Investigating Addiction to Social Media Use: Influential Factors and Mitigation Strategies

by Layla Boroon

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Under the supervision of
Principal Supervisor: Professor Olivera Marjanovic
Co-Supervisor: A/Prof Babak Abedin
Co-Supervisor: Dr Eila Erfani

University of Technology Sydney
Faculty of Engineering & Information Technology

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Certificate of Original Authorship

I, Layla Boroon declare that this thesis is submitted in fulfilment of the requirements for the award of Doctor of Philosophy in Information System, in the School of Professional Practice and Leadership/Faculty of Engineering and Information Technology (FEIT) at University of Technology Sydney.

This thesis is wholly my own work unless otherwise referenced or acknowledged. In addition, I certify that all information sources and literature used are indicated in the thesis.

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Dedication

To my love, Mohammad Kazem whom I am proud of him for his generosity, supports,
passion, kindness, patience and encouragement that let my dreams come true.

And

To my dearest son Soheil who has made my life more amazing, enjoyable, and meaningful.

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List of papers/Publications

1. BOROON, L., ABEDIN, B. & ERFANI, S. Addiction to Social Network Site Use: An Information Technology Identity Perspective. Australasian Conference on Information Systems, 2019.
2. Social media addiction: A systematic literature review (drafted journal paper)
3. Using Artificial Intelligence to Change the Future of IT Addiction Treatment (drafted journal paper)
4. Social media addiction: Influential factors and mitigation strategy (drafted journal paper)

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Abstract

Addiction as one of the most widespread and destructive effects of excessively using social media platforms deserves more attention. While there are many studies from a health perspective and a few scattered studies from an information systems (IS) perspective on this area, there is a lack of 1) a comprehensive view of this negative phenomenon; 2) an understanding of influential factors (e.g. drivers/causes and predictors) of social media addiction from an IS perspective; and 3) study on mitigation strategies for dealing with this type of addiction. Informed by the extant literature that social media addiction as a maladaptive behaviour is an uncontrolled self-related process, this thesis examines the social media addiction from the perspective of self-related process. This process refers to the cognitive and psychological activities which play a crucial role in shaping how individuals understand themselves, in terms of their actions, emotions, interests, own beliefs, motivations, and healthy behaviours, fostering personal growth and development. While uncontrolled self-related process involves excessive rumination, distorted self-perceptions and self-identity, lack of self-awareness and self-regulation. Thus, with the aim of addressing all these gaps and our understanding that social media is an uncontrolled self-related process, this thesis aims to identify some factors that negatively affect the self-related process causing social media addiction, as well as an intervention that positively affects the self-related process for dealing with this addiction.

Therefore, this thesis offers a theory-based conceptual research model informed by 1) the self-related process perspective to investigate the positive effect of a strong IT/social media identity as a type of self-identity on social media addiction, 2) the dual system theory (DST) to investigate whether reflective (i.e. attitude, social norms, and personal norms) and reflexive (i.e. habit) systems/behaviours reinforce the IT/social media identity, and 2) the social cognitive theory (SCT) to delineate whether the self-regulation as a mitigation strategy negatively influences IT/social media identity and also moderates the relationship between IT/social media identity and its influential factors (i.e. attitude, social norms, personal norms, and habit) to deal with addiction.

To achieve all the objectives above, this study conducts a three-phase research using a mixed method comprised of 1) a systematic literature review (SLR) to provide a

comprehensive picture of the characteristics of social media addiction and also to develop the conceptual model with the objective to identify a potential mitigation strategy, 2) an online survey to examine the research hypotheses, and 3) an interview to propose a conceptual structure of the self-regulation to represent how this mitigation strategy works.

The key findings are: Phase 1 proposes a holistic and novel view of the characteristics of social media addiction including a comprehensive definition, 6 symptoms, 86 influential factors, 17 negative consequences, 8 potential mitigation strategies and 4 supported ones, and self-regulation as a mitigation strategy for this research model. Phase 2 discovers that IT/social media identity positively affects social media addiction, both attitude, and social norms significantly reinforce IT/social media identity but habit and personal norms do not have a positive effect on IT/social media identity. Moreover, this phase reveals that self-regulation negatively affects IT/social media identity and weakens it, and also it manifests that this mitigation strategy moderates the relationship between IT/social media identity and its influential factors attitude and social norms. Phase 3 proposes a conceptual structure of self-regulation to show how to apply this mitigation strategy.

This study makes several important contributions to theoretical knowledge about social media addiction, leading to several practical implications. In brief, this thesis: 1) provides a comprehensive picture of social media addiction, thus addressing the limitation of previous research, with various aspects of addiction been studied in isolation; 2) identifies IT/social media identity as an influential factor in social media addiction. In particular, stronger IT/social media identity was found to increase the probability of one's addiction to social media use. This finding has not been considered as a driver of addiction in IS and psychopathological research disciplines; 3) identifies 'attitude' and 'social norms' from the lens of DST as two influential factors of IT/social media identity; 4) determines 'self-regulation' as an effective mitigation strategy, which is able to weaken IT/social media identity, when dealing with addiction; and 5) proposes a conceptualisation of self-regulation thus addressing a lack of prior studies on effective strategies for increasing self-regulation.

Keywords: Social media, Addiction, negative effects, IT/social media identity, mitigation strategy, self-regulation, dual system theory, social cognitive theory

Chapter 1: Introduction

1.1. Overview

Chapter 1 provides a comprehensive overview of the research conducted, setting the foundation for the subsequent chapters. The chapter begins with Section 1.1, which offers an insightful overview of the scope of the research, highlighting the specific areas and boundaries within which the study operates. Section 1.2 delves into the research objectives and significance, elucidating the purpose and importance of the study. In Section 1.3, the research questions are presented, serving as guiding inquiries that the study aims to address. Section 1.4 outlines the research model and research design employed, providing a framework for data collection and analysis. Moving forward, Section 1.5 presents the key findings and contributions of the research, highlighting the novel insights and significant advancements made within the field. Finally, Section 1.6 offers a definition of key terms utilized throughout the study, ensuring clarity and coherence in the subsequent chapters. Together, this chapter establishes a strong foundation, setting the stage for a thorough exploration and analysis of the research topic.

1.2. Overview of the Scope of the Research

Social media platforms as a type of Information technology (IT) artefact are network communication platforms in which users can create profiles and content, establish connections, develop text, audio and video interactions with their connections, and exchange user-generated content (Berger et al., 2014, Ellison and Boyd, 2013, Erfani et al., 2016a). Regard to the goal of IT designers, developers and providers, IT in general and social media in particular have been planned to elevate the quality of their users' life (Tarafdar et al., 2015b, Vaghefi et al., 2017). However, according to some scholars (e.g. (Tarafdar et al., 2015b, Tarafdar et al., 2015a, Turel et al., 2018, Salo et al., 2018, Xu et al., 2022), in addition to positive outcomes, using IT creates negative socio-psychological effects which have received little attention by information systems (IS) scholars.

According to some studies, the dark side of IT use is a wide concept that refers to a number of negative phenomena (Tarafdar et al., 2015b, Boroon et al., 2018a) such as technology overload, technostress, interruptions, addiction, privacy concerns, and

security threats (Fox and Moreland, 2015, Addas and Pinsonneault, 2015, Turel and Qahri-Saremi, 2016, Yin et al., 2018, Wang et al., 2019, Boroon et al., 2018b, Boroon et al., 2018a, Tarafdar et al., 2015b). The latter researchers emphasize that these problems negatively affect various aspects of users' lives. Among all the negative phenomena above, addiction, in fact as a self-control problem (McClure and Bickel, 2014) and the most prevalent risk of IT use (Vaghefi and Lapointe, 2013) deserve more attention from researchers (Karmakar, 2020, Raian et al., 2021, Xu et al., 2022). In general, the term 'addiction' can be defined as "a repetitive habit pattern that increases the risk of disease and/or associated with personal and social problems which are often experienced subjectively as 'loss of control' and continues despite volitional attempts to abstain or moderate use"(Marlatt et al., 1988)(p. 224).

Due to the broad occurrence of the IT addiction phenomenon, it is impossible for a single study to investigate IT addiction in general (Turel and Serenko, 2012). Thus, the context of this study is social media and it focuses on addiction to social media use at the individual level of analysis. Social media addiction, among other different types of addiction such as online auction addiction, computer gaming addiction, cybersex addiction and online gambling addiction is the most prevalence one. This is because, social media platforms (e.g. Facebook, Twitter, YouTube and Instagram) are increasingly used as an essential media channel for personal communications, academic research, information exchange, and entertainment (Vaghefi et al., 2017, Vaghefi and Lapointe, 2013, Boroon et al., 2021) by around 4 billion users all over the world in 2022, 80 percent of 5 billion active internet users worldwide (Statista, 2022b).

Despite the significant number of studies on social media use, scant attention has been paid to identifying and understanding social media addiction. The extant literature mostly provides a monolithic view of the positive or bright side of social media use (Vaghefi and Qahri-Saremi, 2017, Cao et al., 2018, Moqbel and Kock, 2018, Li et al., 2018b, Kanat-Maymon et al., 2018, Zheng and Lee, 2016, Chen et al., 2019, Jafarkarimi et al., 2016). For example many studies in the IS discipline (e.g. (Wang et al., 2014a, Erfani and Abedin, 2018, Oh et al., 2014, Erfani et al., 2016b, Reinecke and Trepte, 2014, Guo et al., 2014, Kross et al., 2013, Chan, 2014, Helliwell and Huang, 2013, Nabi et al., 2013, Baek et al., 2013, Apaolaza et al., 2013, Liu and Yu, 2013, Grieve et al., 2013, Devine and Lloyd, 2012, Hume and Sullivan Mort, 2012, Manago et al., 2012, Lee et al., 2011,

Kalpidou et al., 2011, Sundar et al., 2011, Burke et al., 2010, Dare, 2009, Valenzuela et al., 2009, Valkenburg et al., 2006), primarily focused on the positive aspects of social media and argued that using different types of social media elevate users' psychological well-being. Although in most cases social media use helps individuals to improve their efficiency and help organizations to enhance their economic benefits, the use of social media can have a dark side and lead to undesired outcomes such as addition especially when it is excessively, and compulsively used (Vaghefi et al., 2017, Cao et al., 2018, Boroon et al., 2019).

Moreover, addiction to social media use is one of the most significant problems of IT use (Leong et al., 2019, Dalvi-Esfahani et al., 2019), because it can detrimentally affect the users' performance both academic (Osatuyi and Turel, 2018, Al-Busaidi et al., 2022, Malak et al., 2022) and job (Ho et al., 2017, Vaghefi and Lapointe, 2013), physical health (Nikbin et al., 2020) and mental health of users in different level of individuals, organisations, and societies (Brooks et al., 2017, Vaghefi et al., 2017, Vaghefi and Qahri-Saremi, 2017, Vaghefi and Qahri-Saremi, 2018, Malak et al., 2022). In addition, some other researchers state that , it is essential to study social media addiction as it can adversely affect the social functioning, and wellbeing among social media users (Leong et al., 2019, Kuss et al., 2013). Therefore, research in excessive use of social media and addiction needs more attention to identify the influential factors (e.g. drivers/causes and predicters) of addiction and its negative consequences (Cao et al., 2020, Leong et al., 2019, Dalvi-Esfahani et al., 2019, Ahmed and Vaghefi, 2021, Al-Samarraie et al., 2021). Consequently, researchers will be able to propose interventions or mitigation strategies for dealing with addiction (Khan et al., 2021, Brevers and Turel, 2019, Qaisar et al., 2021, Soh et al., 2022).

Grounded in the extant literature, most of the studies on social media addiction have been explored based on psychopathology and health perspectives to be predicted or identified (Polites et al., 2018, Turel et al., 2011, Turel and Qahri-Saremi, 2016, Marulanda-Carter and Jackson, 2012, Jafarkarimi et al., 2016). For example, some researchers found that social media addiction can be caused by inappropriate expectations (Fox and Moreland, 2015), feeling of jealousy (Sánchez et al., 2015, Fox and Moreland, 2015, James et al., 2017), stress (Fox and Moreland, 2015, D'Arcy et al., 2014, Meier et al., 2016), feeling loneliness (Matook et al., 2015), and anxiety (Oldmeadow et al., 2013). The claim of all

this growing research is that addiction as a negative effect of maladaptive social media use is associated with other psychology problems (Polites et al., 2018). Accordingly, addiction should be treated, controlled or mitigated in the same manner as other mental health disorders (Polites et al., 2018). Thus, clinical services are being offered by a growing number of mental health clinics to struggle with the negative effect of social media use related psychopathologies such as social media addiction (McNamee, 2017).

However, addiction to IT use in general and social media use in particular, should be studied from IS perspectives other than the psychopathology perspective (Carter, 2015, Polites et al., 2018, Raian et al., 2021). Most research in this area has focused on users' psychological problems that facilitate addiction and also investigated psychopathology solutions to deal with addiction (Raian et al., 2021). However, IT interventions as mitigation strategies can be investigated for combating addiction to social media (Khan et al., 2021).

Moreover, the IS literature lacks many studies on minimising or mitigating addictive behaviour (Tarafdar et al., 2015b, Salo et al., 2018, Karmakar, 2020, Ahmed and Vaghefi, 2021, Khan et al., 2021, Meng et al., 2022). Karmakar (2020) systematically reviewed the IS literature to learn and summarise current research on mitigation strategies for combating IT addiction. Their work showed that there is a dearth of research on controlling or mitigating addictive behaviour in the IS literature and only four publications studied mitigation. Therefore, one of the other significant goals of this research is to investigate and propose possible solutions to mitigate and control social media addiction. Using the abovementioned, Figure 1.1 shows the overall scope of this study.
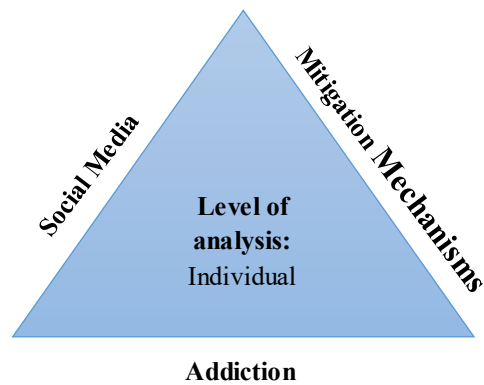
Figure 0-1. An overview of the scope of this research

The gaps above underline the significance of investigating addiction to social media. Thus, the overarching purpose of this study is as follows:

- Although there are many studies from a psychology perspective and a few scattered studies from an IS perspective on social media addiction, there is not a comprehensive view of the characteristics and also a consistent definition of social media addiction (Agbaria, 2022, Meng et al., 2022, Salehi et al., 2022, Karmakar, 2020, Cao et al., 2015, Tarafdar et al., 2015b). Agbaria (2022) states that as IT addiction is a relatively new empirical concept, the distinction between normal, compulsive, and psychopathological use of technology is blurred, and there is no clear operational definition of IT addiction. Therefore, this thesis explores the characteristics of social media addiction that consist of influential factors, symptoms and adverse outcomes of addiction, and as well as unifies all existing different definitions to propose a comprehensive definition of social media addiction.

- Given the gap in existing IS literature, many influential factors (e.g. drivers/causes and predictors) of social addiction have been investigated from a psychopathology or health perspective. This area needs more attention from IS researchers. Since, IT/social media addiction as a self-control problem is a type of maladaptive behaviour in self-related processes/behaviours, therefore, this thesis adopted a concept called 'IT/social media identity' (conceptualised by Carter (2015)) from the self-related process perspective to investigate whether this factor has a positive influence on social media addiction. This concept, despite the considerable attention from many researchers in social science, organisational and management studies, so far has received the least attention in the scope of IS research. Therefore, IT/social media

identity has been investigated on social media addiction in IS discipline for the first time by this study.

- As Xu et al. (2022) argued, argued, without knowing the influential factors, finding effective solutions or mitigations strategy would be complex and likely to be error-prone. This research assumes that the IT/social media identity positively associates with social media addiction. Therefore, researching the factors that make the self-identity stronger becomes necessary.

- Moreover, there is a lack of mechanisms or strategies to lead how to mitigate social media addiction and its negative outcomes. Therefore, this study explores the extant literature on social media addiction to identify an effective and efficient solution/strategy, which can negatively affect IT/social media identity, for combating addiction, as well as to propose a conceptual structure of that strategy to represent how it works or can be applied.

1.3. Research Objectives and Significance

The field of social media addiction deserves more attention from IS researchers, due to: 1) this phenomenon can cause individual, social and organisational problems such as remarkable productivity losses in both job and academic performances (Yellowlees and Marks, 2007, Ho et al., 2017, Osatuyi and Turel, 2018), physical health such as lack of or poor-quality sleep as well as physical tiredness (Nikbin et al., 2020) and mental health (Brooks et al., 2017, Vaghefi et al., 2017, Vaghefi and Qahri-Saremi, 2017, Vaghefi and Qahri-Saremi, 2018, Malak et al., 2022), adversely affect the social functioning, and wellbeing (Kuss et al., 2013, Leong et al., 2019, Zhao, 2021, Chidambaram et al., 2022), conflict in romantic relationships (Bouffard et al., 2021). Therefore, the influential factors of social media addiction need to be clarified and better understood; 2) social media platforms as a type of IT artefact facilitate conditions for involvement to social media addiction in both personal and organisational context (Vaghefi et al., 2017). Therefore, the results of social media addiction research could be very useful and effective for social media designer, implementers and consumers to mitigate/control addiction and reduce its detrimental effects via potential designs or solutions (Turel et al., 2011, Marulanda-Carter and Jackson, 2012, Müller et al., 2014, Jafarkarimi et al., 2016, Vaghefi and Qahri-Saremi, 2018, Khan et al., 2021); 3) understanding the causes of addiction to social media from an IS perspective is as important as from a psychopathological perspective because

this manner helps to identify different interventions, and therefore effective solutions to treat or prevent this problem could be found (Carter, 2015, Polites et al., 2018, Karmakar, 2020, Purohit and Holzer, 2021). All reasons above indicate potential opportunities for IS scholars other than psychologists. Accordingly, this thesis is intended to achieve the following objectives:

Objective 1: *To explore and obtain a comprehensive picture of the characteristics of social media addiction.*

Despite scattered investigations which have been done on social media addiction, there is still a lack of comprehensive cognition about the characteristics, causes and outcomes of this negative phenomenon (Moqbel and Kock, 2018, Turel et al., 2011). While many scientific studies inform us that annoying levels of social media addiction such as Facebook addiction (Serenko and Turel, 2015, Jafarkarimi et al., 2016, Kanat-Maymon et al., 2018, Maqableh et al., 2021), Twitter (microblogging) addiction (Li et al., 2018b), Instagram addiction (Bouffard et al., 2021) and TicTac addiction (Tian et al., 2022) are growing, the notion of social media addiction has not yet integrated into a mainstream social media addiction model. According to Agbaria (2022), since IT addiction is a relatively new empirical notion, there is no precise operational definition of IT addiction and there is no clear line between normal, compulsive, and psychopathological use of technology.

Therefore, the first objective of this study is to unify the extant scattered research on addiction to social media use and to propose a novel view of the characteristics of this phenomenon as a fundamental step in better understanding the addiction to social media use. In addition, it is important to develop a holistic theoretical framework that synthesizes and demonstrates different dimensions or characteristics of addiction. This framework paves a clear path for 1) researchers to have a comprehensive overview of addiction for further research, 2) clinical service providers to have a comprehensive view of potential drivers of addiction, problematic outcomes of addiction and symptoms of addiction, and 3) to find new interventions other than health or psychological treatments to deal with addiction. To achieve this objective the findings of the past studies on addiction to social media should be systematically reviewed.

Objective 2: *To investigate the influence of IT/social media identity on social media addiction and identify the influential factors in creating a strong social media identity, and measure the extent of their influence.*

In line with contemporary 'social media addiction' literature, the majority of investigations on this negative phenomenon has been done from health and psychopathological perspective (Polites et al., 2018). Accordingly, rather than focusing on psychopathology factors as influential factors of social media addiction, this research takes an identity-based perspective and concentrates on a new concept in IS discipline called IT identity in general and social media identity in particular, defined as "the extent to which an individual views use of an IT as integral to his or her sense of self" (Carter, 2015) (p.932). Social media identity has been identified as a catalyst that leads to negative consequences of social media use (Polites et al., 2018). Since this concept has been recently conceptualised as a type of self-identity in the field of IS research, still there is little research available that explores its implications. Furthermore, diagnosing influential factors of one's behaviours that come from one's identity or a mental health pathology has very different implications for the interventions that would be employed to moderate or mitigate such concerns (Carter, 2015, Polites et al., 2018). Hence, this thesis investigates the positive effect of these factors on social media addiction.

Objective 3: *To identify a mitigation strategy for dealing with social media addiction. And to discover how it works in the format of a conceptual structure.*

This objective was initiated by two gaps in the literature as follows:

- There is a lack of studies which characterised the negative effects of IT use based on four salient themes, namely, context of occurrence, negative outcomes, mitigation mechanisms, and level of analysis (Tarafdar et al., 2015b, Tarafdar et al., 2015a). Therefore, this thesis covers all the above important themes through studying individuals' social media addictions and mitigation strategies in the same research.

- The World Health Organization (WHO) recently recognized further research is needed into the understanding of IT addiction and into finding mitigation/treatment strategies for preventing/treating this negative phenomenon (Raian et al., 2021).

- In confirmation of the WHO statement, some IS articles, which systematically reviewed the IS literature, argue that there is a lack of studies to treat or prevent social

media addiction in both information systems (IS) and psychopathology discipline, while with the growth of the number of social media users, the number of users who are addicted to using social media is also increasing (Boroon et al., 2019, Karmakar, 2020, Ahmed and Vaghefi, 2021, Meng et al., 2022). For example, three identified mitigation strategies are increasing social self-regulation (Osatuyi and Turel, 2018), increasing self-efficacy (Qaisar et al., 2021, Soh et al., 2022), and replacing physical activities (Brailovskaia et al., 2018b), all of which are self-help processes. However, none of them have been explained how they work. Future research should therefore focus on mitigating or prevention strategies that can be taken by individuals to develop self-help (using one-self, IT, health psychology, or consultancy). Consequently, this study is going to not only identify a mitigation strategy related to self-help but also to propose a conceptual structure of that strategy to show how it can be applied.

1.4. Research Questions

RQ1: *What characterises social media addiction and how it is manifested?*

Studies on the dark side of using social media have reported a number of different types of social media addiction, but have missed the opportunity to offer a comprehensive picture of this negative phenomenon (Turel et al., 2011, Moqbel and Kock, 2018, Ahmed and Vaghefi, 2021, Meng et al., 2022). Since social media addiction is a broad topic, this study aims to gather all identified dimensions of social media addiction (i.e. influential factors, symptoms, adverse consequences and mitigation strategies) to provide a holistic understandable view of this addiction's characteristics for future research. Therefore, this question was formed to address the first objective.

RQ2: *What factors influence IT/social media identity and to what extent? To what extent does IT/social media identity affect social media addiction?*

Given that there are many investigations on different aspects and types of social media addiction from a psychological perspective, this research now turns its attention to search the addiction from an IS perspective via focusing on IT/social media identity as an influential factor in social media addiction. In addition, in line with previous research, influencer factors and their positive outcomes for adopting and continuing the use of IT

in general and social media in particular have been extensively explored. However, the opposite side has not yet been sufficiently investigated (Li et al., 2018b, Xu et al., 2022, Soh et al., 2022).

RQ3: *What are the mitigation strategies for dealing with social media addiction? To what extent a potential mitigation strategy affects social media addiction? How can social media addiction be dealt with (from IS perspective)?*

Research on mitigation strategies for preventing or treating addiction is scant in the IS literature (Boroon et al., 2019, Karmakar, 2020, Ahmed and Vaghefi, 2021). First this study is going to understand what interventions or mitigation strategies have been proposed by prior studies. It is going to identify an appropriate mitigation strategy, which deals with social media addiction as the self-related behaviour. This is because IT/social media addiction is a problem of self-control (McClure and Bickel, 2014) and it may be mitigated by a self-help process (Karmakar, 2020). Consequently, this study investigates whether the identified strategy mitigates social media addiction; if so, how.

1.5. Research Model and Research Design

To answer the aforementioned questions, this thesis used a hybrid method made up of three phases as follows:

Phase 1: A systematic literature review (SLR) was conducted to completely address QR 1 and partially address the first part of QR 3.

This study used Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA) guidelines as an approach proposed by Moher et al. (2009), Bandara et al. (2011), Wolfswinkel et al. (2013), and has also been previously used by other scholars such as Erfani and Abedin (2018), Ahmed and Vaghefi (2021), Boroon et al. (2021) and Al-Samarraie et al. (2021), to perform the systematic literature review. The SLR led this study to capture important characteristics of social media addiction including the definition of addiction, influential factors, symptoms, negative consequences, and mitigation strategies. Furthermore, this phase contributed to improving the research model by adopting 'self-regulation' as a self-help from the lens of social cognitive theory to be investigated as a mitigation strategy for dealing with social media addiction.

Additionally, the SLR ushered the thesis author to find appropriate and reliable instruments for testing the hypotheses.

Phase 2: A quantitative research in the format of an online survey was conducted and the collected data was analyzed via using Factor Analysis (FA) and structural equation modeling (SEM) analysis technique suggested by (Hoyle, 1995) to precisely address QR 2 and the middle part of QR 3.

