concerns, *J. Retailing Consum. Serv.* 21 (2014) 619–629.
- [98] J.A. Castañeda, F.J. Montoso, T. Luque, The dimensionality of customer privacy concern on the internet, *Online Inf. Rev.* 31 (2007) 420–439.
- [99] A. Aloudat, O. Al-Shamaileh, K. Michael, Why some people do not use Facebook? *Soc. Netw. Anal. Min.* 9 (2019).
- [100] H. Jeff Smith, T. Dinev, H. Xu, Information privacy research: an interdisciplinary review, *MIS Q. Manag. Inf. Syst.* 35 (2011) 989–1015.
- [101] C. Zhu, *Authoring Collaborative Projects: a Study of Intellectual Property and Free and Open Source Software (FOSS) Licensing Schemes from a Relational Contract Perspective*, The London School of Economics, 2011. <http://etheses.lse.ac.uk/294/>.
- [102] S.J. Yoon, The antecedents and consequences of trust in online-purchase decisions, *J. Interact. Market.* 16 (2002) 47–63.
- [103] C. Mayer, R.J.H. Davis, F.D. Schoorman, An integrative model of organizational trust on JSTOR, *Acad. Manag. Rev.* 20 (1995) 709–734. [http://www.jstor.org/stable/258792?seq=1#page\\_scan\\_tab\\_contents](http://www.jstor.org/stable/258792?seq=1#page_scan_tab_contents).
- [104] J.K. Rempel, J.G. Holmes, M.P. Zanna, Trust in close relationships, *J. Pers. Soc. Psychol.* 49 (1985) 95–112.
- [105] P.A. Pavlou, Consumer acceptance of electronic commerce: integrating trust and risk with the technology acceptance model, *Int. J. Electron. Commer.* 7 (2003) 101–134.
- [106] M. Maqableh, R.M.T. Masa'deh, R.O. Shannak, K.M. Nahar, Perceived trust and payment methods: an empirical study of MarkaVIP company, *Int. J. Commun. Netw. Syst. Sci.* 8 (2015) 409–427.
- [107] E. Fife, J. Orjuela, The privacy calculus: mobile apps and user perceptions of privacy and security, *Int. J. Eng. Bus. Manag.* 4 (2012) 1–10.
- [108] S. Kokolakis, Privacy attitudes and privacy behaviour: a review of current research on the privacy paradox phenomenon, *Comput. Secur.* 64 (2017) 122–134.
- [109] T.B. Warrington, N.J. Abgrab, H.M. Caldwell, Building trust to develop Competitive Advantage in E-Business relationships, *Compet. Rev.* 10 (2000) 160–168.
- [110] M.J. Culnan, P.K. Armstrong, Information privacy concerns, procedural fairness, and impersonal trust: an empirical investigation, *Organ. Sci.* 10 (1999) 104–115.
- [111] C. Flavián, M. Guinaliú, Consumer Trust, Perceived Security and Privacy Policy: Three Basic Elements of Loyalty to a Web Site, 2006.
- [112] A.Q. Bataineh, G.M. Al-Abdallah, A.M. Alkharabsheh, Determinants of continuance intention to use social networking sites SNS's: studying the case of Facebook, *Int. J. Market. Stud.* 7 (2015) 121–135.
- [113] Facebook Inc., *Facebook Reports First Quarter 2021 Results*, 2021. <https://investor.fb.com/investor-news/press-release-details/2021/Facebook-Reports-First-Quarter-2021-Results/default.aspx>.
- [114] K. Scherer, College life on-line: healthy and unhealthy internet use, *J. Coll. Student Dev.* 38 (1997) 655–665.
- [115] S.D. Smith, J. Borreson Caruso, The ECAR study of undergraduate students and information technology, *Edu. Cent. Appl. Res.* (2010) 1–13.
- [116] L.Y. Leong, T.S. Hew, K.B. Ooi, V.H. Lee, J.J. Hew, A hybrid SEM-neural network analysis of social media addiction, *Expert Syst. Appl.* 133 (2019) 296–316.
- [117] K.K. Kapoor, K. Tamilmani, N.P. Rana, P. Patil, Y.K. Dwivedi, S. Nerur, Advances in social media research: past, present and future, *Inf. Syst. Front* 20 (2018) 531–558.
- [118] D.J. Kuss, M.D. Griffiths, Online social networking and addiction-A review of the psychological literature, *Int. J. Environ. Res. Publ. Health* 8 (2011) 3528–3552.
- [119] A. Blachnio, A. Przepiorka, I. Pantic, Association between Facebook addiction, self-esteem and life satisfaction: a cross-sectional study, *Comput. Hum. Behav.* 55 (2016) 701–705.
- [120] B. Alzougool, The impact of motives for Facebook use on Facebook addiction among ordinary users in Jordan, *Int. J. Soc. Psychiatr.* 64 (2018) 528–535.
- [121] R.A. Elphinston, P. Noller, Time to face it! Facebook intrusion and the implications for romantic jealousy and relationship satisfaction, *Cyberpsychol., Behav. Soc. Netw.* 14 (2011) 631–635.
- [122] Y. Ndasauka, J. Hou, Y. Wang, L. Yang, Z. Yang, Z. Ye, Y. Hao, A.J. Fallgatter, Y. Kong, X. Zhang, Excessive use of Twitter among college students in the UK: validation of the Microblog excessive use scale and relationship to social interaction and loneliness, *Comput. Hum. Behav.* 55 (2016) 963–971.