This phase was employed to test the research hypotheses. However, before testing the hypotheses, it was needed to identify the relationship between the 34 observed variables of the 'self-regulation' construct and its underlying latent constructs. The FA resulted 4 underlying latent constructs for the 'self-regulation'. Then the hypotheses were tested through the SEM. The outcomes supported 6 out of 10 hypotheses.

Phase 3: A qualitative research in the format of interviews was performed and the collected data thematically were analyzed to answer the last part of QR 3 in order to propose a conceptual structure of self-regulation as a mitigation strategy.

Based on QR 3, this study aimed to identify a mitigation strategy and then investigate how that strategy works. Therefore, first of all, it was required the hypotheses which are relevant to the mitigation strategy and justify that self-regulation can combat addiction, to be supported, it then made sense to examine how the proposed strategy works.

One of the significant results from the second phase of the research was the confirmation of self-regulation as a mitigation strategy. Consequently, this study was able to deeply investigate the functions of this strategy and propose a conceptual structure for it.

1.6. Key Findings and Contributions

This thesis has led to the following major findings and contributions:

comprehensive picture of characteristics of social media addiction (The SLR finding)

The SLR resulted in selection of 74 relevant IS articles. Following the PRISMA guidelines, the selected articles were carefully and thoroughly analyzed, which led to collection of 86 influential factors of social media addiction and their synthesis into 6 major themes (i.e. technology-related factors, socio-environmental factors, enjoyment,

demographics, personality traits, and psychological factors), 6 symptoms of addiction (i.e. relapse and reinstatement, conflict, sense of withdrawal, tolerance, mood modification, and salience), 17 negative consequences of addiction (e.g. suicide related outcomes, romantic relationship conflicts, stress, depression, low job and academic performance), 8 potential and 4 supported mitigation strategies (e.g. physical activity, increasing social self-regulation, increasing self-efficacy, and automating digital nudges). This novel, comprehensive and informative set of findings paves a way for future research and can be applied as a foundation reference.

Comprehensive description of social media addiction (The SLR findings)

Addiction, as a self-control problem and maladaptive behaviour (Marlatt et al., 1988, Müller et al., 2016), can be defined as a maladaptive psychological state (Turel and Serenko, 2012, Vaghefi and Lapointe, 2013, Islam et al., 2019, Lin et al., 2019) of strong dependency on IT/social media use (Turel and Serenko, 2012, Xu and Tan, 2012, Balakrishnan and Shamim, 2013, Vaghefi and Lapointe, 2013, Wang et al., 2015, Nikbin et al., 2020, Błachnio et al., 2017) caused by some factors such as habitual (Wang et al., 2015, Ryan et al., 2016), or excessive/intensive use of IT/social media (Koc and Gulyagci, 2013, Müller et al., 2016, Choi and Lim, 2016, Ryan et al., 2016, Chen, 2019, Foroughi et al., 2019) and manifested by some psychological disorders pattern (Dalvi-Esfahani et al., 2019) like obsessive-compulsive disorder (Vaghefi and Lapointe, 2013) and problematic behaviours (Ryan et al., 2016) of social media use that take place at the expense of other important tasks or responsibilities (Turel and Serenko, 2012).

The effect of IT/social media identity on social media addiction (The quantitative research finding)

Since social media addiction is a self-control problem, this study adopted a new IS concept from self-related processes/behaviors called IT/social media identity to investigate if this identity is an influential factor of social media addiction. The quantitative research proved that a strong IT/social media identity plays a significant role in social media addiction. This is because individuals with strong IT/social media identities feel strongly attached to their favorite social media platforms and they think that it is a part of their being.

The effect of reflective and reflexive systems on IT/social media identity from the lens of dual systems theory (The quantitative research finding)

After finding IT/social media identity as an influential factor of social media addiction, this study investigated what factors positively affect IT/social media identity and make it strong. The dual-system theory informed this study that individuals behave based on two reflective (e.g. attitude, social norms, and personal norms) and reflexive systems (i.e. habit), which cause maladaptive behaviours if they conflict with each other. Accordingly, this study investigated the effect of attitude, social norms, personal norms, and habits on IT/social media identity and found that both attitude and social norms have a positive effect on IT/social media identity but personal norms and habits were not confirmed as influential factors on IT/social media identity.

The positive effect of self-regulation on IT/social media identity and moderating the relationship between IT/social media identity and its influential factors adopted from the lens of social cognitive theory (The quantitative research finding)

The social cognitive theory informed this research that self-regulation as a self-help/self-related process may negatively affect IT/social media identity and also moderate the relationship between this identity and its influential factors. The conducted quantitative research discovered that self-regulation plays a significant role to weaken IT/social media identity and as well it moderates the relationship between self-identity and two of its influential factors attitude and social norms. However, the hypotheses related to the moderation role of self-regulation on the relationship between IT/social media identity and two other factors personal norms and habits (which also had been rejected as influential factors of IT/social media identity) were not supported.

Conceptual structure of self-regulation (The qualitative research finding)

After confirming self-regulation as a mitigation strategy for dealing with social media addiction (negatively affects IT/social media identity and pushes it to be weakened), a qualitative study was conducted to discover what this strategy's functions are and how it works. The thematic analysis led this research to discover three major functions/themes namely self-monitoring, self-judgment, and self-reactions, and also all behaviors which correspond to these functions.

This research makes several theoretical and practical contributions by filling the aforementioned gaps in the extant literature. First, this study proposes a comprehensive and novel view of the characteristics of social media addiction, which has not been considered so far and serves as a foundation for further research in both IS and psychology disciplines. Second, with respect to the lack of study on influential factors and mediators of addiction and mitigation strategies for combating addiction, it investigates both of them in the same study to respond to calls for investigating salient themes of the dark side of IT use. Third, by adopting dual-system theory (DST), this study examines the effect of reflective and reflexive systems/behaviours on IT/social media identity in relation to social media addiction to examine what factors reinforce IT/social media identity. The dual-system theory is a concept from psychology and cognitive science that proposes the existence of two separate cognitive systems or processes involved in decision-making and reasoning. These two systems are often referred to as the "reflective system" and the "reflexive system". This theory suggests that various cognitive processes, including judgment, decision-making, and behaviour, result from the interplay between these two systems. Fourth, from the lens of social cognitive theory (SCT), this study investigates whether self-regulation as a self-related process can negatively affect IT/social media identity and can moderate the relationships between this identity and its influential factor (i.e. reflective and reflexive systems/behaviours) to deal with social media. The SCT emphasizes the interplay between cognitive processes, social interactions, and environmental factors in shaping human behaviours, learning, and personal growth. Fifth, this study uses IT identity as an alternative perspective on the dark side of IS rather than the psychopathological perspective to predict and mediate social media addiction. Finally, it proposes a conceptual structure of the self-regulation.

1.7. Definition of Key Terms

Social media: Social media are interactive computer-mediated technologies including both websites and applications that facilitate the creation or sharing of information, ideas, career interests and other forms of expression via virtual communities and networks (Kane et al., 2014). Therefore, according to Kane et al. (2014)(P. 279) the updated definition of social media possesses four essential features, such that users "(1) have a unique user profile that is constructed by the user, by members of their network, and by the platform; (2) can access digital content through, and protect it from, various search

mechanisms provided by the platform; (3) can articulate a list of other users with whom they share a relational connection; and (4) can view and traverse their connections and those made by others on the platform."

IT identity: IT identity as a new conceptualisation of self-identity refers to the 'extent to which a person views use of IT as integral to his or her sense of self' (Carter, 2015)(P. 938).

Systematic Literature Review (SLR): A systematic literature review refers to types of literature reviews that collect and critically analyze multiple research studies or papers, using methods that are selected before one or more research questions are formulated, and then finding and analyzing studies that relate to and answer those questions in a structured methodology (Okoli, 2015, Tranfield et al., 2003).

Characteristics (of social media addiction): "Characteristic (of something/somebody) a typical feature or quality that something/somebody has" (Oxford-University-Press, 2020). Therefore according to Oxford-University-Press (2020), a characteristic is a feature or quality belonging typically to a person, place, or thing and serving to identify them. In this research, the characteristics of social media addiction refers to some attributes such as definition and symptoms of addiction, influential factors or predictors of addiction, and negative consequences of addiction, which describe what the addiction to social media use is.

Symptoms of addiction: social media addiction as a cyber-relationship addiction applicable to users who spend too much time on social networking sites (SNSs) and display behavioral addiction symptoms such as salience (behavioral, cognitive, and emotional concentration), generosity (SNS usage continues to increase), withdrawal (unpleasant feelings with suspension of SNS usage), conflict (between people or internally), and regression (rapid return to SNS usage once the period of abstinence is over) (Turel et al., 2011).

Influential factors of addiction: An influential factor refers to a person or thing that causes, drives, or predicts something else which will be happened in the future or will be a consequence of something (Cambridge-University-Press, 2020).

Conceptual structure: A conceptual structure is raised from embodied experiences or behaviours, which demonstrates a schema structure of how people think and behave in the context of a concept (Maglio and Matlock, 1999).

Mitigation strategy: It is a framework to identify, prioritize and implement actions to reduce risk to hazards (He, 2012).

The remainder of this research thesis is completed in the following chapters. Chapter 2 and 3 provide an overview of the research background, the gaps in the literature and theories, which have been helpful and mostly used in the field of social media addiction, research model and hypotheses. Chapter 4 provides a comprehensive picture of the research design and outlines a mixed method conducted in three phases. Chapters 5, 6 and 7 respectively provide findings resulting from the systematic literature review, the online survey and the interviews research. Chapter 8 is allocated to discussion section. Finally, Chapter 9 describes limitation, future research and conclusion.

Chapter 2: Literature Review (Research Background)

2.1. Overview

Chapter 2 provides an in-depth exploration of the phenomenon of addiction in the context of information technology. The chapter is divided into five subsections, each addressing a specific aspect of this topic. Section 2.1 delves into the concept of information technology addiction, examining its causes, symptoms, and impacts on individuals. Section 2.2 focuses on addiction to social media use, investigating the addictive nature of social media platforms and their influence on users' behaviours and psychological well-being. Section 2.3 identifies gaps in the existing literature, highlighting areas that require further research and understanding.

2.2. Information Technology Addiction

Information Technology (IT) refers to computer hardware, software, telecommunication devices (mobile phone and robotic systems), and any depended services to technology that are employed in the context of a business, organizations or personal use (Oz, 2005, Mao and Chan, 2018).

The existing research mostly provides a monolithic view of the bright side of IT use (Vaghefi et al., 2017, Boroon et al., 2021). Although in most cases IT use helps individuals to improve their efficiency, the use of technology (in its various forms) can have a dark side and lead to negative outcomes, especially when it is unhealthy, excessively, and compulsively used, such as addiction (Vaghefi et al., 2017, Cao et al., 2018, Bouffard et al., 2021, Lerma et al., 2021).

Technology addiction as a specific type of behavioural non-substance addiction refers to unhealthy and excessive use of IT (Holden, 2001). In essence, IT addiction as one of the behavioural addictions is a false psychological dependency to use an IT (Turel et al., 2011, Serenko and Turel, 2015). According to some studies, IT addiction goes beyond 1) the concept of technology overuse (Davis, 2001), 2) the concept of habit (Limayem et al., 2007), and 3) high engagement with technologies (Charlton and Danforth, 2007). This negative phenomenon is a psychological dependency, while habit refers to automatic actions learned by doing repetitive actions (Limayem et al., 2007). Individuals addicted to information technology, much like other behavioural addicts, tend to exhibit risky

behaviours (Turel et al., 2011, Serenko and Turel, 2015). They often neglect their obligations and responsibilities (Ho et al., 2017) and face a range of negative consequences (Helmuth, 2001).

Since the domain of IT addiction concept has not been well defined, multiple definitions have been proposed (Agbaria, 2022). Thus, several definitions were extracted from the reviewed literature such as 1) IT addiction can be defined as users' maladaptive dependency on IT use which causes negative effects on important activities of users' life (Turel et al., 2011, Turel and Serenko, 2012, Vaghefi et al., 2017); 2) IT addiction refers to the psychological dependency to use a specific technology regardless of its negative outcomes which can be less rational or irrational behaviour (Turel et al., 2011, Vaghefi et al., 2017, LaRose et al., 2003); 3) IT addiction can be defined as a compulsive and obsessive behaviour which has different symptoms such as craving, low quality of life and withdrawal (Ng and Wiemer-Hastings, 2005); 4) IT addiction is further exposed from an obsessive pattern of IT use behaviours and replaced instead of important users' activities (Turel et al., 2011). Furthermore, IT addiction requires more research, because the scope of this phenomenon has not been well defined (Byun et al., 2009, Turel et al., 2011, Serenko and Turel, 2015, Agbaria, 2022). Євгеній et al. (2018) state that new types of addiction have emerged via the advent of new technologies. The main types of technology related addictions reported in the literature include:

Computer addiction refers to the obsessive passion for doing some activities such as computer programming, playing computer games (Євгеній et al., 2018, Shotton, 1991, Turel et al., 2011); *online gambling*, *online auctions* and *e-shopping* refer to a compulsive need such as buying, spending and shopping to perform a psychological dependency that over time cause harmful outcomes (Turel et al., 2011, Євгеній et al., 2018, Tong et al., 2007, Peters and Bodkin, 2007); *cyber-sexual addiction* refers to "cybersex", that is, visiting pornographic sites, sexual chat (Євгеній et al., 2018, Lowry et al., 2016); *cyber-relational addiction* refers to dependency on communication in social media as a virtual world which has been replaced real family members and friends; mobile e-mail addiction (Marulanda-Carter and Jackson, 2012, Addas and Pinsonneault, 2018, Turel and Serenko, 2010, Li et al., 2018b); and *email addiction* refers to excessive use and intermittent cravings for checking email inbox (Turel and Serenko, 2010, Sadeghi et al., 2022);

Internet/online addiction is used to describe the compulsive need to spend a lot of time on the internet (Salehi et al., 2022).

However, so far there is no sufficient and comprehensive study on the scope of IT addiction. Therefore, the content and characteristics of this phenomenon needs to be identified (Turel et al., 2011, Serenko and Turel, 2015, Moqbel and Kock, 2018). Since it is not possible to study all types of IT addictions in a single study, this thesis focuses on social media addiction as the most common type of IT addiction.

2.3. Addiction to Social Media Use

2.3.1. History of Social Media

Social media platforms are increasingly attracting the attention of people all over the world in general (Ellison and Boyd, 2013) and industry and academic researchers in particular (Ellison, 2007). Although, some early social network platforms such as Friendster failed due to technical and social issues, they built a foundation for the success of subsequent social media applications (Ellison and Boyd, 2013). The perspective of origin, source and development of the social media phenomenon is explained in the following paragraphs.

The initial years of social media applications (1997-2002)

The first recognizable social media applications, SixDegrees.com was developed in 1997 (Ellison, 2007). SixDegrees.com enabled its users to create profiles, list their friends and then in the beginning of 1998 allowed its users to surf other users' friend lists. Of course, some similar sites existed before SixDegrees that were used for dating and communicating but they did not have all the site features that SixDegrees provided to its users (Ellison, 2007). AIM and ICQ buddy lists, for example, supported their user to create lists of friends, although those friends were not visible to others. Another example refers to Classmates.com that had been designed for high school/college students for enabling them to surf the network for other users but Classmates.com users could not create profiles or lists of their friends until years later (Ellison, 2007). Ellison (2007) states that SixDegrees as a text messenger tool promoted itself by attracting millions of users, but it failed and closed in 2000 due to the poor development of the online advertising industry. From 1997 to 2001, a number of social networking tools began to support

various combinations of features for users' profiles. For instance, in 1999, LiveJournal launched as an instant messaging tool that allowed its user to manage their privacy settings. In addition, in 1999 a Korean virtual world site, Cyworld started its activity as a social network site and its developers added some features on it in 2001. Furthermore, a Swedish web community, LunarStorm, was redesigned as a social network site in 2000 with new features such as friends lists, guestbooks, and diary pages (Ellison, 2007). In 2001, Ryze.com was constructed as the first business social network site to help people to link their businesses but did not experience great popularity. In the following year, in 2002, Friendster was created and although it provided access of friends-of-friends feature to its users, very soon it lost many of its users due to its inability to handle rapid growth in user numbers (Heidemann et al., 2012).

The maturity and popularity of social network applications (2003–Present)

From 2003 to now, lots of social media apps were created (Ellison, 2007). MySpace, for instance, was developed in 2003 in Santa Monica, California as a social media app typically comprising a digital photo and in-depth information about users' personal interests (Heidemann et al., 2012). According to the latter authors, this platform became very popular by competing with sites like Friendster, Xanga, and Asian Avenue and focusing attracting unsatisfied users of Friendster. Moreover, MySpace promoted itself by considering its users demand for new features to personalise their pages. Of course, in 2003, except MySpace, a few social media apps such as MyChurch as a religion-focused site, SmallWorld as an elite site, Couchsurfing as an activity-centred site and LinkedIn as a business and employment-oriented social networking service attempted to gain a competitive advantage by targeting specific groups but they were not as successful as MySpace (Ellison, 2007). At the same time, some social media apps were launched that had certain popularity in specific regions. For example, Friendster proved attractive in the Pacific Islands; Orkut became the premier social media app in Brazil and India (Madhavan, 2007), Mixi gained very wide adoption in Japan, LunarStorm accepted in Sweden, Dutch users embraced Hyves, Grono took off in Poland, Hi5 was attractive in smaller countries in Latin America, South America and Europe, Chinese QQ instant messaging took off in China, and Bebo became very popular in the United Kingdom, New Zealand, and Australia (Ellison, 2007).

Facebook was created by Mark Zuckerberg in 2004 (Ellison and Boyd, 2013). According to Ellison and Boyd (2013), at the beginning, Facebook was designed as a Harvard-only social media app but after a short time, it was converted to a worldwide social media and now it is the most popular social media platform (Berger et al., 2014, Statista, 2018a). Facebook is used for different purposes such as communicating with friends and family as well as with customers for marketing purposes (KUMAR et al., 2017). YouTube is the second most popular worldwide social media platform (Statista, 2018b, Gill et al., 2007) that was launched in 2005. YouTube is a video-sharing site that provides free video streaming (Keelan et al., 2007). From 2005 onwards, Facebook was accessible for students from other university schools and it was enabled to have a broader membership. In addition, WeChat has profoundly penetrated into the daily life of Chinese people as a social media application (Lien et al., 2017). This application is an instant messaging communication service that provides text, video and voice services to its users. Lien et al. (2017) state that Tencent has developed this application in 2011. WeChat not only is increasingly used in Chinese social communication, but also in the Chinese market and financial transaction (Lien et al., 2017, Business-Insider, 2016). In the early years of their operations, Facebook and other successful social media services such as Hyves (The Netherlands), MySpace, YouTube, Orkut (Brazil), StudiVZ (Germany), and Renren (Asia) fascinated millions of people and began to gain increasing interest among investors (Ellison and Boyd, 2013).

2.3.2. Social media in the Information Systems Literature

Throughout the past few years, a new class of IT artifact called social media has emerged and grown (Berger et al., 2014, Kane et al., 2014). A social media platform is a virtual space that allows its users to generate, share, transfer, and exchange different types of information such as text, video, voice, and picture (Chaffey et al., 2009, Kane et al., 2014). Cao et al. (2015) discussed different categories of social media applications such as, blogs, instant messaging, podcasts, online social networking websites (e.g. Renren and WeChat in China, Vkontakte in Russia, Facebook), professional networking websites (e.g. LinkedIn), microblogging (e.g. Twitter, Weibo in China), and virtual worlds (e.g. Second Life), online video-sharing platforms (e.g. YouTube) (Burgess and Green, 2018) and photo and video sharing social networking service (e.g. Instagram) (Lup et al., 2015).

The following paragraphs provide more information about each category:

- *Microblogging*: Microblogging is a form of online communication that allows a subscriber to distribute short messages to other subscribers of this service (Java et al., 2007). Java et al. (2007) state that micro-posts can be made public or broadcasted to a private group of subscribers. Subscribers can read microblog posts online in forms of an instant message, an SMS text message, email or the web. The latter study explains that microblogging is provided by several platforms such as Twitter, Jaiku and Pownce. According to some researchers, Twitter is the most popular microblogging service (Java et al., 2007, Menkhoff et al., 2015).

- *Virtual worlds*: This world refers to a computer generated space that enables its users to interact with one another in an environment other than the real world (Schroeder, 1996). In other words, a virtual world is a technological environment that allows the users to have a set of experiences and a strong sense of being in that environment (Warburton, 2009). Although there are different types of virtual world that have different utilization, second life is the most mature and popular multi-user virtual world platform being used in education (Warburton, 2009).

- *Social networking websites*: Social network sites can be defined as web-based services that allow users to 1) create a public or semi-public profile within personal settings, 2) generate the content of a social network site and share it with the public or groups of users, 3) view and access their list of connections and those made by others within the system (Ellison, 2007). According to Ellison (2007), although social network sites such as MySpace, Facebook, Cyworld, and Bebo have been designed to provide different service, Facebook is the most popular of the social network sites. Research in 2017 shows that Facebook had 2.06 billion monthly active users and currently has the largest number of users in comparison with other social media platforms (Statista, 2018a).

- *Professional networking websites*: According to Guillory and Hancock (2012), a professional networking site is another way to create linkage or communication to certain people. Users of professional networking sites can engage, share or connect with other professionals. The main purpose of a professional network is to expand a business, build the network, and career improvement (Guillory and Hancock, 2012). What makes a professional network distinct from a social network service is that a

professional network is mainly concentrated on the relationship of business nature and career building rather than personal relationship (Guillory and Hancock, 2012). There are several professional networking sites such as LinkedIn, Quora, Plaxo, Viadeo, XING, Udyomitra, and Meetup. Guillory and Hancock (2012) state that LinkedIn is the most popular professional networking site that enables people to upload online resumes and form connections with colleagues, friends, businesses, and professional people.

- *Blogs*: Nardi et al. (2004) explain that a blog is an online service that allows its users to blog in a form of journalism to shape democracy outside of all the official media and conventional politics. As well, a blog is used in a form of personal communication and expression that enables bloggers to note and record their specific interests with a strong sense of their personality, passions and point of view (Nardi et al., 2004, Hsu and Lin, 2008). To communicate with a blogger, a reader can send their comments through the facilities that are provided by the blog interface (Hsu and Lin, 2008).

- *Instant messaging*: Instant messaging refers to online mobile communications services that have gained considerable attention (Church and de Oliveira, 2013). Recently, the mobile instant messaging has replaced traditional messaging services and people use various types of mobile instant messaging such as Telegram, WhatsApp, Viber, Line (Church and de Oliveira, 2013), WeChat (Li et al., 2018a, Gong et al., 2019a, Cao et al., 2020). Li et al. (2018a) assert that all of the instant messaging platforms have been designed as applications for smartphones and enable their users to send and receive location information, images, video, audio and text messages in real-time regardless of any limitation of time or places.

- *Online video-sharing platforms:* YouTube with over 2.5 billion active users in 2022 (Statista, 2022a) is the most popular video-sharing social media platform launched in 2005 to encourage the growth of para-social connections, or asymmetrical connections between consumers of social media content and producers of social media content (de Bérail et al., 2019). Although the number of its active users is less than Facebook's, it surpasses Facebook to rank as the second-most visited website in the world behind Google (de Bérail et al., 2019).

- *Photo and video sharing social networking service:* Instagram is the most popular Photo and video sharing social media platform (Ponnusamy et al., 2020) with more than 1.3 billion active users across the world (Statista, 2022a). It was originally

launched for Apple devices in 2010 by Mike Krieger and Kevin Systrom (Wikipedia, 2022). Instagram users are able to upload their posts or stories in the format of video or photo, which may be altered with filters and arranged using hashtags and geotagging. Then the public or followers who have already been approved can see posts (Wikipedia, 2022).

Social media applications provide different features to their users such as 'tag', 'post', 'dig', 'blog' (Xiang et al., 2009), 'like', 'follow' and 'friend request' on the Internet. The pervasive nature of social media applications, their unique features to support users to establish connections, develop interactions with their connections, and share content and consume content provided by their networks makes them an attractive tool for people (Shao, 2009, Van Dijck, 2009).

According to Barbagallo et al. (2008), social media platforms, for example, are social systems that allow a very large number of individuals or groups to have an online relationship with one another. According to Ellison (2007), social media applications are communication and interaction tools that allow people to capture, store and present information among one another. In addition, these platforms are collection of individuals who have a common interest and generate, share, transfer and exchange information among themselves (Kumar et al., 1999). More importantly, social media platforms have the ability to connect all people all over the world regardless of all the restrictions of time and place.

Use of various types of social media applications is being significantly increased by online users (Cao et al., 2015) who deal with these applications in three ways: consuming, participating and producing contents online (Van Dijck, 2009, Shao, 2009). The bar-chart below provides information on the most popular social media as of October 2021, ranked by number of active accounts (Statista, 2022a) (Figure 2.1). The top rank has been allocated to Facebook with more than 2.9 billion monthly active users. The second top with a large statistical difference from Facebook is YouTube with over 2.5 billion monthly active users. As the bar-chart below shows, gradually, the number of active users of different applications is reducing to the point where Douyin has the least number of active users (Statista, 2022a).
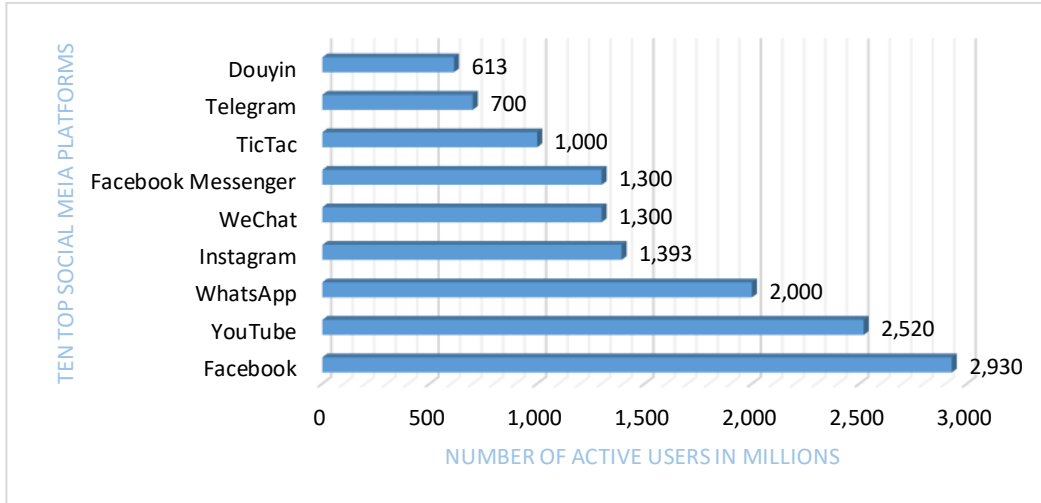
Figure 2-1. Most popular social media platforms worldwide as of October 2021, ranked by number of active users (in millions) (adopted from (Statista, 2022b))
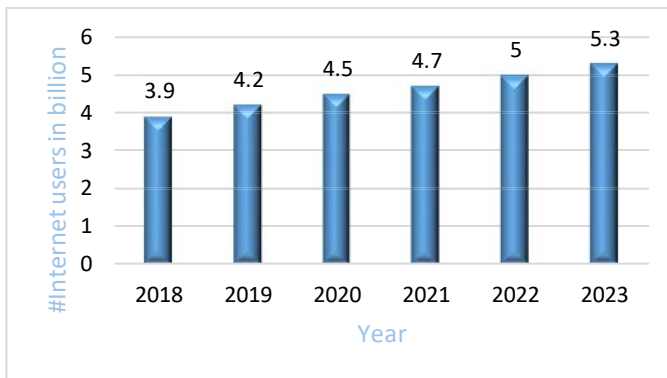
Figure 2-2 Internet user growth worldwide from 2018 to 2023 (in billions) (adopted from (Statista, 2022a))
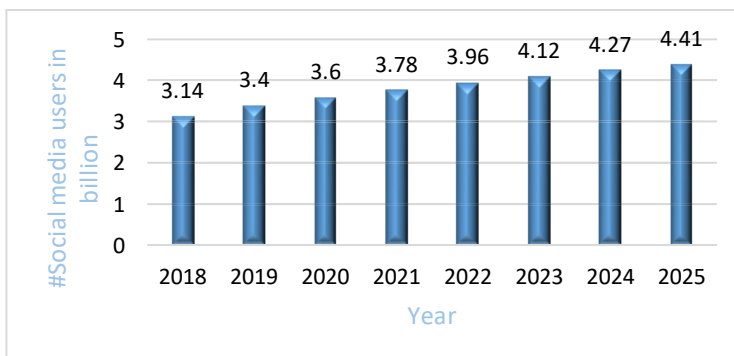
Figure 2-3 Number of social network users worldwide from 2018 to 2025 (in billions) (adopted from (Statista, 2022b))

Social media applications have attracted billions of people and are continually expanding (Cao et al., 2015, Erfani et al., 2017). It is a noteworthy point that in 2023 the number of users of social media platforms will be significantly increased in comparison with 2022 (Statista, 2022a). Moreover, as more than 4.1 billion (Figure 2.3) out of 5.3 billion

Internet users (Figure 2.2) are social media users, social media platforms have the most popularity among Internet users. For instance, Євгеній et al. (2018) found that 52% of children and adolescents 10-17 years use IT just for joining social media applications in order to have online communication, while 24% of this group use the internet for checking their email, 15% for downloading music and movies and just 9% use the Internet/IT for searching relevant information to their classes.

Since these platforms have become an important part of many people's lives (Ellison and Boyd, 2013), many users spend hours using social media each week or even each day (Junglas et al., 2013); naturally, in addition to positive effects, such widespread use of social tools also has significant negative effects on people's lives (Mäntymäki and Islam, 2016).

2.3.3. Addiction to Social Media Use

In general, the term 'addiction' can be defined as "a repetitive habit pattern that increases the risk of disease and/or is associated with personal and social problems which are often experienced subjectively as 'loss of control' and continue despite volitional attempts to abstain or moderate use" (Marlatt et al., 1988) (p. 224). Technology addiction as a specific type of behavioural non-substance addiction refers to unhealthy and excessive use of IT (Holden, 2001). In essence, IT addiction as one of the behavioural addictions is a false psychological dependency to use an IT (Turel et al., 2011b, Serenko and Turel, 2015).

IT addiction distorts the purpose of creating IT artefacts (Carillo et al., 2014). Some researchers (e.g. (Maier et al., 2013, Parlak and Eckhardt, 2014, Turel et al., 2014, Jafarkarimi et al., 2016, Kanat-Maymon et al., 2018)) have emphasized that social media as an IT artefact has high potential to be addictive, because they can fill social voids and create ongoing thrills on users' life specifically for those who have a vulnerable brain (Enrique, 2010, Pempek et al., 2009). Social media addiction as a cyber-relational addiction refers to dependency on communication in social media as a virtual world that has replaced real family members and friends. For example, the prevalence of using some social media platforms such as Facebook, Twitter, Instagram, Google+, YouTube, and WhatsApp has changed the way individuals communicate with one another (Moqbel and Kock, 2018). In addition, many social media users spend approximately 8 hours per day on their favourite platforms to extend their virtual relationships (Vishwanath, 2014). Also,

addictive behaviours reported by some countries such as Russia and The Philipines indicate the self-reported averages of social media usage exceed 4 hours per day (Index, 2020).

Therefore, the applications inside our smartphones that seem to capture most of our attention and time are related to social media (Sha et al., 2019). These programs induce the pattern of an addictive behaviour to the users. The Hook Model, a useful paradigm for considering addictive social media design features, is introduced by (Eyal, 2014). The model presents an iterative rotational process of four phases of feedback that boosts social media users' participation: First, individuals are drawn to the platform by a trigger such as a push notification, second, after entering the platform, individuals are encouraged to act such as liking, posting, or creating a friend list. Third, these activities constitute investments in the platform, making it more difficult to leave ("It took time to establish my friend list"). Additionally, they serve as triggers for other users ("someone liked your post"); these are tempting factors used to fill the user's endless news feed. In the fourth and final phase of this paradigm, the variable reward phase, where users are regularly rewarded with new information to watch, comment on, share, or like, the newsfeed is one of the key design elements. Consequently, many social media users are thereby forced to mindlessly surf through their newsfeeds.

Furthermore, the existing literature highlights that addiction to social media use may lead to various types of negative outcomes (Serenko and Turel, 2015, Jafarkarimi et al., 2016, Li et al., 2018b). Because in general, addicted users engage in risky behaviours, neglect their obligations and responsibilities and suffer various negative consequences (Helmuth, 2001, Ho et al., 2017, Brailovskaia et al., 2020). Accordingly, social media addiction as a serious threat for different aspects of users' life has been identified as one of the critical problems (Turel et al., 2011, Vaghefi et al., 2017, Vaghefi and Qahri-Saremi, 2017, Hussung, 2017, Moqbel and Kock, 2018, Wang et al., 2019). Therefore, growing concern about the addictive use of social media has stimulated scholars to explore the causes and consequences of this negative phenomenon (Serenko and Turel, 2015, Cao et al., 2018, Al-Samarraie et al., 2021).

Facebook, for example, as the most popular social media platform used by more than 2.9 billion internet users (Statista, 2022a) helps users to stay connected with friends and

family and be aware of what matters to them, to discover what is going on all over the world, and also to share or transfer their interests and concerns (Kanat-Maymon et al., 2018). Notwithstanding these advantages, it has a high potential to be addictive (Kanat-Maymon et al., 2018). Some studies argue that low self-esteem (Kraut et al., 2002, Błachnio et al., 2016) and contingent self-worth (Kanat-Maymon et al., 2018) are the key roles in emergence and sustainment of Facebook addiction (Kraut et al., 2002, Błachnio et al., 2016, Kanat-Maymon et al., 2018). This is because, individuals with these personality traits are not ready to have face-to-face communication or interactions, and through Facebook, they are facilitated to develop their relationships in the virtual world. This then leads them to excessively use such platforms. Moreover, some researcher assert that users addicted to Facebook use tend to compare their lives with others and think that others are better that him/her (Moqbel and Kock, 2018). Therefore, they constantly stay in their Facebook to avoid missing any new news about their friends or anyone within their network. Consequently, their tasks or responsibilities are significantly procrastinated with their addictive behaviour (Al-Busaidi et al., 2022, Meng et al., 2022) or their life-satisfaction (Ponnusamy et al., 2020) and well-being (Zhao, 2021, Chidambaram et al., 2022) decreases.

Anouther example refers to *microbelogging* addiction. Microblogging addiction is developed when users have high engagement in this type of social media for different purpose of use such as social communication, sharing and consuming information, and entertainment in order to release emotional stress and to pass time (Li et al., 2018b). Indeed, the gratification caused by using microblogging (social communication) leads users to highly engage with microblogging and subsequently, high engagement induces microblogging addiction (Li et al., 2018b).

Although, scattered investigations have been done on social media addiction, there is still ambiguity and lack of a comprehensive cognition about the characteristics, causes and outcomes of social media addiction (Moqbel and Kock, 2018, Ahmed and Vaghefi, 2021, Al-Samarraie et al., 2021, Malak et al., 2022).

2.4. Gaps in the Literature

Given the reviewed literature on IT/social media addiction and the importance of studying the social media addiction, below are the gaps in the current literature that this P.h.D thesis aims to address:

- Throughout a few past years, not only a number of calls for investigation special issues on the dark side of using IT in the scope of IS research have been published but also a few mini-tracks (i.e. (Tarafdar et al., 2013, Tarafdar et al., 2015b, Tarafdar et al., 2015a, Turel et al., 2017, Turel et al., 2018)). All of the mentioned publications emphasise that recent studies and observations on IT use have revealed worrying findings which may have detrimental effects with different level of severity on the health/wellbeing of individuals, organisations, and societies. However, there is a lack of studies characterised the dark side of IT use based on four salient themes, namely, context of occurrence (refers to any given situation in using IT developed by IT designers and implementers such as social media, Online auction, Internet of things, artificial intelligence), negative outcomes (refers to any specific negative phenomenon of the dark side of IT use such as cybersecurity threats, technostress and IT addiction), mitigation mechanisms (refers to pre-emptive mechanisms contains some useful interventions that mitigate/reduce/control the possibility of occurring a particular dark side phenomenon), and level of analysis (refers to those affected by using IT, individuals, organisations and societies) (Tarafdar et al., 2015b, Tarafdar et al., 2015a). The first three themes indicate the facets of the dark side phenomena, and the last one guide researchers that the facets can be explored at different level of analysis. According to above explanations, a lack of a comprehensive framework (for any phenomenon of the dark side of IT) as shown in Figure 2.4 is a basis gap that can be addressed by future research.
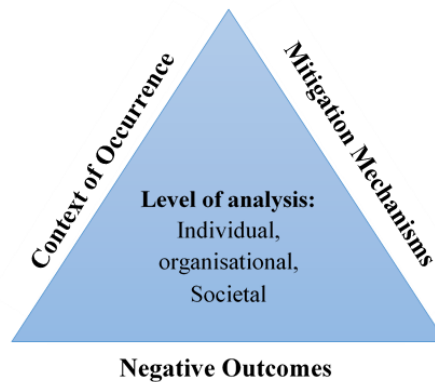
Figure 0-4. Framework for characterising dark side phenomena. (Adopted from (Tarafdar et al., 2015b))

Therefore, this P.h.D thesis is planned to meet all the themes (i.e. social media as context of occurrence, addiction as negative outcomes, mitigation mechanisms for dealing with addiction and individual level of analysis) in the same study to address the gap above.

- Based on the above framework adopted from (Tarafdar et al., 2015b), this study focuses on social media as the context of research and addiction as the negative outcome. These two themes were selected based on some future research recommendations extracted from the reviewed literature as follows:

  o Meng et al. (2022) conducted a meta-analytic review to synthesize the global prevalence characteristics of digital addiction in the general population. These researchers systematically reviewed 498 articles covering 2,123,762 individuals from 64 countries. These researchers found that after smartphone addiction, social media addiction has the highest rate of global prevalence. However, the field of social media addiction has received the less attention for the global research (Meng et al., 2022). The later study identified that 341 out of the 498 reviewed studies focused on Internet addiction, 78 on game addiction, 82 on smartphone addiction, and 31 on social media addiction. However, in 2021, 4.2 out of 4.66 billion active digital users were social media users with an average online of 6.7 hours daily usage. So that, this digital activity could lead to not only social media addiction but also digital addiction. (Király et al., 2020, Meng et al., 2022).

  o Some studies argue that social media as the hedonic IT system can be the main cause of some negative effects such as distraction, waste of time, and loss of productivity (Vaghefi and Qahri-Saremi, 2017, Vaghefi et al., 2017, Boroon et al., 2018a), and psychological problems and addiction (Boroon et al., 2018a, Yoo and

Jeong, 2017). According to the latter studies, the dark side of using social media discipline has a wide potential for investigation, because there are many unexplored gaps in this research area (Hofmann et al., 2018, Boroon et al., 2021).

o Refers to Annisette and Lafreniere (2017), conscious and reflective thought has been thoroughly declined by the widespread prevalence of social media use (Polites et al., 2018). In addition, the results of some studies warn that users' dependency and addiction to using social media is significantly increasing by using this type of IT artefact (Turel and Serenko, 2012, Turel, 2015). Furthermore, not only using social media can be addictive but also its effects are as harmful as substance addiction. However, there is not yet sufficient study about social media addiction.

o The foregoing literature review indicates, some IT/social media's attributes such as user-friendly, reliability and usability are paving the way for decentralised, unwise, unreasonable and continuous use of IT in general and social media in particular (Tarafdar et al., 2015b, Wang et al., 2014a, Polites et al., 2018, Al-Samarraie et al., 2021). Consequently, the likelihood of finding some phenomena associated with the negative effects of IT use such as social media addiction is significantly increasing (Tarafdar et al., 2015b, Tarafdar et al., 2015a, Jain et al., 2018, Salo et al., 2018, Zhao, 2021, Malak et al., 2022, Soh et al., 2022). Social media addiction leads to complex and unintended problems that negatively change different aspects of social media users' life such as living, working, and personality.

o Recent studies on the dark side of IT use point to addiction to social media use as the top ranked type of IT addiction (Yoo and Jeong, 2017, Polites et al., 2018, Al-Samarraie et al., 2021).

o According to the statements of the studies above, social media addiction as a type of IT-related addiction is one of the harmful outcomes of social media use that needs to be deeply explored to be understood and mitigated (Karmakar, 2020, Ahmed and Vaghefi, 2021, Meng et al., 2022). Hence, this belief was reinforced that social media provides a relevant and appropriate context for studying addiction through this thesis.

- The next gap is the lack of a comprehensive view of social media addiction in the existing literature. To provide a comprehensive picture of a phenomenon, it should be

explored from different aspects such as the factors that cause it or the effects caused by the existence of that phenomenon (Karr-Wisniewski and Lu, 2010, Fox and Moreland, 2015, Turel and Qahri-Saremi, 2016, Yin et al., 2018, Delpechitre et al., 2019). Although there have been sporadic investigations about social media addiction in IS discipline, there is still a limited understanding of the characteristics of social media addiction such as symptoms of addiction, factors leading to the addiction, the negative consequences of addiction, and also the strategies or mechanisms employed by social media users and platform providers to avoid or mitigate the addiction (Karmakar, 2020, Al-Samarraie et al., 2021, Ahmed and Vaghefi, 2021). In addition, Agbaria (2022) states that as IT addiction is a relatively new empirical concept, the distinction between normal, compulsive, and psychopathological use of technology is blurred, and there is no clear operational definition of IT addiction. As well as, IT addiction as a kind of mental disorder, which is a special type of behavioural and non-substance addiction (Turel et al., 2011) has not yet been well integrated into a comprehensive classification, and thus, it has not a consistent and uniform description in the contemporary "dark side of IT" or "negative consequences of IT" literature (Turel et al., 2011). According to the testimony of some scholars (Serenko and Turel, 2015), social media addiction as a subcategory of IT addiction has the same situation like IT addiction and needs to be characterised. Most literature on IT addiction did not consistently define social media addiction nor consider its characteristics (Serenko and Turel, 2015, Moqbel and Kock, 2018).

Furthermore, different terms such as 'Facebook addiction' (Serenko and Turel, 2015, Jafarkarimi et al., 2016, Kanat-Maymon et al., 2018), 'microblogging addiction' (Li et al., 2018b), 'problematic or pathological Internet use' (Bayraktar and Gün, 2006), 'compulsive Internet use' (Meerkerk et al., 2010), 'habitual use' (Wang et al., 2015, Ryan et al., 2016), and 'excessive use' (Koc and Gulyagci, 2013, Müller et al., 2016, Choi and Lim, 2016, Ryan et al., 2016, Chen, 2019, Foroughi et al., 2019) have been used to describe social media addiction. While each of the terms above is either a subtype of IT/social media addiction or a variety of alternative terms used to describe addiction. This gap can be filled by unifying all the above terms to provide a holistic and meaningful picture of social media addiction.

- In addition to the above gaps, while many studies about IT addiction in general and social media addiction in particular have been done from health and psychopathology

perspective, there is a lack of study on this field from IS perspective. A little research attention has been paid on how social addiction can be alleviated (Serenko and Turel, 2015, Karmakar, 2020, Al-Samarraie et al., 2021, Ahmed and Vaghefi, 2021). Understanding the influential factors of addiction to social media from IS perspective is as important as the psychopathological perspective because this manner helps to identify different interventions, and therefore effective solutions to treat, prevent or mitigate this problem could be found (Polites et al., 2018, Boroon et al., 2019, Tian et al., 2022, Xu et al., 2022, Carter, 2015, Shi et al., 2017). All reasons above indicate potential opportunities for IS scholars rather than psychologists.

- The World Health Organization (WHO) recently recognized further research is needed into the understanding of IT addiction and into finding mitigation/treatment strategies for preventing/treating this problem (Raian et al., 2021). Our preliminary study reveals that there is a lack of study to treat or prevent social media addiction in both information systems (IS) and psychopathology discipline. In addition, this study found that social media users often have difficulties in their time management due to lack of self-regulation (Osatuyi and Turel, 2018, Foroughi et al., 2019, Abbasi and Dibble, 2019). Moreover, there is still a lack of understanding on how technological design features can enhance one's self-regulation and thus mitigate/treat/prevent social media addiction (Rahayu et al., 2020, Liu et al., 2020). Therefore, this study attempts to address this research gap by developing a research model to not only propose a mitigation strategy for dealing with addiction but also to propose a conceptual structure to show how it works.

Chapter 3: Theoretical Background, Research Model and Hypotheses

3.1. Overview

his chapter provides a theoretical background, research model, and hypotheses for the study. The first subsection, 3.2.1, discusses IT/social media identity as an influential factor of social media addiction. This concept refers to the extent to which a person views IT use as integral to their sense of self. It is a dynamic concept influenced by organizational contexts and IS implementation. The second subsection, 3.2.2, introduces the Dual Systems theory of self-related behaviours. This theory is considered effective for studying IT addiction and understanding its causes and mitigation strategies. The dual systems theory proposes two systems: the reflective system and the reflexive system. These systems process information differently and can influence individuals' behaviour. The research model, depicted in Figure 3.1, integrates the dual systems theory, the social cognitive theory, and the self-related processes perspective. It consists of three sections. The first section explores the positive relationship between IT/social media identity and social media addiction. The second section introduces four constructs informed by the dual systems theory (reflective system: attitude, social norm, and personal norm; reflexive system: habit) as factors influencing IT/social media identity. It investigates whether these factors positively affect IT/social media identity and make it stronger. The fourth section incorporates the social cognitive theory and examines self-regulation as a mitigation strategy for addiction. It explores the negative effects of self-regulation on IT/social media identity and also explores its moderating role in the relationship between IT/social media identity and its influential factors.

3.2. Theoretical Background

3.2.1. IT Identity as a Part of Self-identity or Self-Concept

The term 'identity' generally refers to 'who a person is, or the qualities of a person or group that make them different from others' (Cambridge-dictionary, 2019). Three major types of identity with varying perspective have been mostly considered by prior studies: 1) social or collective identity (psychology) reflects "we, as a group" such as an

organization, 2) role identity (sociology) reflects what it means to be "me, as a role," such as a work role, 3) person (sociology) or personal (psychology) identity reflects "me, independent of others" (Carter, 2013).

According to organisatioal literature the concept of identity is very important, because it positively influences the extent of individuals' perceptions about their work environments (Panyasorn et al., 2006). Similar to organisational and management studies, this concept needs to be considered in IT literature because it helps everybody who interacts with technology to make sense 1) of the purpose of IT use, 2) what the scope of their expectations of IT use is, and 3) how they develop their knowledge of IT (Orlikowski and Gash, 1994). Consequently, IT users are able to reinforce or modify their perception of IT and IT identity (Panyasorn et al., 2006).

IT identity as a new concept in IS literature can be attributed to any entity that is related to technology (hardware device, software application, or software application environment) (Carter, 2015). In essence, IT identity as a new conceptualisation of identity refers to the 'extent to which a person views use of IT as integral to his or her sense of self' (Carter, 2015)(P. 938). Therefore, 'IT identity becomes part of one's identity when an individual expands his/her self-identity to include IT' (Carter, 2015). In this sense, when an IT artefact becomes an important part of an individual's identity if she/he loses that artefact then subsequently would feel like losing a part of her/himself (Carter, 2015).

Moreover, IT identity is a dynamic concept similar to other types of identity (Panyasorn et al., 2006), because hardware or software used in an organisation are continuously changed (Bansler and Havn, 2004). According to Panyasorn et al. (2006), an IT identity is created by considering the organizational contexts and other IS implementation. In other words, the reason for using and implementing a system has a prominent role in the creation of that system's identities. If two organisations, for example, use the same application for different purposes, therefore different identities are attributed to that system through those organisations. The identity of any IT-related system plays a major role in describing how people make sense of that system in order to interact with it. In addition, once individuals interact with many IT systems, they can develop many IT identities (Carter, 2015).

3.2.1.1. The Domain of IT Identity

Due to the focus of this thesis on individuals' social media addiction, the literature review of identity in IS research was conducted on individual/group level studies. In today's digital world, IT is used as a tool by individuals to 1) promote and support their social communications, and 2) present their role and position in their work-life (Nach and Lejeune, 2009, Gal and Kjærgaard, 2009). Consequently, individuals' social roles and their IT relationships become increasingly inseparable, so that, IT identity as a new construct is needed to expand understandings of human behavior (Carter, 2015). Carter (2015) argue that persons are able to express, maintain, and expand their self-concepts by utilising IT identity.

At the *individual level*, IT identity is a construct that concentrates on an IT user's self-identification with an IT (Panyasorn et al., 2006). According to all studied identity theories, individuals define themselves in relation to social objects. Therefore, an essential source of self-definition refers to social interactions (Aron and Aron, 1997). Individuals have to expand their self as a fundamental need to enhance their potential efficacy through increasing social and physical resources, perspectives, and identities. This is because the achievement of any personal goal can be facilitated by the mentioned factors above (Aron and Aron, 1997). According to identity theories, the networks of an individual's roles and relationships influence his/her role and personal identity and also his/her thinking and behavior, relative to others (Burke and Stets, 2009). One of the ways that individuals expand their self-concepts is to incorporate their natural abilities and the capabilities afforded by material objects. According to sociological identity theories, a strong IT identity, which influences an individual's behavior, especially with respect to interacting with IT in the long term is in relation to a particular IT (Stets and Biga, 2003). Thus, IT identity may be predictable from long-term behaviors. Identity research indicates that some types of IT encourage repeated interactions which often become integrated into an individual's sense of self (Panyasorn et al., 2006).

At the *collective or group level*, according to social identity theory, IT identity refers to common behaviors in a social group or a category (Carter, 2015). From this perspective, characteristics of a group motivate group members to 1) become like other group members, 2) behave like other group members, and 3) see things from the group's

perspective. This process which is called depersonalization suppresses a group members' individuality in favor of the group's welfare and issues affecting it (Clayton, 2003, Sluss and Ashforth, 2007).

3.2.1.2. The Dimenssions of IT Identity

According to Carter (2015), IT identity is applicable to all types of IT artifacts. Thus, IT identity as a type of personal identity instead to answer the question "who am I?", it specifically answers the question "who am I in relation to IT?". The answer to this question reflects three interrelated dimensions of individuals' perceptions of relatedness, dependence, and emotional energy with respect to the IT (Carter, 2015).

With respect to IT use: ***Relatedness*** means the extent to which the boundary between the self and IT becomes obscured, so that individuals represent a sense of connectedness with IT. Consequently, they experience tight relatedness with an IT when their interactions with that IT become amalgamate with their sense of self. ***Emotional energy*** indicates an individual's lasting feelings of emotional attachment and enthusiasm for using an IT; ***Dependence*** **refers** to the extent to which individuals are confident in using IT to fulfill their social or professional goals, such as expanding and supporting their communications. Note that the concept of dependence in the context of IT identity is different from the notion of dependence in the context of IT addiction, because dependency in IT addiction necessarily involves negative consequences.