- [123] N.M. Punyanunt-Carter, J.J. De La Cruz, J.S. Wrench, Investigating the relationships among college students' satisfaction, addiction, needs, communication apprehension, motives, and uses & gratifications with Snapchat, *Comput. Hum. Behav.* 75 (2017) 870–875.
- [124] K. Kircaburun, M.D. Griffiths, Instagram addiction and the Big Five of personality: the mediating role of self-liking, *J. Behav. Addict.* 7 (2018) 158–170.
- [125] M. Maqableh, M. Jaradat, A. Azzam, Exploring the determinants of students' academic performance at university level: the mediating role of internet usage continuance intention, *Educ. Inf. Technol.* (2021).
- [126] C.S. Andreassen, T. Torbjørn, G.S. Brunborg, S. Pallesen, Development of a facebook addiction scale, *Psychol. Rep.* 110 (2012) 501–517.
- [127] C.O.M. Odel, A. Bhattacharjee, Understanding information systems continuance: an expectation-confirmation model, *MIS Q.* 25 (2001) 351–370.
- [128] A. Blachnio, A. Przepiorka, M. Benvenuti, E. Mazzoni, G. Seidman, Relations between facebook intrusion, Internet addiction, life satisfaction, and self-esteem: a study in Italy and the USA, *Int. J. Ment. Health Addiction* 17 (2019) 793–805.
- [129] S. Yang, Y. Liu, J. Wei, Social capital on mobile SNS addiction: a perspective from online and offline channel integrations, *Internet Res.* 26 (2016) 982–1000.
- [130] Y. Chen, R. Li, P. Zhang, X. Liu, The moderating role of state attachment anxiety and avoidance between social anxiety and social networking sites addiction, *Psychol. Rep.* 123 (2020) 633–647.
- [131] A. Sayeed, M.N. Hassan, M.H. Rahman, S. El Hayek, M.H. Al Banna, T. Mallick, A.R. Hasan, A.E. Meem, S. Kundu, Facebook addiction associated with internet activity, depression and behavioral factors among university students of Bangladesh: a cross-sectional study, *Child. Youth Serv. Rev.* 118 (2020).
- [132] C. Cuomo, M. Sarchiapone, M. Di Giannantonio, M. Mancini, A. Roy, Aggression, impulsivity, personality traits, and childhood trauma of prisoners with substance abuse and addiction, *Am. J. Drug Alcohol Abuse* 34 (2008) 339–345.
- [133] B.S. Grodner, D.B. Reid, *Permanent habit control: practitioner's guide to using hypnosis and other alternative health strategies*, Perm. Habit Control Pract. Guid. to Using Hypn. Other Altern. Heal. Strateg. (2010). <http://ovidsp.ovid.com/ovidweb.cgi?T=JS&PAGE=reference&D=psyc7&NEWS=N&AN=2010-03300-000>.
- [134] N.S. Hawi, M. Samaha, The relations among social media addiction, self-esteem, and life satisfaction in university students, *Soc. Sci. Comput. Rev.* 35 (2017) 576–586.
- [135] M. Griffiths, Internet abuse and internet addiction in the workplace, *J. Workplace Learn.* 22 (2010) 463–472.
- [136] N. O'Rourke, L. Hatcher, *A Step-by-step Approach to Using SAS for Factor Analysis and Structural Equation Modeling*, 2013.
- [137] J. Hair, W. Black, B. Babin, R. Anderson, *Multivariate Data Analysis*, 2014.
- [138] R. V. Krejcie, D.W. Morgan, Determining sample size for research activities, *Educ. Psychol. Meas.* 30 (1970) 607–610.
- [139] P.M. Podsakoff, D.W. Organ, Self-reports in organizational research: problems and prospects, *J. Manag.* 12 (1986) 531–544.
- [140] D.F. Larcker, C. Fornell, D.F. Larcker, Evaluating structural equation models with unobservable variables and measurement error, *J. Mark. Res.* 18 (1981) 456–464.
- [141] J. Hair, C. Ringle, M. Sarstedt, PLS-SEM: indeed a silver bullet, *J. Market. Theor. Pract.* 19 (2011) 139–151.
- [142] D. Harrington, *Confirmatory Factor Analysis*, Oxford University Press, 2009.
- [143] G.D. Garson, *Testing Statistical Assumptions: Blue Book Series*, 2012. [https://www.researchgate.net/profile/Jurandy\\_Penitente-Filho/post/What\\_is\\_the\\_best\\_statistical\\_method\\_to\\_correlate\\_immunohistochemistry\\_and\\_rt-pcr/attachment/59d61d9879197b807797853c/AS:271755204071424@1441802897825/download/assumptions.pdf](https://www.researchgate.net/profile/Jurandy_Penitente-Filho/post/What_is_the_best_statistical_method_to_correlate_immunohistochemistry_and_rt-pcr/attachment/59d61d9879197b807797853c/AS:271755204071424@1441802897825/download/assumptions.pdf).
- [144] A.F. Hayes, A.K. Montoya, N.J. Rockwood, The analysis of mechanisms and their contingencies: PROCESS versus structural equation modeling, *Australas. Mark. J.* 25 (2017) 76–81.