Considering the three dimensions, when IT identity as a selfrelated process becomes stronger, it may lead to problematic or maladaptive behaviors (Polites et al., 2018, Hou et al., 2019). Therefore, in order to identify the influencing factors on social media addiction from IS perspective, this thesis adopted this IS concept to investigate whether a strong IT/social media identity positively affects social media addiction.

IT identity is a measurable construct through its dimensions which vary based on the strength of IT identity. Hence, IT identity is comparable across individuals and applicable to different types of IT (Carter, 2015). Table 3.1 describes conceptual and operational definitions for IT identity.

Construct	Conceptual Definition	Operational Definition
IT identity	The extent to which an individual view use of an IT as integral to his or her sense of self	Reflected in three interrelated dimensions: relatedness, emotional energy, and dependence
Relatedness	A blurring of boundaries between notions of the self and an IT experienced as feelings of connectedness with an IT	The extent to which an individual express feeling of connectedness when thinking about her- or himself in relation to an IT
Emotional Energy	An individual's enduring feelings of emotional attachment and enthusiasm in relation to an IT	The extent to which an individual express feeling of confidence, enthusiasm, and energy when thinking about her- or him-self in relation to an IT
Dependence	An individual's sense of reliance upon an IT	The extent to which an individual express feeling of reliance when thinking about her- or himself in relation to an IT

3.2.2. Dual Systems Model of Self-related Behaviours

According to the reviewed literature, the dual-system theory (DST) is one of the efficient and effective theories in the field of IT addiction in both identifying the influencers of addiction and mitigation mechanisms. An appropriate and well-established theoretical lens to investigate and identify the etiology of maladaptive behaviors is the DST (Soror et al., 2015, Turel and Qahri-Saremi, 2016, Polites et al., 2018).

The DST states that individuals process their incoming information through two structurally different systems called reflective and reflexive systems (Bargh and Chartrand, 1999, Strack and Deutsch, 2015). Most of the time these two systems work in harmony, but when they come into conflict, each one deeply influences individuals' behaviour and consequently causes problematic behaviors (Soror et al., 2015). The reflective system comprises intentional, conscious, and controlled activities, whereas the reflexive system involves processes that are automatic, unintentional, unconscious, and difficult to control (Lieberman et al., 2002). Consequently, the reflective system normally governs reasoned actions, faith and beliefs and the reflexive system drives individuals' habits (Kruglanski and Orehek, 2007).

Since, both systems influence the processes underlying self-identity (Vignoles et al., 2011) and as well cause problematic behaviours when they conflict together (Soror et al.,

2015), this thesis's conceptual model (Figure 2.5) suggests both reflective and reflexive systems may lead to addiction in the context of social media use.

Previous studies showed that the self can be helpful in guiding useful and rational behaviors and beliefs while simultaneously it can drive irrational thinking and lead to unpleasant consequences (Guay et al., 2015, Hou et al., 2019). Thus, the influences of self-identity in general and IT/social media identity in particular as two interrelated self process is explored on social media addiction.

3.2.2.1. Reflective System: Intentional Actions and Beliefs

Reflective systems point to reasoned behaviors based on the theory of reasoned action (TRA) and the theory of planned behavior (TPB) (Ajzen, 1991, Fishbein and Ajzen, 1977, Fishbein, 1975).

On the one hand, the TRA use two elements, attitudes and subjective/social norms (refer to the expectations or suggestions received from other people) to predict intentional behavior (Fishbein, 1975, Ajzen and Fishbein, 1980). Whenever one's attitudes lead her/him to do one thing but the relevant norms suggest she/he should do something else, both factors influence that person's intentional behaviors. For example, your attitudes encourage you to want to read a romance novel, but your friends may think this is time-consuming and it is better to watch its movie. Do you do what your attitudes suggest (read the book) or what the norm of your friend suggest (replace the movie) (Fishbein, 1975, Ajzen and Fishbein, 1980)? On the othe hand, the TPB suggests that conscious and intentional sociocognitive processes, such as normative beliefs/personal norms and attitudes, are the cause of intentional behaviours (Ajzen, 1991).

Thetefore, based on two TRA and TPB, intentional behaviours are reflective action of conscious and deliberate sociocognitive processes including: 1) individual attitudes, which refers to both positive or negative feelings (evaluative affect) that an individual has about performing the target behaviour (Fishbein, 1975), 2) subjective norms or social pressures refer to general normative pressures or perceived societal pressure to perform or not to perform the behaviours in consideration (Ajzen, 1991), and 3) normative beliefs/personal norms represents one's own moral standards or "what I believe is right to do." (Ajzen, 1991).

Based on TRA and TPB , all abovementioned components have close relationship with self-identity (Conner and Armitage, 1998). This study focuses on these types of reasoned actions as reflective systems because they influence conscious and intentional behaviours such as using social media which cause IT/social media identity become attributed as a part of self-identity (Figure 2.5). Accordingly, the IT/social media identity as an self-related process which may lead to social media addiction is investigated (Figure 2.5).

3.2.2.2. Reflexive System: Habit

Habit as a reflexive system refers to "learned sequences of acts that have become automatic responses to specific cues, and are functional in obtaining certain goals or end-states" (Verplanken and Aarts, 1999). Social psychologists state that once an action is repeatedly and satisfactorily executed, it may become a habit.

In comparison with the reflective system, reflecxive ones have received less attention by IS scholars in the context of problematic behaviours (Polites et al., 2018), whereas paying attention to this system is as important as reflective systems because many daily activities and decisions occur automatically, outside of our conscious choice (Bargh and Chartrand, 1999). Habits develop over time by reapiting a particular behavior and become stable. Four features are attached to habit actions: unintentionality, uncontrollability, lack of awareness, and efficiency (Bargh, 1994).

Given all the above explanations on IT/social media identity and the DST, Figure 2.5 presents the research model which investigates the impact of IT/social media identity as a self-identity process on social media addiction from a self-related process perspective. And also it investigated the influence of both reflective and reflexive systems on IT/social media identity to discover whether these systems positively affect IT/social media identity.

3.2.3. Social Cognitive Theory (SCT) of Self-Regulation

Social cognitive theory (SCT), which is usually used in psychology, education, and communication research disciplines, convenes that portions of an individual's knowledge are achieved by observing others within the context of social interactions, experiences, and outside media influences. Albert Bandura as an extension of his social learning theory advanced this theory in 1991 (Bandura, 2009). According to Bandura (1991), the social

cognitive theory of self-regulation suggests that individuals' behaviour is not only motivated and regulated by external variables but also by the continuing exercise of self-influences.

Self-regulation generally refers to controlling one's behaviour, emotions, and thoughts, which leads individuals to obtain their goals and promote their plans or standards (Bandura, 1991, Vohs and Baumeister, 2011). In addition, low self-regulation has been identified as a common influential factor that associates with many individual and societal problems such as impulsive buying, eating disorder, addiction, and criminality (De Ridder et al., 2012, Vohs and Baumeister, 2011). Bandura (1991) states that the self-regulatory mechanism operates via three primary sub-functions, called self-monitoring, self-judgment, and self-reaction.

The *self-monitoring* refers to observing an individual's actions to gather information about the impact of such behaviours on her/himself, others, and the environment. The observed results will provide foundations for the self-judgment function (Bandura, 1991). Individuals evaluate the results against personal and/or social standards through the *self-judgment* function. Consequently, they establish cognitive beliefs (Turel, 2015), which will result in two types of beliefs, including cognition about outcomes and self-efficacy (Bandura, 1991). If such judgment is desirable, positive behavioural changes will be performed. Otherwise, the result comes to be maladaptive and may underlie maladaptive responses such as continuing addiction/problematic behaviour (Milne et al., 2000). However, SCT highlights the prominent role of self-efficacy in causing positive changes. In other words, when addicted persons believe that they can perform a behaviour, they will do their behavioural changes (Chiu et al., 2006). In the next stage, the results of self-judgment influence individuals to make a response through the *self-reaction* function (Bandura, 1991). They either abstain from problematic/addictive behaviours, or continue such negative and harmful behaviours (Soror et al., 2015).

SCT has been used as a framework in different research disciplines for explaining healthy and favourable changing behaviours. For example, Ahn et al. (2017) used SCT to investigate how to reduce sodium intake in avoiding cardiovascular disease; they found that a supportive social environment and self-efficacy play an important role in changing cardiovascular patients' behaviours. Stacey et al. (2015) proved that SCT based

intervention for changing cancer survivors' diet and physical activities caused their health improvement. In addition, this theory has also been used to investigate some types of IT addiction such as Internet addiction (Lin et al., 2018), online gaming addiction (Lee et al., 2016, Gong et al., 2019b, Chen et al., 2019), and mobile phone use addiction (Ko et al., 2015, Soror et al., 2012). Thus, SCT is a promising theory that helps researchers to explain the regulatory function of changing behaviours.

However, in IS discipline, research on self-regulation is fledgling and new, so there are a few studies on this area, and a scientific understanding of this concept and its relation to the pattern of technology use is still evolving (Osatuyi and Turel, 2018, Foroughi et al., 2019, Abbasi and Dibble, 2019), although a few studies such as Soror et al. (2012), Ko et al. (2015), and Chen et al. (2019), investigated the role of self-regulation on online gaming users and smartphone users. The majority of these scattered IS researches investigated the positive role of self-regulation in promoting desirable behaviours or inhibiting maladaptive and problematic behaviours. For example, Li et al. (2014) explored the effects of self-regulation on organizational justice, personal ethics, and sanctions relevant to the internet use policy. Wan et al. (2012) examined the role of self-regulation on learning processes on online-learning outcomes. Soror et al. (2015) investigated how self-regulation can reduce the negative consequences of mobile phone use. Lee et al. (2016) and Gong et al. (2019b) proposed self-regulation as a potential mitigation strategy for preventing online gaming addiction. Another study empirically examined the impact of self-regulation on decreasing the level of addiction in smartphone game users (Chen et al., 2019). In the context of social media addiction, Khan et al. (2021) hypothesizes that self-regulation may reduce the negative consequences of social media addiction on work-technology performance.

Grounded on the reviewed literature, self-regulation, which is a self-related process, was identified as a potential mitigation strategy for combating addiction due to 1) it was already confirmed as a mitigation strategy for dealing with some of the other types of IT addiction, and 2) this strategy lead individuals to have positive behavioural changes. Therefore, as Figure 2.5 represents, this research model is designed to investigate the negative effect of self-regulation on IT/social media identity and also its moderating role between IT/social media identity and its influential factor adopted from the lens DST.

3.3. Research Model and Hypotheses

As shown in Figure 3.1, the research model comprises of three sections informed by the dual-systems theory, the social cognitive theory, and the self-related processes perspective. The part adopted from the concept of self-related processes investigated the positive relationship between IT/social media identity and social media addiction as two self-related processes. The part informed by the dual-systems theory proposed four original constructs (i.e. reflective system: attitude, social norm and personal norm; reflexive system: habit) as influential factors of IT/social media identity and investigated whether these factors positively affect IT/social media identity to make it stronger. Finally, the social cognitive theory proposed the self-regulation as a mitigation strategy for dealing with addiction and investigated whether the self-regulation negatively affects IT/social media identity and also moderates the relationship between IT/social media identity and its influential factors.
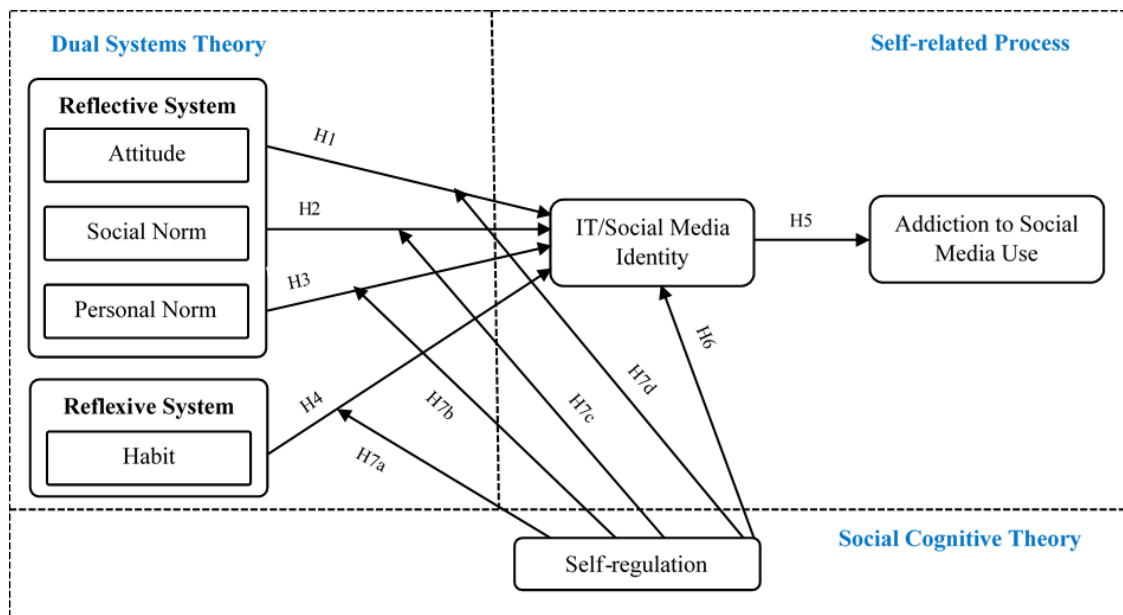
Figure 0-1. Research Model

3.3.1. Reflective System (attitude, social norms and personal norms) Influencing IT/Social Media Identity

This study proposes the hypothesises that reflective behaviours including attitude, social norms and personal norms directly influence IT/social media identity and reinforce it. The idea of discovering the influence of reflective behaviours on IT/social media identity

is rooted in self-discrepancy theory as it argues that different type of self-identity (specifically IT/social media identity(Polites et al., 2018)) is formed, maintained, or changed over time (Higgins, 1987).

In general, the self-identity refers to personal, social, role and IT/social media identities (Carter, 2015). At any time, an individual has a 'real self' (which refers to the current identity that one has in oneself: "who I really am") and a 'desired self' in his/her perspective. The desired self is a combination of the 'ought self' (which refers to the identity attributes that one believes she/he should possess in order to fulfil her obligations and commitments: "who I should be") and the 'ideal self' (which refers to the identity attributes that a person aspires to have: "who I wish to be") (Higgins, 1987). According to Higgins (1987)'s assertation, the components of reflexive behaviours including attitude, personal and social norms define the domains of the desired self.

Since individuals are prompted to retain the consistency between their actual self and desired one, this motivation frequently leads to action (Higgins, 1987). Therefore, if individuals perceive disparity between their various selves, they frequently rectify their behaviour to attain congruence (Breakwell, 2015). In addition, when individuals perceive that their real self and the desired one have a proper congruence, they continue to act in ways that are consistent with their current identity-relevant behaviours. Therefore, conscious and deliberate self-evaluations of individuals on their attitudes, personal norms/beliefs/values and social norms/pressures, in part, play a role in their identity development and maintenance (Polites et al., 2018). Consequently all these together define the desired self and also lead individuals to compare the self-evaluations with perceptions of their actual self or IT/social media identity (Polites et al., 2018). These comparative assessments reveal that IT/social media identity as an identity depend on self-related behaviours and are frequently either changed (to become stronger or weaker) or retained (Breakwell, 2015), so that, the strength or weakness of this identity plays a significant role in the result of individuals' behaviours. For example, Polites et al. (2018) argue that a strong IT/social media identity positively influences deficient self-regulation and decreases the quality of the self-regulation process. Therefore, this expects that the components of reflective systems/behaviours have a positive effect on individuals' IT/social media identity and make it stronger.

Accoring to TRA and TPB, attitude as one of the reflective behavoiurs influences individuals to perform or not to perform a particular behaviour (Ajzen, 1991, Fishbein and Ajzen, 1977, Fishbein, 1975). Attitudes can be defined as both positive or negative feelings (evaluative affect) that an individual has about performing the target behaviour (Fishbein, 1975). Given the reviewed literature, attitude can be considered as an effective factor or variable for predicting excessive and intensive use of social media platforms. For instance, Pornsakulvanich (2017) argues that positive attitude toward using social media causes online support satisfaction. Therefore positive attitude causes social media users considerable time on their favorite platform such as Facebook because both positive attitude and social influence lead them to feel satisfied with their online social support. Those who have a positive attitude towards social networking sites spend more time than expected on these platforms, so over time, they feel dependent and get emotional energy and then they become addicted to their social media (Ho et al., 2017). Given both dependency and emotional energy are two dimentions of IT/social media identity, therefore, this research hypothesizes:

H1. Attitude positively influences IT/social media identity.

The subjective norms or social pressures refer to general normative pressures or perceived societal pressure to perform or not to perform the behaviours in consideration (Ajzen, 1991). Therefor, individuals who care and attention about the pressures of the society around them or the demand of others, decide how to behave and perform or not to perform the behaviours based on these pressures. For example, a person may not have much desire to use social media but feel pressure due to a lack of compatibility and coordination with family members, life partners, or friends who use social networks to coordinate activities or share the news. Consequently, not only that person is forced to join social media but also to use social media repeatedly. This repetition may make one feel dependent on one's social media platform/s. Therefore, this research hypothesizes:

H2. Social norms positively influence IT/social media identity.

The normative beliefs/personal norms, which refer to one's own moral standards or "what I believe is right to do.", is suggested by TPB as one of the reflective behavoiurs that influences individuals' behaviours perform or not to perform a particular behaviour (Ajzen, 1991). Individuals who have strong personal norms behave based on their beliefs.

They are loyal to their beliefs and make decisions and act based on their beliefs (Polites et al., 2018). Those who, for any reason (e.g. security, privacy, user friendly, variety of available features, type of content, or services), have strong personal beliefs about a social media platform share their personal information through that medium with their friend or followers, not necessarily because of perceived social pressure to do so, but because they believe it is the right thing to do (Polites et al., 2018). For example, an individual who has a strong personal norm on the suitability and user friendliness of Instagram for information and knowledge exchange prefers Instagram to alternative platforms and frequently uses Instagram instead of spending time on other social media platforms. Consequently, she/he posts more, posts with more volume, and uses more features of Instagram. When a user uses a particular social media platform such as Instagram more than other ones, that social media lends itself well to integration into the user's identity (Carter, 2015). Subsequently, one's IT/social media identity is strengthened by enhancing one's emotional energy, feeling of dependency, and relatedness to one's favourite social media platform (Carter, 2015). Therefore, this research hypothesizes:

H3. Personal norms positively influence IT/social media identity.

3.3.2. Reflexive System (habit) Influencing IT/Social Media Identity

For example, many people in the world naturally and automatically identify themselves with social categories or specific roles (e.g. gender, blood type) without knowing when and where these identity constructs first appeared (Vignoles et al., 2011), so that, many daily activities and decisions happen automatically either out of habit or outside of individuals' conscious awareness. Research from the past has even supported the notion that habit reinforces one's self-identity with a particular behavior or a certain activity (Polites et al., 2018). Although according to conventional habit theories, a steady condition (e.g. time, mood, location, and presence of specific individuals) is a requirement for habit formation and subsequent activation, media consumption habits including both traditional and electronic media types (e.g. newspapers, television, e-mail, and online video and music streaming) function as distinct from other habits (LaRose, 2010). It is argued that successive activations of media habits do not depend on a steady state after the initial habit is formed.

Since engaging with social media platforms is so pervasive, a social media habit may be spontaneously and unknowingly started by a variety of triggers and cross-context cognitive associations, which substantially integrates the habitual use of social media into the users' life (LaRose, 2010, Limayem and Hirt, 2003). A particular IS/IT habit can consequently lead to a more general habit of employing that IS/IT in a variety of contexts (Limayem et al., 2007). Therefore, in the context of social media, the habit of continuous social media use increases the user's sense of emotional attachment and dependence on social media. As explained in Section 3.2.1, both emotional attachment and dependency are the key dimensions of IT/social media identity (Carter, 2015). Moreover, Polites et al. (2018) asserts that users who habitualy use a certain social media platform start to perceive themselves as having a strong self-identification with that social media platform because they derive implications about their self-concept from their behaviours. Hence, the following hypothesis is posited:

H4: Habit positively influences IT/social media identity.

3.3.3. IT/Social Media Identity Influencing Social Media Addiction

Carter (2015) argues that IT usage behaviours are posited to be core influencer of IT identity development and maintenance because they are deeply embedded in users' daily activities. Individuals who engage with different types of IT artifacts (e.g. a Samsung mobile phone, Facebook, Instagram, and WhatsApp) can form and maintain multiple IT identities (e.g. a Samsung mobile phone identity, Facebook identity, Instagram identity, and WhatsApp identity). However, these identities have different weights based on their relative importance to one's identity (Carter, 2015). Technology artifacts which provide a variety of applications across a variety of social contexts are more appropriate to be integrated into individuals identities because they are significant and valuable to the individual. Social media platforms, for example, are a collection of different applications across different social contexts for providing different services such as maintaining relationships, seeking and sharing information (Polites et al., 2018).

Social media platforms provide immediate positive reinforcement through their attractive services, so individuals may prefer a short-time desirable feeling over their other important tasks or goals, and subsequently spend lots of time for using such platforms (Polites et al., 2018, Turel et al., 2014). In other words, active users who deeply engage

in social media use in comparison with the passive-one hardly control themselves to ignore the distracting stimuli and concentrate on their target tasks. Therefore, frequency and the extent of SNS use automatically is enhanced insofar as social media become the most important and primary communication channel for those active users (Turel et al., 2014). Thus, frequent, high-volume use of a social media platform leads to a stronger IT/social media identity (Carter, 2015). This study assumes that a strong IT/social media identity, which is formed by the extensive conscious and unconscious use of social media platforms, enhances the likelihood of involving in social media addiction. Hence, the below hypothesis is posited:

H5. IT/social media identity positively influences social media addiction.

3.3.4. Self-regulation as a Mitigation Strategy and Moderator

Self-regulation refers to goal-to-action conversion because self-regulation deliberately controls behaviours and leads to thoughts, feeling, and behaviours being planned and periodically adapted to achieve personal goals (Kitsantas et al., 2000). Thus, it helps individuals in concentrating on their obligations and dealing with adverse consequences such as technology-oriented work conflicts (Lu et al., 2015). People with a high level of self-regulation consciously restrain their excessive social media use or the addictive use of IT to accomplish long-term objectives or specific goals (LaRose and Eastin, 2004, Khan and Khan, 2019). However, individuals with a low level of self-regulation cannot ignore the short-term appeals of social media (such as posts and stories that are available for the short term) and constantly check their platforms (Gökçearslan et al., 2016). Since the lack of self-regulation increases the use of social media, the feeling of dependency and relatedness also increases unconsciously (LaRose and Eastin, 2004) (two dimensions of IT/social media identity).

Therefore, this study focuses on self-regulation, which refers to self-controlling one's behaviour, emotions, and thoughts (Bandura, 1991, Vohs and Baumeister, 2011), as a mitigation strategy to deal with addiction. Grounded to the reviewed literature, this research hypothesis that the self-regulation can negatively affect IT/social media identity (which is one of the dimensions of self-identity and it forms one's self-process or behaviours (Carter, 2015)) and consequently mitigate addiction to social media use. Furthermore, this research assumes that if self-regulation can have a negative effect on

IT/social media identity and weaken it, then self-regulation can moderate the relationship between this identity and the factors that strengthen it. Therefore, this study hypothesizes that:

H6: Self-regulation negatively influences IT/social media identity.

H7a: Self-regulation moderates the relationship between attitude and IT/social media identity.

H7b: Self-regulation moderates the relationship between social norms and IT/social media identity.

H7c: Self-regulation moderates the relationship between personal norms and IT/social media identity.

H7d: Self-regulation moderates the relationship between habit and IT/social media identity.

Chapter 4: Research Design and epistemology

4.1. Overview

The objective of this chapter is to outline the research approach and methodology as well as data collection and analysis techniques. This chapter presents a Sequential Mixed Methods Approach is a research methodology that combines qualitative and quantitative data collection and analysis techniques in a systematic and sequential manner.

This study uses a mixed method approach to answer its research questions. According to Creswell (2011), mixed methods is a procedure combining different research methods for collecting and analyzing data at the some stages of a research process with a single study to understand and address a research objective/s. In this type of methodology, researchers not only need to choose the appropriate methods but also constructs, variables and units of analysis, which are suitable for addressing their research questions (Creswell et al., 2003).

Compatibility among the chosen research methods is a principle in a mixed method. So, both numerical and text data, which are collected simultaneously or sequentially should help researchers to have better and deeper understanding of their research gaps/problems (Creswell et al., 2003). According to Creswell et al. (2003), researchers need to consider three important issues while they are designing a mixed method including priority, implementation, and integration. Priority means which method, either the systematic literature review, or quantitative or qualitative, is given more emphasis in a study. Implementation refers to whether the systematic literature review, quantitative and qualitative researches come in sequential stages, one following another, or simultaneously in parallel. Finally, integration refers to the phase of the research process where one of the chosen methods analyses the collected data to inform the other or the mixed methods study together for analyzing the collected data and comparing the findings.

As Figure 4.1 shows, this thesis uses one of the most popular mixed methods called sequential explanatory mixed methods design (Creswell et al., 2003), consisting of three distinct processes namely, 'systematic literature review, 'quantitative' and 'qualitative' research to answer its questions.
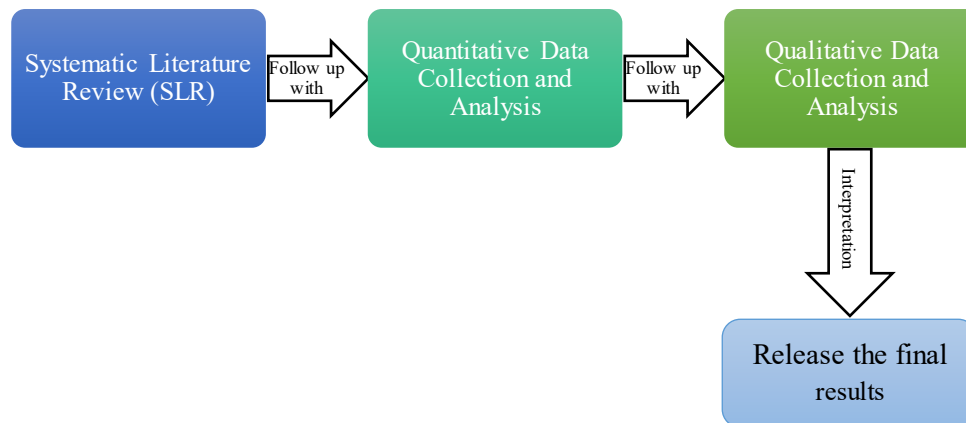
Figure 4-1. An overview of the sequential explanatory mixed methods design

A systematic literature review as the first phase was conducted to not only to propose a comprehensive picture of the characteristics of social media addiction but also to develop the very initial version of the research model through adopting appropriate theories and constructs based on those theories. A systematic literature review is used to find the most closely relevant articles on a particular research question in order to identify, evaluate, synthesize/summarize the findings of all selected studies to draw conclusions based on the existing evidence to answer a research question/s (Moher et al., 2015).

The first phase, which was a systematic literature review, informed the second phase that was a quantitative study. The numeric data was collected using a web-based survey called Qualtrics. Quantitative research opens a way for researchers to rely on numerical data for answering their research questions (Venkatesh et al., 2013). This method is used for developing some knowledge such as causes and effects by focusing on some specific hypotheses, variables, measurements and the test of theories. In addition, researchers need to choose reliable instruments, which yield highly reliable and valid results to investigate cause-and-effect relationships in a research model (Venkatesh et al., 2013). The goal of the quantitative research was to identify the positive and negative affect of the selected constructs/variables as potential influential factors and mitigation strategy on social media addiction. In addition, the result of this phase allowed this study to purposefully select some information for the third phase to identify how a mitigation strategy work to deal with social media addiction.

Alternatively, in the third phase, qualitative research was used to collect text data through individual semi-structured interviews to explain how a mitigation strategy leads a social media user to deal with her/his addiction to social media use. The reason for selecting this approach is that the quantitative data and results provide a general picture of the research problem (Creswell et al., 2003). A qualitative research as an investigation process for deep understanding of a complex concept leads researchers to develop a holistic picture or a conceptual framework via conducting a study in a natural setting and subsequently reviewing detained interviews or reports and analyzing words (Creswell et al., 2003). This method collects data from people who are immersed in the everyday life of the setting in which the study is framed.

The visual model of the procedures for the sequential explanatory mixed methods design of this study is presented in Figure 4.2. The first priority in this design was given to the SLR, because a part of the findings of this method led this thesis to develop the final version of the research model through identifying the suitable theories, constructs and instruments. The second priority was given to the quantitative research, because the designed research model/hypotheses needed to be tested to find out whether the proposed influential factors of addiction and the mitigation strategy are supported or not. The final priority was given to the qualitative method, because once the proposed mitigation strategy was confirmed as an effective way to deal with addiction, this study needed to focus on in-depth explanation on how the approved mitigation strategy works.

All the SLR, the quantitative and the qualitative methods were integrated after finalizing the SLR phase while selecting the instruments and the participants for the quantitative research and developing the interview questions based on the result of the statistical analysis.
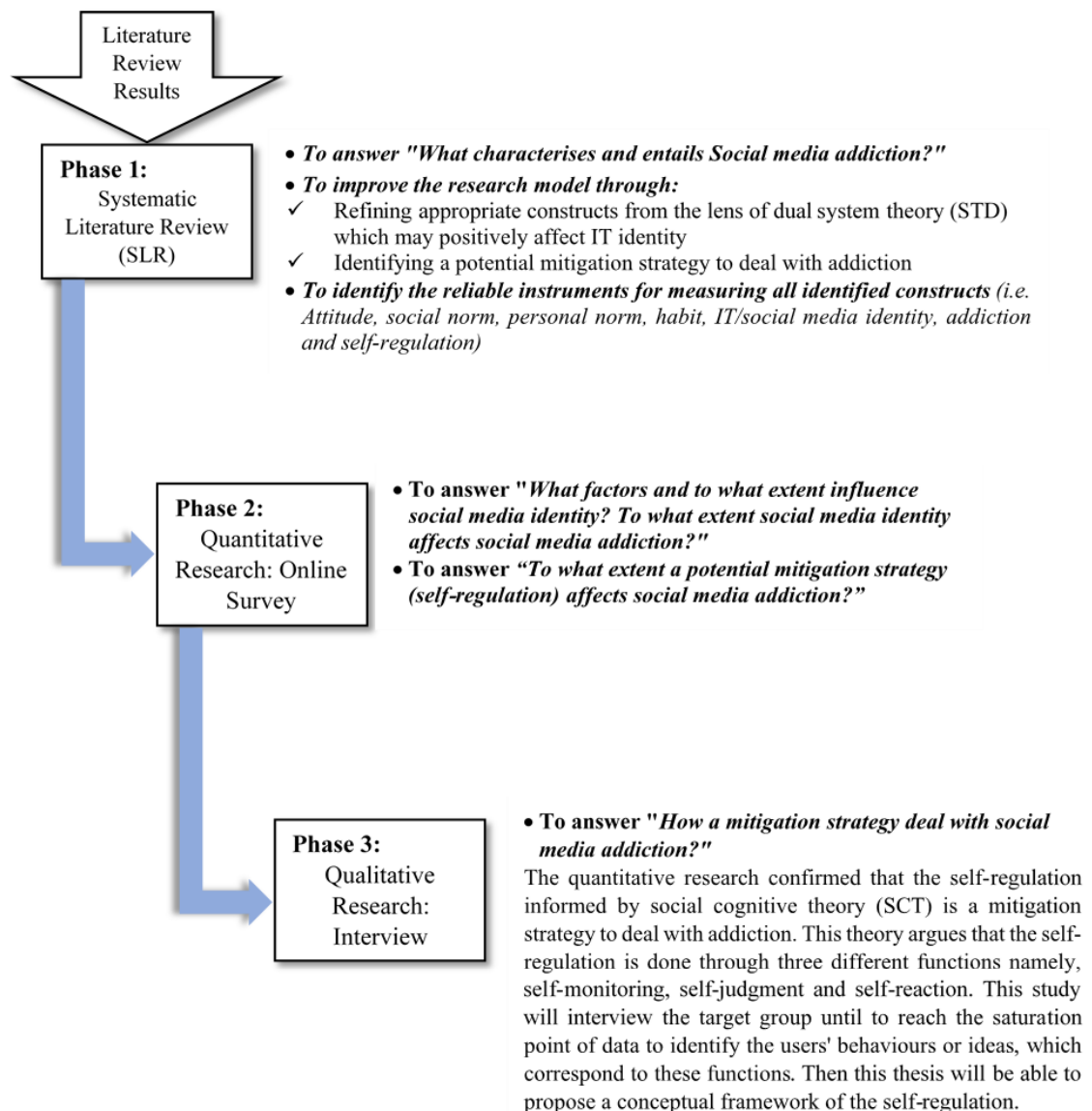
Figure 0-2. Research Design

4.2. Phase I: Systematic Literature Review (SLR)

Although a literature review is a necessary stage of any academic research (Levy and Ellis, 2006), a comprehensive and an accurate analysis on a research field requires a structured and systematic literature review (Bandara et al., 2011). A systematic review requires a holistic and repetitive literature review strategy that helps to select relevant publications through selecting relevant sources, relevant keywords, and a relevant period of time (Vom Brocke et al., 2009). Moreover, a systematic review aims to address a problem/s by identifying, critically evaluating and integrating the findings of all relevant, high-quality individual studies addressing one or more research questions. Bandara et al.

(2011) argue that an effective systematic literature review helps to know: i) how to search relevant papers to review within achievable and defensible scope, ii) how to select relevant articles among the searched articles, iii) how to analyse the findings from a literature review, and iv) how to write and present the findings. Accordingly, a systematic literature review study is "a scholarly research that in its entirety summarizes and synthesizes knowledge from a prior body of research" (Okoli, 2015)(p.879).

According to Bandara et al. (2011) two main criteria have to be identified and elucidated for a holistic review in the field of information systems: i) sources: which refer to useful outlets for a literature review (Webster and Watson, 2002), and ii) research strategy, which refers to what terms and periods can be utilized during the paper exploitation process (Levy and Ellis, 2006). This study applies PRISMA statements or guidelines as recommended by Moher et al. (2009), (Crawford et al., 2015), Bandara et al. (2011), and Wolfswinkel et al. (2013) for meeting the above criteria and conducting a systematic literature review in information systems.

PRISMA guidelines contribute to a theoretical process and have an adequate flexibility for a literature review (Moher et al., 2009, Crawford et al., 2015). This perspective enables researchers to conduct an accurate theory-based or conceptual analysis review (Strauss and Corbin, 1998). Furthermore, it enables researchers to apply thematic content analysis to identify key themes in every single field of study.

Accordingly, some stages namely 'define eligibility criteria', 'search strategy', 'select strategy', 'data extraction and data synthesis, and 'present' are undertaken in this thesis for conducting a systematic literature review (Moher et al., 2009, Crawford et al., 2015).

This method answers the first question (*What characterises social media addiction and how it is manifested?*). Furthermore, it paves the way for addressing the questions 2 (*What factors influence social media and to what extent?*) and the question 3 (*What are the mitigation strategies?*).

4.2.1. Eligibility Criteria

The first step in SLR is to identify a set of inclusion and exclusion criteria for identifying relevant studies (Moher et al., 2009) that investigated the influential

factors/predictors/drivers of social media addiction and also mitigation strategies. Accordingly, this study applied a set of inclusion and exclusion criteria as follows:

Inclusion criteria:

1) Studies were included if they had a primary focus on social media addiction to identify any influential factor/predictor of addiction or mitigation strategies for combating addiction. To find these relevant studies, this SLR chose the key terms based on the research questions. Consequently, the primary keys such as "social media", "addiction", "addiction mitigation" and also some other terminologies which alternatively have been used in the literature such as "social network site", "excessive use", "compulsive disorder", "obsessive disorder", "maladaptive behaviour", "problematic behaviour", and "addiction treatment" were chosen to search the relevant studies.

2) In March 2019, the thesis executed a keyword search for the period 2003 to 2021 in major databases such as Scopus and Google scholar to capture published articles on social media addiction. According to some studies, the development of social media platforms into a global phenomenon started in 2003 (Berger et al., 2014; Heidemann et al., 2012). Also, given the impact of social media use is both positive and negative, this phenomenon represents an interesting area for IS researchers that has been growing since 2004 and academic papers have called for more research in this area (Berger et al., 2014; Cao et al., 2015). Therefore, the search period started from 2004 as major social media platforms were launched after this date.

3) Limiting the discipline or subject area is another important criterion to search the relevant studies (Tranfield et al., 2003). Otherwise, researchers may encounter an information overload and subsequently struggle with the creation of transdisciplinary understanding (Tranfield et al., 2003). Accordingly, the discipline or subject area which is closer to the field of main research can be considered. Therefore, this SLR selected studies were published in information systems, human-computer interaction, computer science applications, computer networks and communications, cyber-psychology, social networking, and information systems management discipline.

4) Moreover, this SLR included studies which were published in peer-reviewed journals or IS conferences, which were written in English.

Exclusion criteria ensured that selected studies would not be:

1) Clinical studies with focus on social media addiction

2) Studies focused on any type of IT addiction (e.g. online auction addiction, gambling addiction, computer game addiction, and cybersex addiction) other than social media addiction,

3) Book, and

4) Non-academic articles.

Table 4.1 summarizes the research criteria for searching the relevant studies.

Table 4-1. Overview of the search criteria

Overview of the Research Criteria	
Time frame	2003 - Current
Search terms	Group 1:'social media', 'social networking sites' Group 2: 'addiction', 'excessive', 'obsessive', 'maladaptive behaviour', and "mitigation strategy"
Search fields	Title, Keywords, Abstract
Language	English
Search Query	(ALL (TITLE-ABS-KEY ("social media") OR TITLE-ABS-KEY ("social network sites")) AND (TITLE-ABS-KEY (addiction) OR TITLE-ABS-KEY (excessive) OR TITLE-ABS-KEY (maladaptive) OR TITLE-ABS-KEY (obsessive) OR TITLE-ABS-KEY (mitigation strategy), OR TITLE-ABS-KEY (addiction treatment))) AND (("2003" ; "2021")) AND (LIMIT-TO (LANGUAGE , "English")
Source	Scopus, Google scholar

4.2.2. Search Strategy

As the Figure 4.3 illustrates the search strategy and article selection, a multi-database search identified studies conducted between 2003 and 2021. Given the inclusion criteria explained in the "Eligibility criteria" section, the search period started from 2004 and the databases included were Scopus and Google Scholar. Since the scope of this study is an interdisciplinary research area (e.g. information systems, psychology, and psychopathology disciplines), Scopus was chosen as the major database to search and capture published research relevant to addiction to social media use. In addition, Scopus as the largest abstract and citation database of peer-reviewed scientific journals, and conference proceedings covers and delivers a comprehensive overview of the world's publications in the science, technology, information systems, health, social sciences, and arts and humanities disciplines (Elsevier, 2020).

Furthermore, since the focus area for this research is about addiction to social media use, two groups of keywords are used to find the relevant articles. Group 1 consists of 'social media', 'social networking sites', 'internet' and group 2 includes 'addiction', 'excessive', 'obsessive', 'maladaptive behaviour', 'problematic behaviour', 'mitigation strategy' and 'addiction treatment'. All possible combinations of these two key terms groups were used to search closely relevant studies. The combination of these key terms (social media OR social network sites) AND (addiction OR excessive OR maladaptive OR problematic behaviour OR excessive OR addiction mitigation OR addiction treatment) was used to search titles, keywords and abstracts.

Table 4.2 illustrates the distribution of the searched publications filtered by their subject area. The majority of these papers were not necessarily related to the scope of this research. Consequently, based on the filtering of the inclusion and exclusion of criteria and field of this study, the findings were further filtered from the collected publications by performing the 'select' stage.

Table 4-2. The distribution of the searched publications based on their subject area

Subject area	# Publication
Medicine	1283
Social Sciences	539
Computer Science and Information Systems	524
Psychology	518
Environmental Science	219
Engineering	176
Arts and Humanities	125
Pharmacology, Toxicology and Pharmaceutics	111
Business, Management and Accounting	109
Neuroscience	108
Mathematics	99
Nursing	89
Decision Sciences	71
Multidisciplinary	55
Earth and Planetary Sciences	54
Biochemistry, Genetics and Molecular Biology	50
Agricultural and Biological Sciences	44
Health Professions	38
Economics, Econometrics and Finance	36
Energy	30
Physics and Astronomy	17
Immunology and Microbiology	14

Material Science	9
Chemical Engineering	5
Veterinary	5
Dentistry	1

4.2.3. Study Selection and Quality Assessment/Assessment of Risk Bias

The output from the search was 2538 papers. 2014 out of 2538 were excluded as non-relevant discipline publications. In the following, another 91 books and non-English language were excluded. Up to this stage, another 410 articles were excluded because those ones neither addressed the influential factors/predictors of addiction to social media nor proposed mitigation strategies to combat social media addiction. The Figure 4.3 provides an overview of the study selection strategy.

Next this study implemented the assessment of risk bias and as a result, no studies were excluded from the remaining 74 relevant studies. The existence of a tool for developing and implementing this process is required (Higgins et al., 2011, Li et al., 2019). Many tools have been proposed for implementing the process of assessment of risk bias in an SLR such as i) scales which score various components of quality to give a summary score, or ii) checklists, which ask specific questions (Moher et al., 1996). Whereas according to Higgins et al. (2011), a tool for assessing the risk of bias is neither a scale nor a checklist, it is a domain-based evaluation that critically assess different domains.

To implement the quality assessment of each selected study, the assessment questionnaires of the risk of bias for both qualitative and quantitative studies, was adopted from (Erfani and Abedin, 2018). Appendix 1 presents the applied questionaries. These questions were rated by the authors from "0 = High risk of bias", "1 = Unclear risk of bias", and "2 = No bias" and were summed to create a final score between 0 and 22 for quantitative and 0 to 20 for qualitative studies. According to Erfani and Abedin (2018), articles with a rating of 10 or below should be excluded. The consensus was reached on all ratings. All 74 selected studies were qualified as appropriate studies for the SLR as presented in Appendix 2.

Scopus and Google scholar
(ALL (TITLE-ABS-KEY ("social media") OR TITLE-ABS-KEY ("social network sites")) AND (TITLE-ABS-KEY (addiction) OR TITLE-ABS-KEY (excessive) OR TITLE-ABS-KEY (maladaptive) OR TITLE-ABS-KEY (obsessive) OR TITLE-ABS-KEY (mitigation strategy), OR TITLE-ABS-KEY (addiction theatment))) AND (("2003" ; "2021")) AND (LIMIT-TO (LANGUAGE , "English")

Identification

Total number of search result
(n = 1263)
The subject area of searched publications
is shown in Table 1

Excluded Non-journal and non-conference papers
(n = 142)

Screening

Total number of abstract reviewed
(n = 1021)

Excluded papers not addressing addiction to social media use
(n = 846)

Eligibility

Full text papers: Addiction to social media from all discipline
(n = 175)

Excluded papers from no relevant discipline (e.g., Clinical studies: medicine, nursing, and neuroscience)
(n = 121)

Full-text articles assessed for eligibility
(n = 54)

Excluded for bias criteria
(n = 0)

Additional studies identified through the references lists of included studies
(n = 0)

Included

Studies included in narrative synthesis
(n = 54)

Figure 0-3. Overview of search strategy and selection process for the systematic literature review

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4.2.4. Data Analysis and Synthesis

The main purpose of this stage was to synthesize the information/codes gathered from the selected studies and summarize the results. As stated by Li et al. (2019), when there is a wide range of data or information, it will be difficult to not only read those but also to find the connection among them. Therefore, synthesizing information is used to naturally help others see the connection among some things. Information synthesis is a process of reviewing and comparing data from different sources, making connections among the identified information with similar concepts, and combining the newly discovered information with the existing relevant knowledge to generate something new (Li et al., 2019).

Data collection and data synthesis was led by using Higgins et al. (2011) and Li et al. (2019)'s guidelines to identify and collect important data. Accordingly, all 74 selected articles were downloaded and then their bibliographic details, as well as their pdf files, were captured via EndNote X8.2.

We then coded the data extracted from each paper independently, and recorded them through excel sheets. This study employed a descriptive qualitative approach to data synthesis. It is a narrative approach that is widely used to describe characteristics of a phenomenon being studied (Erfani and Abedin, 2014). Subsequently, we designed and executed a number of queries to summarise the data and facilitate data handling in the format of different excel-sheets to generate the required information in order to address the research questions and meet the SLR requirements.

Each excel-sheet included row/s for each of the selected studies and columns for theme nodes (e.g. year of publication, objectives, theory/ies, research method/s, the type of social media platform/s, data analysis method, data analysis tools, demographics of participants, the region of study, influential factors/predictors of addiction, the definition of addiction, symptoms of addiction, negative consequences of addiction, and mitigation strategies) extracted from each study. Then, we analysed the extracted information with respect to the research questions.

4.3. Phase II: Quantitative Research (Online Survey)

It was proposed to perform a quantitative approach by conducting an online survey to address the questions 2 and a part of the question 3. A survey research uses numbers to help researchers to understand 'what' or 'why' is happening (Creswell, 2011). According to Bhattacherjee (2012), the following reasons highlight that survey research has several inherent strengths in comparison with other research methods.

- This method is an excellent medium for measuring an extensive variety of unobservable data, such as individuals' preferences, attitudes, beliefs, behaviors or factual information.

- The online survey is an appropriate method for remotely collecting data about a population that is too large and too difficult to be directly observed.

- This method can cover a large area, such as an entire country by meticulous sampling.

- Some respondents prefer surveys because this method is more convenient than others to be answered.

- Large sample surveys may allow researchers to detect small effects. In addition, this method by considering analyzing multiple variables may allow comparative analysis of population subgroups.

Therefore, to test the hypotheses, this study must perform a survey to be able to measure the effect of both dependent and independent constructs on social media addiction in both aspects of causes of addiction and mitigating addiction.

4.3.1. Participants/Samples

To test the research model empirically, the targeted population for this study is Australian university students who are Instagram users.

This study is not supposed to find the addicted person. However, it investigates whether some factors namely, social media identity, attitude, social norm, personal norm and habit positively affect social media addiction. Therefore, to test the research hypotheses and to obtain more valid and reliable outcomes, this thesis needs to focus on a population that has the most likelihood of having users addicted to social media. The following reasons

lead this study to focus on Australian university students who are Instagram experienced users:

1. University students is one of the young population groups that uses social media as part of their daily routine in order to maintain their social relationships, decrease their academic stress, access to more entertainments or transmit their information. Consequently, the main group of social media addicts are young people that most of them are students and they have more vulnerability to be addicted users because of their patterns of use and needs (Ponnusamy et al., 2020, Punyanunt-Carter et al., 2018, Atroszko et al., 2018, Moghavvemi et al., 2017, Ndasauka et al., 2016, Jafarkarimi et al., 2016, Koc and Gulyagci, 2013).

2. In addition, according the findings of the SLR, the majority of the studies systematically reviewed focused on Facebook as the most famous social media platform. Instagram as one of the most popular social media platforms after Facebook has received less attention so far from IS researchers. Instagram deserve more attention because Instagram is not just a social network for sharing photos, it is a platform for building a brand and promoting services (Ponnusamy et al., 2020, Kircaburun and Griffiths, 2018). Thus, this study focuses on Instagram as its context of research.

3. Furthermore, according to some reliable statistical sources that can be cited such as Statista, throughout the past three years not only the number of worldwide Instagram users has dramatically increased but also Australia Instagram users, so that there were 9,709,000 Instagram users in Australia in March 2020, which accounted for 38.1% of its entire population and it increased to 13 010 000 in June 2021, which accounted for 50.1% of its entire population (Hughes, 2021). As the following bar chart demonstrates, people aged 18 to 34 are the largest user groups, which accounted for 76.52% of entire Instagram users in Australia (Hughes, 2021). This statistic supports some researchers' statements that the main group of social media users is the young generation, who has the highest rates of social media addiction (Ponnusamy et al., 2020, Punyanunt-Carter et al., 2018, Atroszko et al., 2018, Moghavvemi et al., 2017, Ndasauka et al., 2016, Jafarkarimi et al., 2016, Koc and Gulyagci, 2013).

Given all aforementioned explanations, this study focused on a sample who were:

- Australian university students,

- An experienced Instagram user for at least 6 months,

- Aged between 18 and 40 years old and

- Fluent in English
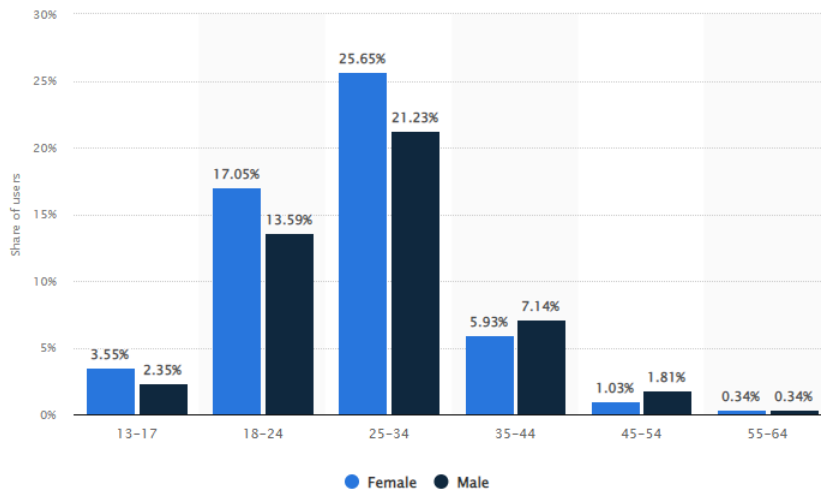
4.3.2. Measurements and Data Collection Procedure

The research questions "What factors and to what extent influence social media identity? To what extent does social media identity affect social media addiction?" and "To what extent does a potential mitigation strategy affects social media addiction?" predetermined a set of variables for this study. Therefore, this quantitative phase focused on identifying both dependent and independent influential factors/drivers of social media addiction as well as a mitigation strategy for dealing with addiction.

As mentioned in the Section 4.1, this thesis reviewed the articles, which had the overall intention of identifying the drivers of social media addiction or mitigation strategies for dealing with addiction. One of the objectives of this SLR was to identify questionnaires, which could cover the thesis's topic, had evidence of validity and reliability and also would be appropriate for self-completion by Australian university students who are experienced Instagram users. Table 4.3 shows all identified instruments needed for testing the research model.

Table 4-3. Instruments and constructs used by prior studies

Construct/Study	Brief overview of measurement target

Social Media Addiction	
(Turel and Serenko, 2012)	Measuring social network sites addiction
Andreassen et al. (2012)	Measuring Facebook addiction
(Hong et al., 2012)	Measuring mobile phone addiction
(Huang et al., 2014)	Measuring social network sites addiction
(Błachnio et al., 2017)	Measuring Facebook addiction
(Kanat-Maymon et al., 2018)	Measuring social network sites addiction
(Kanat-Maymon et al., 2018)	Measuring Facebook addiction
(Leong et al., 2019)	Measuring internet addiction
(Barnes et al., 2019)	Measuring smart phone addiction
(Zhang et al., 2019)	Measuring short-form video app addiction
(Ponnusamy et al., 2020)	Measuring Instagram addiction
Attitude	
(Venkatesh et al., 2003)	Measuring attitude toward using technology
(Ho et al., 2017)	Measuring attitude toward using social network sites
Personal Norm	
(Ho et al., 2017)	Measuring personal norm toward using social network sites
(Polites et al., 2018)	Measuring personal norm toward using Facebook
Social Norm	
(Ho et al., 2017)	Measuring social norm toward using social network sites
(Polites et al., 2018)	Measuring social norm toward using Facebook
Habit	
(Xu and Tan, 2012)	Measuring habit toward using Facebook
(Yahya et al., 2019)	Measuring habit toward social networking sites usage
IT/Social media Identity	
(Carter, 2013)	Measuring the impact of IT identity toward using smartphone
(Polites et al., 2018)	Measuring the impact of IT identity on self-regulation
Self-Regulation	
(Lee et al., 2016)	Measuring self-regulation on online game addiction
(Brevers and Turel, 2019)	Measuring self-regulation on social media addiction
(Khan et al., 2021)	Measuring self-regulation on social media addiction

Observed variables/Indicators were listed then those that had the highest usage rate in previous researches were selected. Since the selected instruments were extracted from the existing literature and their content validity, reliability and validity had been already

tested and confirmed, this thesis just needed to conduct a face validity (Taherdoost, 2016). A face validity evaluates a questionnaire in terms of feasibility, readability, consistency of style and formatting, clarity of the language used and also its comprehensibility (Taherdoost, 2016). Accordingly, an invitation (Appendix 4) was sent to 50 Ph.D. candidate and academic staff which kindly asked them provide their feedbacks on whether the survey is easy to read, understand and answer. 35 out of the 50 invited persons filled out the survey and also, they confirmed that the questionnaire is easy to understand and answer. In addition, the content of the survey items was examined by the supervision team. After analyzing their feedback, some minor revision by considering applicable comments were made. Consequently, the final version of this questionnaire included eight sections (i.e. demographic information, addiction, habit, attitude, social norm, personal norm, IT/social media identity, self-regulation) was generated (Appendix 5). Then the data collection process was performed.

The cross-sectional survey design, which implies the data to be collected at one point in time (Setia, 2016), was used. The primary technique for collecting the quantitative data was a self-administered questionnaire, containing items of different formats: short question and answer like 'age' and 'nationality', single answer questions like 'gender' and 'education', and self-assessment items, measured on 5-point Likert-type.

The first section of the survey asks questions related to socio-demographic information and social media usage included 5 items such as age, gender, education, the participants' experiences of Instagram use, and hours per day spent on Instagram. These questions include the selection answers needed to be completed just by one option. The second section included 3 items and measures the positive impact of participants' habit of Instagram use on the social media identity. A 5-point rating scale from "Strongly Disagree" to "Strongly Agree" is used. The purpose of the third section which included three items is to measure the positive impact of participants' attitude toward using Instagram on the social media identity. The scale from 1 to 5 equivalent to "Strongly Disagree" to "Strongly Agree" is used. The fourth section included four items focused on participants' personal norms toward using Instagram and measures the positive impact of this factor on the social media identity. A 5-point Likert type scale from "Strongly Disagree" to "Strongly Agree" is used. The fifth section included 4 items measuring the positive impact of participants' social norm toward using Instagram on the social media

identity. The scale from 1 to 5, from "Strongly disagree" to "Strongly agree", is used. The sixth section included 12 items measuring the positive affect of social media identity on social media addiction. A 5-point rating scale from "Strongly Disagree" to "Strongly Agree" is used. The seventh section included 18 items focused on social media addiction to measure that to what extent it is positively affected by both the dependent (i.e. social media identity) and independent variables (i.e. attitude, social norm, personal norm and habit). This factor is measured on a 5-point Likert type scale from "Very rarely" to "Very often". Finally, the eighth section included 34 items measuring the positive effect of self-regulation as a mitigation strategy to moderate the relationship between social media identity and another variables attitude, social norms, personal norms and habit. Also, it measures the negative effect of self-regulation on social media identity to deal with addiction. It is measured on a 5-point Likert type scale from "Never" to "Always".

The data collection process was performing in both online and in person invitation. An electronic version of the online survey was generated through Qualtrics XM (University of Technology Sydney license (UTS)). Then the invitation letter (Appendix 6) including the link of the online survey was advertised through different websites such as UTS Faculty of Science (School of Built Environment), UTS Faculty of Health, UTSWiEIT (UTS Women in Engineering and Information Technology) community, UTS Center on Persuasive Systems for Wise Adaptive Living (PERSWADE), School of Engineering of Macquarie University. In addition, the invitation was sent to different Australian university students' groups in Facebook and Telegram. Furthermore, a QR code including the link of online survey, which was generated by Qualtrics, was given to eligible study participants to access and complete the survey. In addition, participants were invited to forward the online survey link to others in their social network if they wished; this sampling method refers to snowball sampling (Noy, 2008). Respondent were informed that participation was voluntary and that the answers would be collected and analyzed anonymously. Moreover, they were informed that they need to sign the consent form (Appendix 7) before entering their answers.

Respondents were Australian university students experienced Instagram users who were between 18 and 40 years old, and fluent in English. While a total of 467 respondents completed the survey, data from 145 respondents were removed due to incomplete responses. The remaining 332 samples was analyzed to test the hypotheses.

Since this study uses structural equation modeling (SEM) analysis technique suggested by (Hoyle, 1995), a number of 332 samples was a proper size for testing the hypotheses. This is because, Hoyle (1995) suggests that minimum sample size for SEM can range from 100 to 200.

4.3.3. Data Analysis

Data analysis was conducted in three steps, 1) Factor Analysis (FA)/dimension reduction to identify the relationship between the observed variables and their underlying latent constructs. 2a) measurement model as the first part of Structural Equation Modelling (SEM) to assess reliability and validity of the constructs, and 2b) structural model as the second part of SEM to test the research hypotheses. This study applied all of these steps within the estimated SEM model, and calculations were performed using the IBM SPSS 28 and SmartPLS (v.3.3.9) programs.

4.3.3.1. Factor Analysis (FA)

FA is used as a data reduction technique. The main advantage of using FA is that it can help researchers close the frequently noted gap between theory and observation (Brown, 2015). It takes a large number of observed variables and then reduce or summarize those variables to represent them in different factors or components (Brown, 2015, Hair et al., 2017). In other words, FA is accomplished by categorizing observed variables according to how well they are closely relevant to one another. As a result, a latent construct/unobserved variable is assigned to those observed variables which have been categorized in to the same group. Then the discovered latent variables should be given names which is fit enough to each group from the authors' point of view (Brown, 2015, Hair et al., 2017).

Given the research model, the self-regulation is one of the constructs, which plays the role of a moderator in the research model and is examined as a mitigation strategy for combating addiction. To measure this latent variable, this study uses a set of 34 observed variables identified by the SLR. Since there was this possibility that some of them are related or correlated to one other, a FA was conducted because correlation is the basis of factor analysis. FA examined the systematic interdependence among those 34 observed

variables and consequently grouped them in to four latent factors or components by determining the base of commonality among them.

To be able to interpret the outcome of a FA, the value of the following factors must be considered (Brown, 2015, Hair et al., 2017):

- *Standard Deviation (SD):* The standard deviation refers to a measure of the amount of variation or scattering of a set of values. Statistics experts have established that measures that are within ± 2 SD of the true value are more accurate than those that fall outside of this range.

- *Communalities or R square (R^2):* Communalities show the amount of variance in each observed variable that is accounted for. Therefore, the calculated communalities including initial and extraction communalities show to what extent each observed variable contributes to measuring "Self-regulation". Initial communalities, which are always equal to 1.0 for correlation analysis, are estimates of the variance in each observed variable that is accounted for by all components or latent factors. Estimates of the variance in each observed variable that the components are expected to account for are known as extraction communalities. The high communalities, which are closer to the value of "1", indicates that the extracted latent factors/components represent the observed variables well. Observed variables having low communalities, which are lower than 0.40, and do not have appropriate contribution to measure the underlying factors/components. It has been suggested to remove such observed variables having low communalities from the analysis.

- *KMO and Bartlett's Test*: The outcome of this test shows two values indicated the suitability of the collected data for structure detection. These values lead researchers to recognize whether the observed variables are suitable for measuring a latent variable and also are accepted by the FA. The first value is The Kaiser-Meyer-Olkin Measure of Sampling Adequacy, which shows what percentage of the variance in the observed variables might be caused by underlying factors/components. A high value close to 1.0 indicates that a factor analysis is useful with the collected data. The results of the factor analysis probably will not be very useful if the value is less than 0.7. The second value shows the significance of KMO and Bartlett's Test, which should be less than 0.05 to be acceptable. A small value (less than 0.05) of the significance level indicate that a FA may be useful with the collected data.

- *Total Variance Explained*: As explained at the beginning of this section, the main purpose for conducting FA is to transform a large number of observed variables in to a number of second-order latent variables/component to measure a main latent variable. This makes it easier to model in regression because it reduces a large number of observed variables (i.e., survey items) into a smaller set of factors/components. Each factor explains a percentage of the total variance. Factors that do not explain much variance might not be worth including in the final model. It takes some iteration to come up with the optimal number of factors/second-order latent variables. The number of Initial Eigenvalues that their calculated total value is greater than 1 reveals the number of factors/second-order latent variables, which have been identified by FA. Accordingly, this study was able to transform the 34 self-regulation's observed variables in to 4 factors.

- *Rotated Component Matrix*: The rotated component matrix helps researchers to determine what the components (factors/groups/second-order latent variables) represent. This matrix contains estimates of the correlations between each of the observed variables and the estimated components. Consequently, each of the 34 observed variables is transformed to one of the identified components with the highest correlation value. Also, these factors/components/second-order latent variables were named based on the functionalities on their observed variables. The FA's result is explained and demonstrated in Chapter 6.

4.3.3.2. Structural Equation Modelling (SEM)

SEM is used mainly to examines the strengths of relationships among some dependent/endogenous variables (which describes latent target constructs in the structural model that are explained by other constructs via structural model relationships; accordingly, 'social media identity', and 'addiction' are dependent variables in this thesis's research mode.) and independent/exogenous variables (which refers the latent constructs that do not have any structural path relationships pointing at them; accordingly, 'attitude', 'personal norm', 'social norm', 'habit', and 'self-regulation' are independent variables) measured through a set of observed variables (Hoyle, 1995, Gefen et al., 2000, Blunch, 2012). SEM deals with measured/observed variables and latent variables. A measured variable is a variable that can be observed directly and is measurable. Given the existing literature, measured variables are also known as observed variables,

indicators, or manifest variables. A latent variable is a theoretical construct that cannot be observed or measured directly and must be deduced from measured/observed variables. They are also known as factors, constructs, second-order variables, or unobserved variables.

This statistical model is highly recommended because (Gefen et al., 2011, Hair et al., 2017):

- In comparison with first-generation data analysis techniques such as linear regression, LOGIT, ANOVA, AANOVA, SEM as the second-generation data analysis technique enables researchers to answer a set of interrelated questions by simultaneously modeling the relationship between a number of independent and dependent constructs.

- This capability for simultaneous analysis makes SEM greatly different from most first-generation regression models because they could analyse only one layer of linkages between independent and dependent variables at a time.

- SEM can statistically assess research models with different level of complexity.

- SEM has potential advantages over linear regression models because it is able to infer latent variables which involve multiple indicators.

- SEM enables researchers to assess the reliability and the validity of a latent variable and its observed variables through evaluating the measurement model.

- In SEM, the latent variables are free of random error. This is because error has been estimated and removed through assessing the measurement model, leaving only a common variance.

SEM is a combination of multiple regression and factor analysis and it is divided into two parts: a measurement model and a structural model. The measurement model deals with the relationships between measured/observed variables and their latent variables to assess the reliability and validity of those constructs. However, the structural model just deals with the relationships between latent variables (i.e. mediating and moderating relationships). Hence, a combination of a structural models and measurement models leads to a SEM.

4.3.3.2.1. *Measurement Model Assessment (*Construct Reliability and Validity)

Although having evidence of validity and reliability was one of the criteria for selecting appropriate instruments from prior studies, it is still important to test the reliability and

validity of the selected instruments in order to decrease the possibility of errors that might arise from measurement problems in a quantitative research (Boudreau et al., 2001, Taherdoost, 2016, Gefen et al., 2000, Hair et al., 2017). An instrument's reliability refers to its ability to produce consistent results when repeated measurements are taken (Carmines and Zeller, 1979). Taherdoost (2016) states that if observed variables hang together and measure the same construct, it is considered to have high internal consistency dependability.

Since this research uses SEM to test its hypotheses, measurement model as an integral part of this statistical technique assesses both construct reliability and validity. For each of the latent variables within SEM, a measurement model has to be defined. These models embody the relationship between the empirically observable indicator variables and the latent variables. According to (Gefen et al., 2000, Hair et al., 2017), the following criteria needs to be considered in a measurement model assessment for checking the construct reliability:

- *Composite reliability (CR):* Internal consistency is the degree of interrelationship or homogeneity among the items/observed variables on a test, such that they are consistent with one another and measuring the same factor (Gefen et al., 2000). Internal consistency is an index of the reliability of a test, which is also called internal consistency reliability or internal reliability or composite reliability (CR). It measures the reliability of the indicators where values are between 0 and 1. A good and adequate consistency is a CR of above 0.7 (Gefen et al., 2000, Hair et al., 2017).

- *Cronbach*'s *alpha*: the Cronbach Alpha coefficient as the internal consistency measure is most frequently employed for testing the reliability of the research instruments. It is regarded as the most fit measure of reliability when using Likert scales (Boudreau et al., 2001, Sun et al., 2015, Gefen et al., 2000, Hair et al., 2017). Similar to the composite reliability, Cronbach's alpha is applied to find the true value of internal consistency reliability between the values (Hair et al., 2017). An acceptable reliability confirms how well the measurement variables/items in an instrument are designed for measuring the effect of a construct in a causal relationship. Although there are no absolute rules exist for governing internal consistency, most scholars agree on a minimum internal consistency coefficient of 0.6 (Boudreau et al., 2001, Gefen et al., 2000). Thus, a Cronbach alpha greater than 0.6 denotes a good degree of

reliability (Boudreau et al., 2001, Sun et al., 2015, Taherdoost, 2016, Hair et al., 2017).

- *rho_A value*: This value helps the measurements of reliability to be presented together. This is because a good indicator of reliability is a rho_A value between Cronbach's alpha and composite reliability. It should be greater than 0.7.
- *Indicator reliability*: Indicator reliability just basically reflects on the indicator items or observed variables. This assessment shows that each observed variable is a good measurement of the latent construct or not. Therefore, the squared loading as the result of this assessment must be above 0.5.

Next, the validity of the constructs or measurement models was tested. When a relationship is a causal one, it is important to identify what the specific cause and effect behaviors or constructs are involved in that relationship (Taherdoost, 2016). Construct validity means how well a concept or behavior has been translated or transformed into a functioning and operating reality. Therefore, construct validity refers to an instrument's capacity or ability to accurately measure specific concept or construct relevant to a research model (Carmines and Zeller, 1979). According to Taherdoost (2016) and Hair et al. (2017), construct validity has two components: convergent and discriminant validity.

- *Convergent validity*: Convergent validity is described as a degree to which two measures of constructs that are expected theoretically to be related are, in fact, related. Although it is uncommon for any two measures to be perfectly convergent, proving a correlation between the two measures serves as the typical method for proving convergent validity. When the Average Variance Extracted (AVE) is greater than 0.50, convergent validity is established (Boudreau et al., 2001, Taherdoost, 2016, Gefen et al., 2000, Hair et al., 2017).
- *Discriminant validity*: This criterion refers to divergence between construct/latent variables. Constructs should be different in a framework or a research model. Therefore, to assess the distinction between constructs, researchers need to establish the discriminant validity. Discriminant validity (also known as divergent validity) examines whether constructs that ought to be unrelated are, in fact, unrelated (Taherdoost, 2016, Hair et al., 2017). Different methods, some of which are regarded as conventional while others as contemporary, are used to evaluate discriminant validity. These methods are as follows (Taherdoost, 2016, Hair et al., 2017):

o   Fornell-Larcker Criterion: it is a traditional criterion to assess the discriminant validity. The Fornell-Larcker criterion (FL criterion) is a rule suggested by Fornell and Larcker (1981) to assess discriminant validity. The Fornell-Larcker criterion is a decision rule based on a comparison between the squared construct correlations and the AVE. The constructs' discriminant validity has been established: (1) the square root of each construct's AVE is higher than its correlation with another construct, and (2) each item loads highest on its associated construct.

o   Cross loading: When a variable is found to have more than one significant loading (depending on the sample size) it is termed a cross-loading, which makes it troublesome to label all the factors which are sharing the same variable and thus hard to make those factors be distinct and represent separate concepts.

o   Heterotrait-monotrait (HTMT) ratio: To assess the distinction between constructs, researchers need to establish the discriminant validity via assessing Heterotrait-monotrait (HTMT) ratio. The HTMT is a measure of similarity between latent variables. If the HTMT is clearly smaller than one, discriminant validity can be regarded as established. Accordingly, it is recommended this value should be less than 0.9 (Boudreau et al., 2001, Taherdoost, 2016, Gefen et al., 2000, Hwang, 2017, Hair et al., 2017).

4.3.3.2.2.   Structural Model Assessment

In a theoretical model, a structural model indicates the causal and correlational links among latent variables. the structural model allows researchers to determine the degree of correlation among latent variables (calculated as path coefficients) (Hoyle, 1995, Gefen et al., 2000, Blunch, 2012). Some of the variables may be a mediator or moderator construct.

Mediation is a hypothesized causal relationship in which one latent variable affects a second latent variable then the second one affects the third latent variable. The intervening variable, the second one, is the mediator. A mediator variable explains the relation between the independent and the dependent variable. Many theories in different research disciplines rely on moderating variables. These variables have an impact on the strength or nature of the relationship that exists between two other variables.

To assess the structural model, the following criteria should be considered:

Coefficients of determination (R^2): The coefficient of determination, denoted R^2, is the proportion of the variation in the dependent constructs that is predictable from the independent constructs. R-squared is a statistical measure that indicates how close the data is to the fitted regression line. For the explained variance of a specific dependent construct to be considered sufficient, R-square values should be equal to or greater than 0.10.

Size and significance of path coefficients (f^2): A path coefficient shows the direct effect of a latent variable assumed to be a cause on another latent variable assumed to be an effect. To interpret the path coefficient, the significance of the path coefficient should be checked. The acceptable value for the path coefficient should be greater than -1 and less than 1 (-1< path coefficient<1). Otherwise, a path coefficient > 1 or < -1 indicates a collinearity problem.

4.4. Phase III: Qualitative Research (Interview)

The main purpose of this phase of the study was to address the second part of the question 3, "How does a mitigation strategy deal with social media addiction?" in order to propose a conceptual structure of the mitigation strategy investigated. A conceptual structure is raised from embodied experiences or behaviors, which demonstrates a schema structure of how people think and behave in the context of a concept (Maglio and Matlock, 1999).

As previously explained, the SLR as the 'phase I' of the research method led this study to identify the self-regulation as a mitigation strategy for dealing with addiction. Next, the 'phase II' examined to what extent the 'self-regulation' affects social media addiction. Then the 'phase III' was conducted after the 'phase II'. This is because, before learning how this strategy works, it had to be proven that this strategy has a negative effect on social media addiction. The outcome of the quantitative research (phase II) confirmed that the "self-regulation' is an effective mitigation strategy for combating addiction. Therefore, this study performed a qualitative research by conducting interviews to address the abovementioned question. Consequently, this study interviewed to deeply understand how this strategy operates to be able to propose a conceptual structure for the performance of this strategy, which can be used as a guideline by individuals, software developers, and psychological clinics for dealing with social media addiction.

4.4.1. Participants

This phase of the research was subjective research since it was important to be informed on how experienced social media users (i.e. Instagram users) behave to control their social media usage. This phase was supposed to be conducted after the quantitative research because first of all it was needed to confirm that the suggested mitigation strategy (i.e. self-regulation) is an effective and efficient strategy to deal with social media addiction.

Due to the nature of the sequential design of this study, and also in order to extract a reliable and meaningful result, it was important to select the interviewees from those ones who participated in the online survey. Thus, this study focused on a sample who were:

- Australian university students,
- An experienced Instagram user for at least 6 months,
- Aged between 18 and 40 years old and
- Fluent in English
- Participated in the online survey research

4.4.2. Measurements and Data Collection

While the SLR helped this study to develop its theoretical research model and identify potential constructs which positively effect social media addiction, it led this thesis to identify self-regulation as a potential mitigation strategy from the lens of social cognitive theory to deal with addiction. The quantitative phase of this study confirmed that self-regulation is a mitigation strategy that can be considered for treatment and prevention. Therefore, the qualitative phase of the study focused on investigating how self-regulation deals with social media addiction. Consequently, this study conducted an interview process to provides an in-depth understanding of the way Instagram users act, behave and manage their day-to-day social media use in a particular setting.

Interview questions: Social cognitive theory states that the self-regulation mechanism is operated through three functions called self-monitoring, self-judgment, and self-reaction (Bandura, 1991). Hence, this study needed to use a set of questions, which should correspond to self-regulation functions. This study adopts open-ended questions from the reviewed literature, which were developed and validated by Brevers and Turel (2019).

The identified questions needed to be modified to be a good enough fit for this thesis because the original version was made to examine the effect of self-regulation on social media addiction in general, without focusing on any specific social media application. Then, the first drafted questionnaire was verified by the supervisory team and additional experts in IS and computer science who were academic staff members in Information System and Modelling School and Computer Science School at UTS. They were asked to read the questions and comment on their clarity, appropriateness and completeness. Some applicable comments recommended by the supervision team were applied and consequently a semi-structured interview with open-ended questions shown in Appendix 8 were designed to obtain experienced Instagram users' opinions on how they regulate their Instagram usage. This questionnaire included two sections. The first section asks questions related to personal information including 5 items such as age, gender, education, the participants' experiences of Instagram use, and the amount of daily usage of Instagram. These questions include the selection answers needed to be completed just by one option. The second section included 5 open-ended questions on how self-regulation deals with Instagram addiction.

A semi-structured interview is one of qualitative interview types that can be carried out between interviewer and interviewees. Some prominent reasons explained by Myers and Newman (2007) led this research to focus on semi-structured interviews rather than other interview techniques. A semi-structured interview provides rich data and also ensures that the respondents produce closely relevant themes or topics to the research questions, while the unstructured interview has the risk of not getting the all-important answers to topics related to the research questions. Furthermore, this technique takes shorter duration in comparison with an unstructured interview which takes a lot of time and consequently is difficult to be managed.

Data collection: The data collection process was performing in both online and in person meetings. An invitation letter (Appendix 8) was advertised through different websites such as UTS Faculty of Science (School of Built Environment), UTS Faculty of health, UTSWiEIT (UTS Women in Engineering and Information Technology) community, UTS Center on Persuasive Systems for Wise Adaptive Living (PERSWADE), School of Engineering of Macquarie University. In addition, the invitation was sent to different Australian university students' groups in Facebook and Telegram. Furthermore,

participants were invited to forward the invitation to others in their social network if they wished; this sampling method is referred to as snowball sampling (Noy, 2008).

Respondents were informed although participation is voluntary and that the answers would be collected and analyzed anonymously, it is important that they have already participated in the online survey research coded "reference number: ETH205332" and titled "Investigating Addiction to Social Media Use: Influential Factors and Mitigation Strategies". *Also, all themes, subthemes* that they needed to sign the consent form in order to be interviewed (Appendix 10).

The participants received the interview questions in the first minutes of their attendance at the interview sessions and were informed the interview will be voice recorded and also transcribed verbatim. According to Francis et al. (2010), the predominant concept for setting a sample size in qualitative studies is "saturation". Since there is no agreed method of stablishing a sample size in a qualitative study, sample size is often justified by interviewing participants until reaching data saturation (Francis et al., 2010). Francis et al. (2010) propose principles for deciding saturation in theory-based interview studies: first, specify a minimum sample size for initial analysis, and second, specify how many more interviews will be conducted without new ideas emerging (stopping criterion). Accordingly, after interviewing 41 participants, the data collection was terminated due to reaching the saturation point of data.

This number of interviewees was sufficient to capture different opinions to discover behaviours which were matched with self-regulation functions. The data collection took 4 months to be completed. Although the participants had the online meeting option to participate in the interview, they ignored the invitation because of their online work overload during Covid-19 lockdown.

4.4.3. Data Analysis

The data analysis technique conducted in this phase was thematic analysis, which is a qualitative method for identifying, analyzing, organizing, describing, and reporting themes found within a set of rich data (Nowell et al., 2017). Thematic analysis is a valuable technique because: it leads researchers to examine different participants' point of views about a topic and then generate unanticipated insights by highlighting

similarities and differences of those ideas; and also, it summarises key findings of a large data set to a well-structured approach and then provides them as identified themes. A theme is a pattern that highlights a significant aspect or meaning of the collected data, which are related to the research question (Nowell et al., 2017).

In qualitative study, data collection and data analysis are not always separate steps because they are often interrelated processes (Francis et al., 2010, Creswell and Poth, 2016).

Accordingly, data collection and analysis were simultaneously processed in this study to be able to determine that saturation point of data is reached (Francis et al., 2010). Therefore, every single interview recorded was transcribed in the format of text data, then analysed and coded (to identify the behaviors corresponding to the self-regulation functions) for themes with the help of NVivo 12. NVivo is a qualitative data analysis software that is used to analyse unstructured data such as text, audio, video and Images (Edhlund and McDougall, 2019). This thesis adopted the following steps recommended by Nowell et al. (2017) for the thematic analysis process.

Step 1: Familiarising with collected data

When data are collected through an interactive way like interviews, researchers will approach the analysis with some background information about the data and perhaps some early analytic interests or ideas. Thus, researchers' immersion in the data is essential to become familiar with the depth and scope of the content. Immersion in the data entails reading it repeatedly while actively looking for patterns and meanings. Accordingly, researchers need to: 1) document theoretical and reflective thoughts, 2) document thoughts about potential codes and themes, 3) store raw data (e.g. voice record, transcripts, videos, documents, and images) in well-organized archives.

Step 2: Generating initial codes

After familiarising with the collected data, researchers need to have ideas on what is in the data is and what is interesting about the data. This step involves the initial production of codes from the rich data. Qualitative coding is a process to search inside the collected data for identifying different concepts and also relationships between them (Auerbach and Silverstein, 2003). In addition, the coding process allows researchers to simplify

unstructured data, identify specific characteristics of the data, allocate labels to those characters and also link the characters to their relevant themes.

After storing and organising the data set with the help of the NVivo software, this study systematically reviewed all text files with full and equal attention to generate the initial codes. Through an iterative process, all transcripts were read several times to identify participants' behaviours, practical actions or reactions, experiences or opinions about their self-regulation ability. Memos were written down to identify the noteworthy aspects. Consequently, the relevant concepts to the self-regulation were marked and then the concepts with similar character/functionality were highlighted with similar colours to be easily identified.

Some research meetings were held by the supervision team throughout the coding process to examine 1) how my thoughts and ideas were evolving as I engaged more deeply with the data, and 2) whether the extracted codes were sensible and relevant to the proposed themes.

Step 3: Searching for themes

A theme is an abstract concept that gives a recurring experience and its various expressions meaning and identity (Nowell et al., 2017, Braun and Clarke, 2006). A theme is not necessarily dependent on measurement variables but rather on whether it captures some important things relevant to the research question/s. In another words, themes are significant concepts that connect the identified codes together (Auerbach and Silverstein, 2003).

Thematic analysis is a flexible technique that allows researchers to determine themes in a number of ways (Braun and Clarke, 2006). A theme, for example, may be 1) initially generated inductively from the raw data, 2) generated deductively from theory and prior research, or 3) extracted from a few predefined codes (Boyatzis, 1998, Braun and Clarke, 2006, Nowell et al., 2017).

This step begins when all collected data have been initially coded, and a list of the identified codes has been developed. It involves sorting and then gathering all the potentially relevant extracted codes into themes. This study adopted the appropriate

themes named 'self-monitoring',' self-judgment', and 'self-reaction' from the lens of social cognitive theory.

To visualise the first, second and third steps, the coding process was adopted from Saldaña (2021) as Figure 4.5 demonstrates.
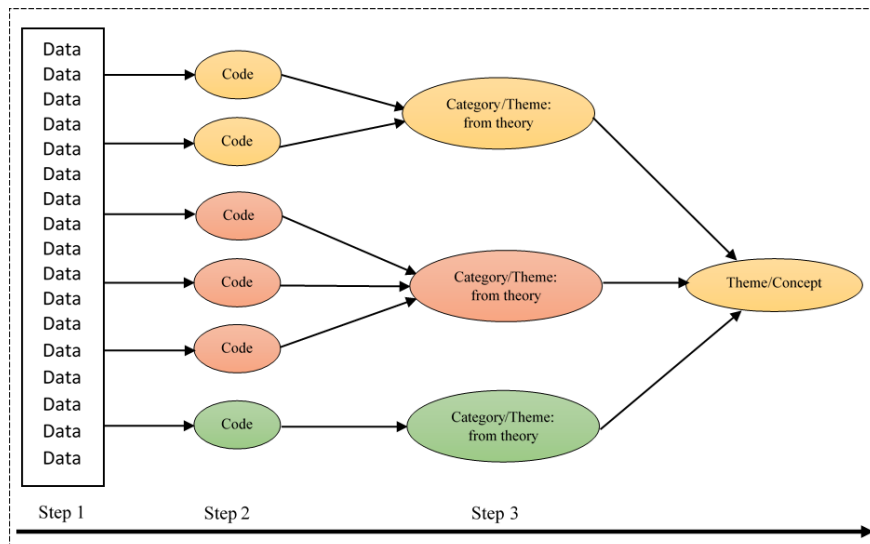
Figure 4-5. Coding steps adopted from (Saldaña, 2021)

Step 4: Reviewing themes

This step begins when a set of themes has been generated and they now need to be improved. In this step, the coded data extracts for each theme are reviewed by academics to see if they seem to fit together in a logical pattern. The validity of every single theme should be considered to assess whether the themes accurately capture the meanings visible in the data set as a whole (Braun and Clarke, 2006).

Step 5: Defining and naming themes

During this step, researchers determine what aspect of the data is captured by each theme and also identify what interesting things are about the generated themes and why. Braun and Clarke (2006) state that theme names need to be meaningful and immediately give the reader a sense of what the theme is about.

During this step, all descriptions for each individual theme, provided by the existing literature, were re-reviewed to make sure that each theme fitted into the overall story about the entire data set in relation to the research questions. Next, after ensuring that the necessary and sufficient themes have been identified, the name of all themes were

revisited with the intent to ensure that the concept of user opinions, experiences, performance or behaviours of participants were used in the names.

Step 6: Producing the report

Once the themes have been fully stablished then the result is ready to be written and reported. A thematic analysis's report should give a succinct, logical, entertaining, cogent, and nonrepetitive description of the data within and across themes.

Once the final themes were established the process of writing up the result was started. The reports contained both shorter narrative quotes and lengthier block quotes. Since the interviews were conducted anonymously, all quotes were accompanied by a unique number to show that different participants were represented in the outcomes. Also, all themes, subthemes, and exemplar quotes are presented in a table in Appendix 16.

Finally, the outcome of this qualitative research as a conceptual framework of the self-regulation in a format of a prototype is described and presented in the findings section. In addition, the findings are discussed in the discussion section to explain where the findings were supported, contradicted, or added to the current body of knowledge on the topic.

4.5. Consideration of Ethics and Risks

UTS researchers who are staff or students are required to consider the code of ethics if their research is involved in communicating with human participants. UTS highlights the function of the UTS Human Research Ethics Committee (HREC) into this directive. This directive has been designed to ensure compliance of UTS HREC with government regulations in the field of human research.

Ethics is important to protect people and organization from manipulation and misconduct. All activities within research including data collection, data analysis, and disposal of the data must align with law and professional ethics. Unethical scientist's conduct face severe damage to his or her reputation and can disadvantage the community. Thus, ensuring that this study will comply with UTS etiquette and conduct is important.

Interviews allow researchers to obtain a deeper understanding of the existing issues by following up statements with the designed questions. However, these interactions may harm the interviewee, for example if the questions related to sensitive issues, violate

participants' privacy, or secretly observe participant behavior. Furthermore, interviews demand allocation of time that might be unjust and risky. We as a researcher must protect participants from any harmful situation that might occur due to the research.

Similar to the interview research, questionnaire survey research may also bring negative impacts to the participants. Researchers must ensure that all the information provided by participants is kept confidential, the participation is voluntary, and questions asked in the questionnaire are carefully developed to accommodate ethics.

Accordingly, obtaining ethical approval was very important for this study to demonstrate to my participants that I have adhered to the accepted ethical standards of a genuine research study. This is because, participants have the right to be informed who and how their data are used. This study obtained ethics approval for both online and interview data collection from UTS ethics committee (UTS HREC REF NO. ETH20-5332). The ethics approval ensures data collection is conducted ethically with regards to the UTS's rules for protecting participants' identity, privacy and security of the data collected.

Chapter 5: Findings of Systematic Literature Review (SLR)

5.1. Overview

The phase I of this research was allocated to the SLR to 1) answer the very first research question "What characterises social media addiction and how it is manifested?" based on the extant literature on social media addiction, 2) partially answer a part of the second and third research questions in terms of developing the research model through identifying the appropriate constructs which positively influence social media addiction, and also identifying mitigation strategies which combat social media addiction.

This research aims to address the gaps in the existing literature on social media addiction. A systematic literature review (SLR) was conducted to identify and analyse the significant factors, definitions, symptoms, and negative consequences of social media addiction. The SLR also included the mitigation strategies proposed in previous studies. The findings revealed the lack of a unified definition of social media addiction. Consequently, this study proposed a comprehensive description based on keywords from reviewed articles. The symptoms of social media addiction were identified as salience, mood modification, tolerance, relapse and reinstatement, sense of withdrawal, and conflict, which are similar to other types of technology addiction. The study also highlighted the variability in measuring these symptoms across different studies. To provide a comprehensive overview, the research synthesized influential factors into categories such as technology-related factors, socio-environmental factors, and psychological factors. It also identified negative consequences and proposed mitigation strategies. This study expanded the current literature by covering a wider range of influential factors, negative consequences, symptoms, and mitigation strategies compared to previous research. This research did not limit the analysis to specific target groups or social media platforms. It also emphasised the importance of measuring addiction symptoms as a fundamental dimension of the addiction construct.

The following subsections indicate 1) the selected studies, 2) demographic information of the selected articles, 3) the factors that characterise social media addiction including definition of addiction, symptoms of addiction, negative consequences of addiction and influential factors/drivers/causes/predictors of addiction, which were identified by prior studies, 3) potential mitigation strategies to deal with addiction.

5.2. Selected Studies

The PRISMA flow diagram is an evidence-based minimum set of items such as search, select, visualise, and report the relevant studies which enabled this study to perform a meta-analysis to answer the research questions. Consequently, 74 out of 2539 searched studies were collected by considering inclusion and exclusion criteria explained in the subsection 'study selection'. As a result, Table 5.1 demonstrates the selected studies published in IS discipline.

Table 0-1. Studies included in narrative synthesis

#	Author(s)	Title	Journal
1	(Turel and Serenko, 2012)	The benefits and dangers of enjoyment with social networking websites	European Journal of Information Systems
2	(Wang et al., 2015)	A theory of social media dependence: Evidence from microblog users	Decision Support Systems
3	(Leong et al., 2019)	A hybrid SEM-neural network analysis of social media addiction	Expert Systems with Applications
4	(Huang et al., 2014)	Gratifications and social network service usage: The mediating role of online experience.	Information & Management
5	(Soh et al., 2022)	The Relationship between Social Capital and Social Media Addiction: The Role of Privacy Self-Efficacy	Australasian Journal of Information Systems
6	(Xu et al., 2022)	Why are people addicted to SNS? Understanding the role of SNS characteristics in the formation of SNS addiction	Journal of the Association for Information Systems
7	(Hong et al., 2014)	Analysis of the psychological traits, Facebook usage, and Facebook addiction model of Taiwanese university students	Telematics and Informatics
8	(Tang et al., 2016)	Personality traits, interpersonal relationships, online social support, and Facebook addiction	
9	(Foroughi et al., 2019)	Are depression and social anxiety the missing link between Facebook addiction and life satisfaction? The interactive effect of needs and self-regulation	

10	(Zhang et al., 2019)	Exploring short-form video application addiction: Socio-technical and attachment perspectives	
11	(Dalvi-Esfahani et al., 2019)	Social media addiction: Applying the DEMATEL approach	
12	(Aparicio-Martínez et al., 2020)	Gender differences in the addiction to social networks in the Southern Spanish university students	
13	(Monacis et al., 2021)	The risk of social media addiction between the ideal/false and true self: Testing a path model through the tripartite person-centered perspective of authenticity	
14	(Balakrishnan and Shamim, 2013)	Malaysian Facebookers: Motives and addictive behaviours unravelled	Computers in Human Behaviour
15	(Müller et al., 2016)	A hidden type of internet addiction? Intense and addictive use of social networking sites in adolescents	
16	(Błachnio et al., 2016)	Association between Facebook addiction, self-esteem and life satisfaction: A cross-sectional study	
17	(Choi and Lim, 2016)	Effects of social and technology overload on psychological well-being in young South Korean adults: The mediatory role of social network service addiction	
18	(Yang et al., 2016)	Exploring the dual outcomes of mobile social networking service enjoyment: The roles of social self-efficacy and habit	
19	(Błachnio and Przepiorka, 2016)	Personality and positive orientation in Internet and Facebook addiction. An empirical report from Poland	
20	(Gao et al., 2017)	How does social presence influence SNS addiction? A belongingness theory perspective	

21	(Błachnio et al., 2017)	The role of personality traits in Facebook and Internet addictions: A study on Polish, Turkish, and Ukrainian samples	
22	(Ho et al., 2017)	Till logout do us part? Comparison of factors predicting excessive social network sites use and addiction between Singaporean adolescents and adults	
23	(Kanat-Maymon et al., 2018)	Contingent self-worth and Facebook addiction	
24	(Atroszko et al., 2018)	Facebook addiction among Polish undergraduate students: Validity of measurement and relationship with personality and well-being	
25	(Jasso-Medrano and Lopez-Rosales, 2018)	Measuring the relationship between social media use and addictive behaviour and depression and suicide ideation among university students	
26	(Brailovskaia et al., 2018b)	Physical activity mediates the association between daily stress and Facebook Addiction Disorder (FAD) - A longitudinal approach among German students	
27	(Osatuyi and Turel, 2018)	Tug of war between social self-regulation and habit: Explaining the experience of momentary social media addiction symptoms	
28	(Chen, 2019)	From attachment to addiction: the mediating role of need satisfaction on social networking sites	
29	(Barnes et al., 2019)	Mobile ubiquity: Understanding the relationship between cognitive absorption, smartphone addiction and social network services	
30	(de Bérail et al., 2019)	The relations between YouTube addiction, social anxiety and parasocial relationships with YouTubers: A moderated-mediation model based on a cognitive-behavioural framework	

31	(Ponnusamy et al., 2020)	Drivers and outcomes of Instagram Addiction: Psychological well-being as moderator	
32	(Müller et al., 2020)	Maximizing social outcomes? Social zapping and fear of missing out mediate the effects of maximization and procrastination on problematic social networks use	
33	(Boursier et al., 2020)	Do selfie-expectancies and social appearance anxiety predict adolescents' problematic social media use?	
34	(Naranjo-Zolotov et al., 2021)	Drivers of online social media addiction in the context of public unrest: A sense of virtual community perspective	
35	(Zhao, 2021)	The impact of social media use types and social media addiction on subjective well-being of college students: A comparative analysis of addicted and non-addicted students	
36	(James et al., 2017)	The Effect of Belongingness on Obsessive-Compulsive Disorder in the Use of Online Social Networks	Journal of Management Information Systems
37	(Tarafdar et al., 2020)	Explaining the link between technostress and technology addiction for social networking sites: A study of distraction as a coping behaviour	Information Systems Journal
38	(Islam et al., 2019)	Duality of self-promotion on social networking sites	Information Technology & People
39	(Tian et al., 2022)	How short-form video features influence addiction behaviour? Empirical research from the opponent process theory perspective	
40	(Ryan et al., 2016)	Who gets hooked on Facebook? An exploratory typology of problematic Facebook users	Cyberpsychology: Journal of Psychosocial Research on Cyberspace
41	(Lee, 2019)	Predicting SNS addiction with the Big Five and the Dark Triad	

42	(Wang and Wang, 2013)	Social Support and Social Interaction Ties on Internet Addiction: Integrating Online and Offline Contexts	Cyberpsychology, Behaviour, and Social Networking
43	(Baek et al., 2013)	Social and Parasocial Relationships on Social Network Sites and Their Differential Relationships with Users' Psychological Well-Being	
44	(Koc and Gulyagci, 2013)	Facebook Addiction Among Turkish College Students: The Role of Psychological Health, Demographic, and Usage Characteristics	
45	(Casale et al., 2016)	Grandiose and Vulnerable Narcissists: Who Is at Higher Risk for Social Networking Addiction?	
46	(Punyanunt-Carter et al., 2018)	Analysing College Students' Social Media Communication Apprehension	
47	(Pontes et al., 2018)	Beyond ''Facebook Addiction'': The Role of Cognitive-Related Factors and Psychiatric Distress in Social Networking Site Addiction	
48	(Brailovskaia et al., 2018a)	Facebook Addiction Disorder in Germany	
49	(Li et al., 2018a)	WeChat Addiction Suppresses the Impact of Stressful Life Events on Life Satisfaction	
50	(Brailovskaia et al., 2020)	Positive Mental Health Mediates the Relationship Between Facebook Addiction Disorder and Suicide-Related Outcomes: A Longitudinal Approach	
51	(Baturay and Toker, 2017)	Self-Esteem Shapes the Impact of GPA and General Health on Facebook Addiction: A Mediation Analysis	Social Science Computer Review
52	(Abbasi and Dibble, 2019)	The Role of Online Infidelity Behaviours in the Link between Mental Illness and Social Media Intrusion	

53	(Bouffard et al., 2021)	Social Media and Romantic Relationship: Excessive Social Media Use Leads to Relationship Conflicts, Negative Outcomes, and Addiction via Mediated Pathways	
54	(Abbasi and Dibble, 2021)	The role of online infidelity behaviours in the link between mental illness and social media intrusion	
55	(Salehi et al., 2022)	Online Addictions Among Adolescents and Young Adults in Iran: The Role of Attachment Styles and Gender	
56	(Hawi and Samaha, 2019)	Identifying commonalities and differences in personality characteristics of Internet and social media addiction profiles: traits, self-esteem, and self-construal	Behaviour & Information Technology
57	(Gong et al., 2019a)	Understanding the formation mechanism of mobile social networking site addiction: evidence from WeChat users	
58	(Nikbin et al., 2020)	Personality traits, psychological well-being, Facebook addiction, health and performance: testing their relationships	
59	(Qaisar et al., 2021)	Effects of social networking site overloads on discontinuous intentions of users: a moderated mediation analysis	
60	(Malak et al., 2022)	Correlation between psychological factors, academic performance and social media addiction: model-based testing	
61	(Chidambaram et al., 2022)	Parental neglect and emotional wellbeing among adolescent students from India: social network addiction as a mediator and gender as a moderator	
62	(Al-Busaidi et al., 2022)	The role of excessive social media content generation, attention seeking, and individual differences on the fear of missing out: a multiple mediation model	

63	(Lin et al., 2019)	Role of social anxiety on high engagement and addictive behaviour in the context of social networking sites	Data Technologies and Applications
64	(Cao et al., 2020)	Exploring the mechanism of social media addiction: an empirical study from WeChat users	Internet Research
65	(Gong et al., 2020a)	Understanding the role of individual differences in mobile SNS addiction	Kybernetes
66	(Maqableh et al., 2021)	Examining the Determinants of Facebook Continuance Intention and Addiction: The Moderating Role of Satisfaction and Trust	Informatics
67	(Vaghefi and Lapointe, 2013)	Can it hurt productivity? An investigation of its addiction	IS Conference papers
68	(Moghavvemi et al., 2017)	Facebook and YouTube Addiction: The Usage Pattern of Malaysian Students	
69	(Hwang, 2017)	The Influence of personality traits on the Facebook Addiction	
70	(Luke and Evelina, 2017)	Exploring Indonesian Young Females Online Social Networks (OSNs) Addictions: A Case Study of Mass Communication Female Undergraduate Students	
71	(Yahya et al., 2019)	Between Habit and Addiction: An Overview of Preliminary Finding on Social Networking Sites Usage among Teenagers	
72	(Purohit et al., 2020)	Designing for digital detox: Making social media less addictive with digital nudges	
73	(Bulut and Tuncay, 2020)	Social Media Addiction and Sleep Problem: A Structural Equation Modelling	
74	(Purohit and Holzer, 2021)	Unhooked by Design: Scrolling Mindfully on Social Media by Automating Digital Nudges	

In addition, Figure 5.1 represents distribution of the selected publications from 2003 to 2022.
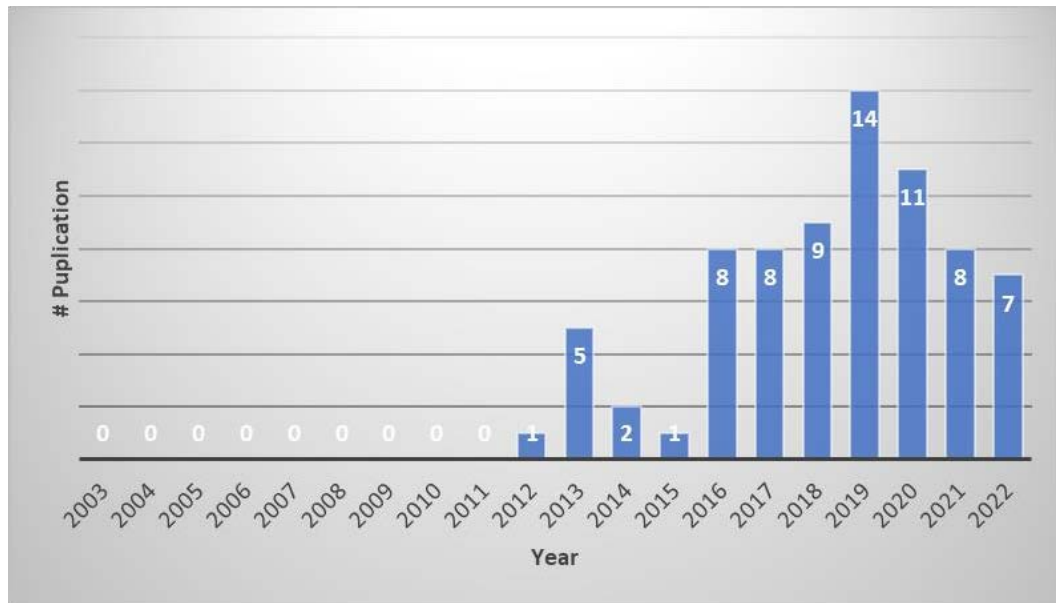
Figure 0-1. Distribution of the selected publications from 2003 to 2020

5.3. Studies' Demographics

Findings of the reviewed articles illustrate that the number of female participants was greater than males in most studies, and few of them had nearly equal distribution of male and females. As Figure 5.2 shows, more importantly, we found that the majority of the selected articles (n=42) used both college and university students in the age range of 17 to 37 as their samples, neglecting other cohorts of social media users and their patterns of use and needs. Unsurprisingly 30 out of the 74 reviewed articles focused on Facebook as the most popular social media platform and 32 of the reviewed papers investigated social media addiction in general, while the remaining studies investigated one or more other platforms such as WeChat (n=4), Instagram (n=3), YouTube (n=2), TikTak (n=2), and LinkedIn (n=1) (Figure 5.3).

Papers absed on their sample group

Legend:
- College & University students
- Youth & Adults (19≤ age≤65)
- Not mentioned
- Teenagers & Youth & Adults (13≤ age≤65)
- High school students
- Teenagers & Youth (13≤ age≤25)
- Youth (19≤ age≤25)
- Employee
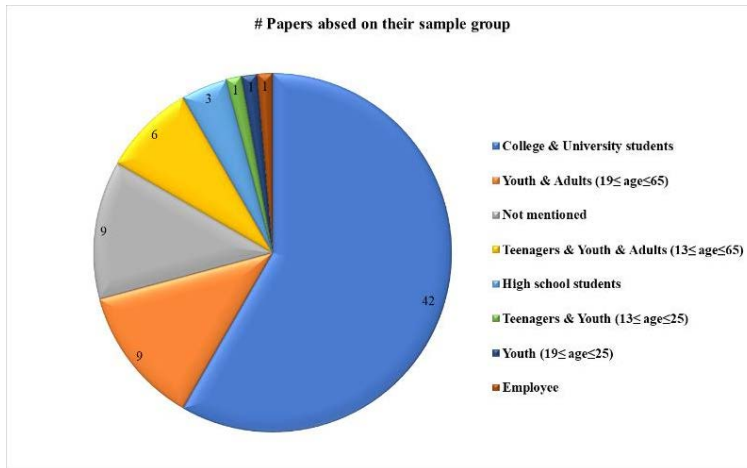
Figure 0-2. The statistics of the reviewed articles based on their studied sample groups

Papers based on their context of the study

Legend:
- social media
- Facebook
- Wechat
- Instagram
- Youtub
- TikTak
- LinkedIn
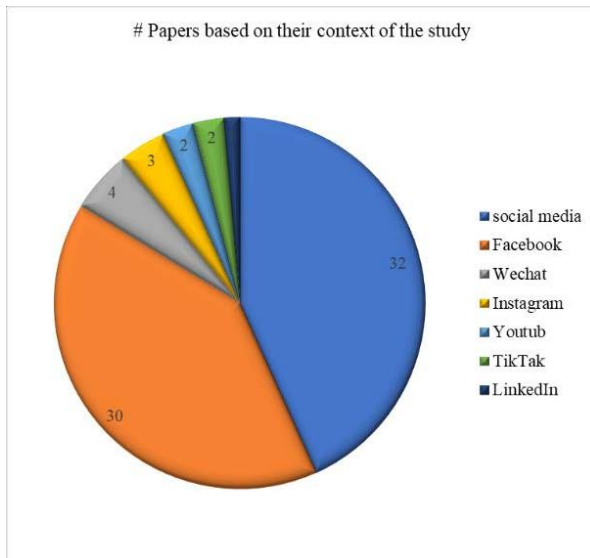
Figure 5-3. The statistics of the reviewed articles based their context of study

As Figure 5.4 shows, significantly, most of the studies, 31 out of 74 reviewed articles, have been conducted just in the United States, China and Malaysia respectively. Also, with a significant difference, countries such as Germany, Taiwan and Poland have paid attention to this research area. Surprisingly, this statistic shows that just a few Australian IS researchers paid attention to this field of study. Also, other countries such as European and Middle East countries have been ignored by IS researchers.

 # Papers based on the studied region
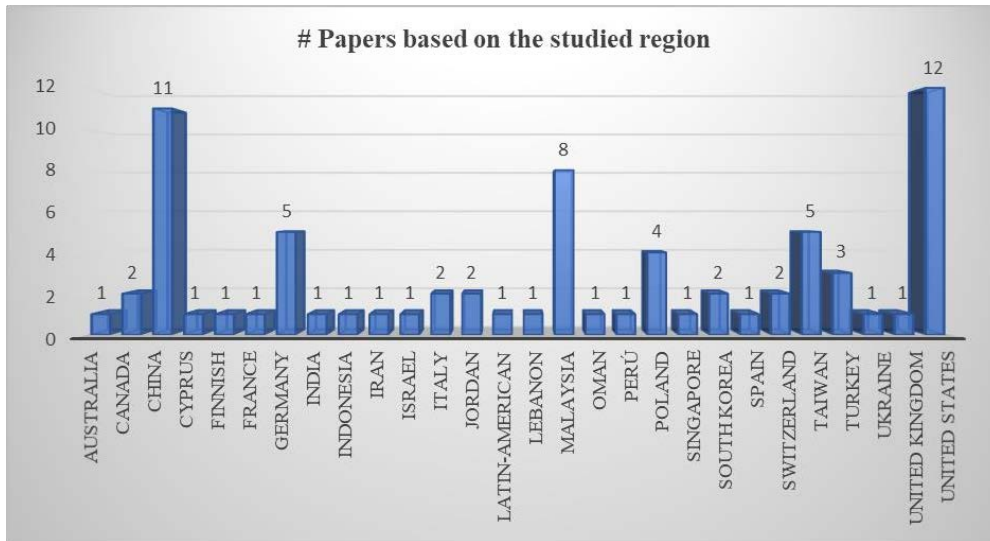
Figure 5-4. The statistics of the reviewed articles based their region of study

The next noteworthy point is the scope of the study of the reviewed articles. The result of this research confirms the claim of some studies such as Tarafdar et al. (2015a) and Tarafdar et al. (2015b) that there is a lack of study on characterising the dark side of IT use in general and social media addiction in particular, in terms of investigating influential factors of addiction, negative consequences of addiction and also mitigation mechanisms to deal with addiction, all in the same study.

As Figure 5.5 shows, 40 articles out of the reviewed ones just investigated influential factors/drivers/predictors of addiction. Then the most statistics 12 out of 74 and 11 out of 74 respectively belong to the studies that simultaneously investigated "influential factors & negative consequences" of addiction and "influential factors & mitigation strategies".
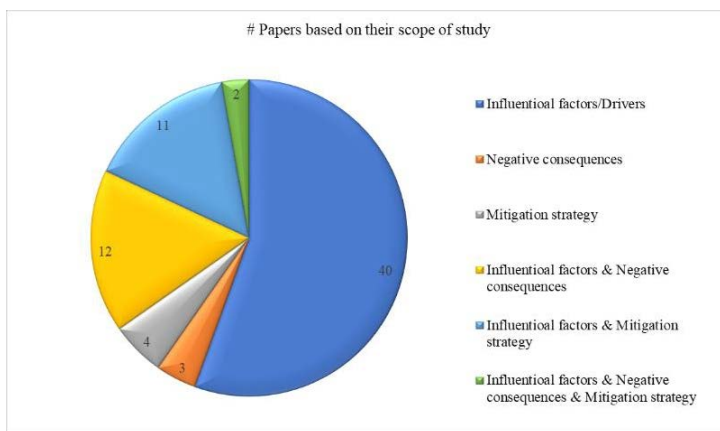
Figure 5-5. The statistics of the reviewed articles based on their scope of studies

In terms of the research structure as visualised in Figure 5.6, findings of the SLR revealed that 67 out of the 74 selected papers have used just the quantitative method, which includes both online surveys (n=43) and paper-and-pencil surveys (n=24). The remaining studies conducted qualitative research (n=3) and mixed method research (n=4). This outcome also illustrates the types of research methods conducted in both qualitative and mixed methods.
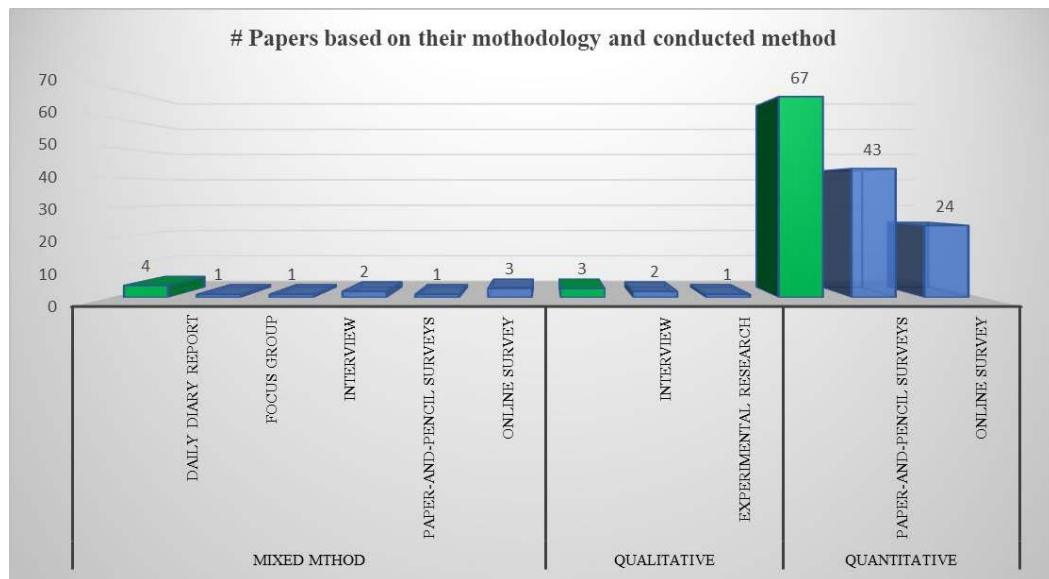
Figure 0-6. The statistics of the reviewed articles based on their methodology and research method

Furthermore, the review of the 74 selected articles shows that 44 of the studies did not use any theory or did not refer to any use of a particular theoretical perspective. This calls for more application of relevant theories in understanding addiction to social media use, especially as theories can significantly help in understanding users' behaviour. Exceptions were articles that applied Uses and Gratifications theory (U&G Theory) (Balakrishnan and Shamim, 2013, Huang et al., 2014, Foroughi et al., 2019, Lin et al., 2019, Leong et al., 2019), Attachment theory (Chen, 2019, Zhang et al., 2019, Cao et al., 2020, Chidambaram et al., 2022), Need-to-belong theory (Gao et al., 2017, James et al., 2017), Cognitive load theory (Choi and Lim, 2016, Qaisar et al., 2021), Cognitive behavioural theory (de Bérail et al., 2019, Gong et al., 2019a), Flow theory (Hong et al., 2014, Gong et al., 2020a), and Dual system theory. Figure 5.7 represents comprehensive details on each reviewed study.
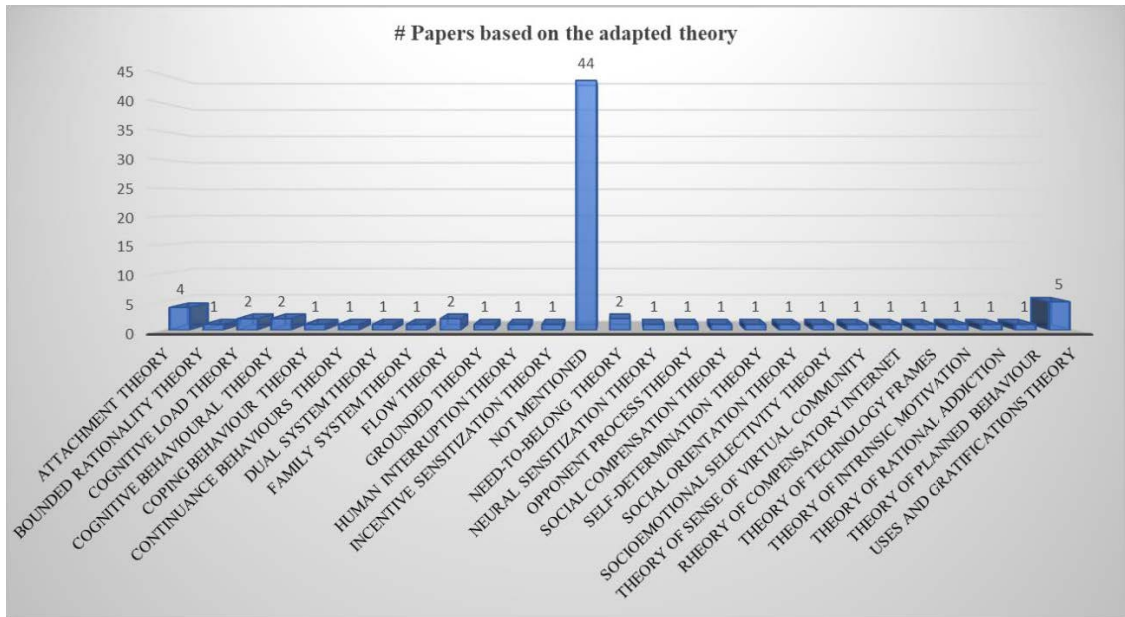
Figure 0-7. The statistics of the reviewed articles based on their adopted theories

Table 5-2. Summary of the reviewed articles

Author	Methodology	Data Collection	Theory	Region of Study	Sample	Social media platform	Recruitment	Data collection tool	Data analysis technique
(Turel and Serenko, 2012)	Quantitative	Online survey	1.TIM 2.NST	United States	N=194; F=93; M=101; Age=19-40	Social media	American university students with at least 3 months of SNS use experience	None	CA
(Balakrishn an and Shamim, 2013)	Mix method	1. Focus group 2. Online Survey	U&G Theory	Malaysia	1. N= 20; 2. N=707; F=382; M=324; Age=17-30	Facebook	University and college students. participators were randomly selected by sending email	Google. docs	FA; TA
(Wang and Wang, 2013)	Quantitative	Online Survey	None	Taiwan	N=1642; F=991; M=651; Age= 19-60	Social media	Online community members	Online survey panels	FA
(Baek et al., 2013)	Quantitative	Online Survey	None	South Korea	N= 404; F=229; M= 175; Age=19-50	Social media	Adults who use at least one SNS. Participators were recruited from the Korean Ipsos panel, which is an online survey service based on national samples of Internet users in South Korea.	Korean Ipsos panel	RA
(Koc and Gulyagci, 2013)	Quantitative	Survey	None	Turkey	N= 447; F=100; M=347; Age= 18-30	Facebook	College Students who were Facebook users	None	FA
(Vaghefi and Lapointe, 2013)	Quantitative	Survey	None	Canada	N=250	Facebook	White-collar employees who 1) have access to the Internet at work, 2) enrolled in a major social media network (Facebook) 3) use it at least once a week for personal non-work-related purposes while at work.	None	CA
(Huang et al., 2014)	Quantitative	1.Online survey 2.Personal interview	1. Flow theory 2. U&G Theory	Taiwan	N= 405; F=59%; M=41%; Age: Under 25=735%; 26–35=24%; Over 36 = 3%	Facebook	Individuals who were fairly comfortable using SNSs	mailed survey (Phase 2) to collect data	FA

(Hong et al., 2014)	Quantitative	Survey	None	Taiwan	N=241; F=41.5%; M=58.5%	Facebook	University students who were Facebook users	None	FA; RA
(Wang et al., 2015)	Quantitative	Online survey	TRA	China	N= 470; F=41.70%; M=58.30%; Age= 12-65	Microblogs	Active microblogging users (A general self-reported survey was distributed to microblog users. Only those who self-reported as having a microblogging habit were eligible to participate in this study.)	https://zxxd.cnnic.cn/	FA
(Tang et al., 2016)	Quantitative	Online survey	None	Taiwan	N=894; F= 65%; M= 35%	Facebook	College students	None	FA; CA; RA
(Müller et al., 2016)	Quantitative	Online Survey	None	Germany	N= 9173; M= 4515; F= 4658; Age= 12-19	Social media	Student: The participants were drawn randomly according to a sampling plan stratified by region, school type, and age.	None	CA; RA
(Błachnio et al., 2016)	Quantitative	Online Survey	None	Poland	N=381; F=62.8%; M=38.8%; Age= 12-58	Facebook	Facebook user were recruited through posting a link to the online survey on the Facebook 'wall.'	Facebook 'wall'	ClA; CA
(Choi and Lim, 2016)	Quantitative	1. Survey 2. Online survey	1. CLT 2. BRT 3. HIT	South Korea	N=419; F=204; M=215; Age= 19-39	Social media	Young SNSs users who were Undergraduate students or Employees	None	ClA; TA
(Yang et al., 2016)	Quantitative	Survey	None	China	N = 398; F=212; M= 186	Social media	Subjects were randomly intercepted and asked whether they had experience using mobile SNS.	Data were collected from the physical branches of China Mobile	FA; RA
(Błachnio and Przepiorka, 2016)	Quantitative	Survey	None	Poland	**Study 1: (Internet addiction)** N=631; F=64%; M=36%; Age=14-64;	Facebook	Normal Facebook users in terms of personality traits and positive orientation were recruited.	None	ClA; CA

					Study 2: **(Facebook addiction)** N=452; F=67%; M=33%; Age=14-64				
(Ryan et al., 2016)	Quantitative	Online Survey	None	Australia United Kingdom Ireland Canada	N=417; F=286; M=131; 18<= Age <= 80	Facebook	Three methods of recruitment were used in this study: (a) a Facebook Ad, specifically targeted to appear on the profile pages of Facebook users who were over 18 and listed English as a known language; (b) a sharable Facebook post on the primary investigators' personal account; and (c) posts on ten online discussion boards from Australia, Canada, Ireland, and the United Kingdom.	Qualtrics (www.qualtrics.com)	ClA; TA
(Casale et al., 2016)	Quantitative	Survey	None	Turkey	N=447; F=100; M=347; Age=18-30	Facebook	College students who were accessible and volunteer during our visits to lecture halls for survey administration	None	Two-way analysis
(Błachnio et al., 2017)	Quantitative	Online survey	None	Poland Turkey Ukraine	N=1011; F=701; M=310; 13< Age <56	Facebook	The snowball procedure to recruit the participants was applied. The link of electronic versions of the questionnaires was sent the study website to undergraduate students, requesting them to post it on their Facebook walls and thus spread the message about the study among their Facebook friends.	None	FA
(Gao et al., 2017)	Quantitative	Online survey	NTBT	China	N=278; F=132; M=146	Social media	SNS users were invited to participate in the online survey and were asked to send the link to the questionnaires to their SNS friends and invite them to complete the questionnaires.	None	FA; RA

(Ho et al., 2017)	Quantitative	Survey	TPB	Singapore	N=5920; (Adolescents= 4920; Adults= 1000); F=52%; M=48%; Adolescents age= 13-18; Adults age19-50	Social media	The adolescent sample was recruited using multi-stage cluster sampling and simple random sampling respectively. The adult participants were recruited through a door-to-door household survey using stratified random sampling.	None	RA
(James et al., 2017)	Quantitative	Online survey	NTBT	United States	1.Online survey: N=100 2.Online survey: N=798; F=539; M=259; Age >=18	Facebook	Regular Facebook user (who use Facebook at least 2–3 times a week) were recruited	Pilot test: Mechanical Turk (mTurk) Main Survey: Qualtrics	1.RA
(Baturay and Toker, 2017)	Quantitative	Online survey	None	Not Mentioned	N=120; F=63; M=57; Age=18-40	Facebook	Potential study participants (individuals easily accessible) were sent a Facebook message that included a link to the questionnaire form	Google Docs	FA; MA
(Moghavve mi et al., 2017)	Quantitative	Online survey	None	Malaysia	Facebook Users N = 667; F=450; M=217; YouTube Users N=1056; F=758; M=402	Facebook YouTube	University students who were Facebook or YouTube Users were sent the questionnaire	None	CA
(Luke and Evelina, 2017)	Qualitative	Interview	None	Indonesia	N=15; F=15; Age=18-19	Social media	Undergraduate students majoring in Mass Communication were selected randomly from an English class	None	TA
(Kanat-Maymon et al., 2018)	Mix method	1. Online survey 2. Daily diary report	None	Israel	1. study 1: N=337; F=55%; M=45%; Age=16-66 2. study 2:	Facebook	1. Active Facebook account were invited. Then Participants were invited to forward the survey hyperlink to others in their social network if they wished.	None	FA

					N=80; F=72; M=8; Age=19-32		2. undergraduate psychology students from an Israeli college participated in this study		
(Atroszko et al., 2018)	Quantitative	Survey	None	Poland	N=1157; F=601; M=546; persons who did not report gender = 10	Facebook	Undergraduate students were invited to participate anonymously in the study during lectures or classes.	None	FA; RA
(Jasso-Medrano and Lopez-Rosales, 2018)	Quantitative	Online survey	None	Perú	N=374; F=58.6%; M=41.4%; Age=18-24	Social media	University students were invited to participate in the survey with prior authorization from the universities	Online platform	CA
(Brailovskaia et al., 2018b)	Quantitative	Online survey	None	Germany	N 122; F=82.8%; M=17.2%; Age=17-38	Facebook	University students were randomly invited via email included the online survey	University email	DA; CA; RA; MA
(Punyanunt-Carter et al., 2018)	Quantitative	Online survey	None	United States	N=396; F=280; M=116	Social media	College students	Qualtrics	RA
(Pontes et al., 2018)	Quantitative	Online survey	None	United Kingdom	N=532; F=330; M=201; Age>= 16	Social media	English-speaking SNS users were recruited via opportunity sampling from online SNSs (e.g., Facebook, Twitter, LinkedIn)	None	DA; CA
(Brailovskaia et al., 2018a)	Quantitative	Online survey	None	Germany	N=520; F=%75; M=%25; Age=17-64	Facebook	University students who were Facebook users that voluntary participated to this study	None	DA; RA; MA
(Li et al., 2018a)	Quantitative	Online survey	None	China	N=463; F=247; M=216	WeChat	Undergraduate students voluntarily completed a questionnaire survey in school during a specified class period lasting *20 min.	None	FS; RA; DA
(Osatuyi and Turel, 2018)	Quantitative	Online survey	DST	United States	N=161; F=69; M=92; Age >18	Facebook	Undergraduate students who were Facebook users were recruited via class announcements sent to students in the college of business	Qualtrics	FA; DA

(Abbasi and Dibble, 2019)	Quantitative	Online survey	None	United States	N=243; F=177; M=66; Age=18-73	Social media	Undergraduate students who were enrolled in psychology courses at a large public university were recruited. Then the link of survey was sent to Amazon's Mechanical Turk (MTurk), WhatsApp, Facebook, and Twitter to invited users of those platforms to participate.	1. Website SurveyMon key	RA
(Hawi and Samaha, 2019)	Quantitative	Survey	None	Lebanon	N=512; F=54.2%; M=55.8%; Age=18–38	Social media	University students were randomly recruited through systematic random sampling	None	FA; RA
(Gong et al., 2019a)	Quantitative	Online survey	CBT	China	N=335; F=181; M=154	WeChat	University students were invited to this study by receiving invitation messages contain the URL of the questionnaire in the online discussion forums of their universities	None	FA; RA
(Lin et al., 2019)	Quantitative	1.Survey 2.Online survey	U&G Theory	Taiwan	N=254; F=115; M=139; Age=20-25	Facebook	University students: 1. A random sample was drawn from the list of all students enrolled in both undergraduate and post-graduate courses. 2. Other participants were recruited through an announcement on the Facebook pages of various members of the research team.	None	FA
(Yahya et al., 2019)	Quantitative	Online survey	None	Malaysia	N=60; F=70%; M=30%; Age=10-19	Social media	Students were recruited and the link of survey was distributed among parents in urban areas.	None	CA
(Lee, 2019)	Quantitative	Survey	None	Malaysia	N=204; M=77; F=124; Not mentioned =3 Age=18-27	Social media	Undergraduate students: The present research was advertised at a university's lecture halls. Those who were interested contacted the researcher for further arrangement to complete the survey questionnaire.	None	CA; AR

(Islam et al., 2019)	Quantitative	Online Survey	SDT	Finnish	N=289; F=196; M=93; 15=< Age <30	Facebook	Undergraduate students were randomly invited from the student database of a major Finnish university. The invitations were sent via email.	email included the online survey link	CA
(de Bérail et al., 2019)	Quantitative	Online Survey	CBT	France	N=932; F=679; M=253; Local students=558 international=374	YouTube	University students were recruited through an invitation posted on French students' Facebook groups	LimeSurve	FA; RA
(Barnes et al., 2019)	Quantitative	Online Survey	None	United States	N=140; F=68.6%; M=31.4% Age: 75%<=34; 25% > 34	Facebook	Undergraduate students	Qualtrics	RA
(Chen, 2019)	Quantitative	Online Survey	AT	United States	N=314; F=120; M=194	Facebook	Undergraduate students from a public American university voluntary were participated in this study.	None	CA; MA; FA
(Dalvi-Esfahani et al., 2019)	Qualitative	DEMATEL technique	None	Not Mentioned	N=35; F=21; M=14	Social media	1.Internet and social media addiction therapists 2. Researchers in the fields of Internet addiction and social media addiction	None	CA
(Zhang et al., 2019)	Quantitative	Online Survey	AT	China	N=388; F=62.9%; M=37.1%	TikTok	TikTok users	Company SoJump	FA
(Foroughi et al., 2019)	Quantitative	Online Survey	U&G Theory	Malaysia	N=358; F=56%; M=44%; Age=19-67	Facebook	Facebook user: The link to the survey was shared with Malaysian Facebook groups and the participants were asked to share the questionnaire with other respondents via their Facebook accounts.	None	FA; RA
(Leong et al., 2019)	Quantitative	Survey	U&G Theory	Malaysia	N=615	Facebook	Facebook user	None	RA
(Aparicio-Martínez et al., 2020)	Quantitative	Survey	None	Spain	N=278; F=172; M=106; Age=17-25	Social media	University students: Students were told about the study, voluntarily in the participation and the anonymity of their	None	DA; CA

							responses. One researcher and teacher were remaining in the classroom during the survey administration and filling out.		
(Ponnusamy et al., 2020)	Quantitative	Survey	None	Malaysia	N=364; F=186; M=178; Age=19-26	Instagram	Undergraduate students who were Instagram users	None	MetaA; FA; RA
(Müller et al., 2020)	Quantitative	Survey	None	Germany	N=226; F=135; M=91; Age=17-37	Social media	This non-clinical, convenient sample was recruited by mailing lists and contact lists of the University of Duisburg-Essen.	None	DA; CA; FA
(Tarafdar et al., 2020)	Quantitative	Online Survey	1. TTF 2. CoBT	United States	N=444; F=%55.1; M=%44.9	Facebook	Facebook users were invited from a database of individuals who have voluntarily expressed their interest in and have agreed to be contacted for, participating in research studies.	Invitation via email included the online survey link	FA
(Nikbin et al., 2020)	Quantitative	Online Survey	None	Malaysia	N=301; F=52%; M=48%; Age=18-64	Facebook	Facebook users: the link of electronic version of the survey was sent to Facebook users, with a request to spread the message among their Facebook friends.	None	FA; RA
(Cao et al., 2020)	Quantitative	Online survey	AT	China	N = 505	WeChat	WeChat users: Only those active WeChat users (i.e. at least using WeChat several times a week) were invited.	Sojump	FA; RA
(Bulut and Tuncay, 2020)	Quantitative	Online survey	None	Cyprus	N=146; F=73; M=73	Social media	Dentistry students: who were social media users and studding in Cyprus Health and Social Sciences University	Survey Monkey	SEM t-test
(Purohit et al., 2020)	Mixed Method	1. Survey 2.Interview	Grounded theory	Switzerland	N=14; N=67	Facebook	Group 1) Facebook users who were NUDGE active users. Group 2) First-year business students at the University of Neuchâtel, Switzerland	None	TA; WSRT
(Brailovskaia et al., 2020)	Quantitative	Online survey	None	Germany	N=250; N=209;	Facebook	Facebook users who study/have studied at a large German university in the Ruhr region and who had expressed willingness to be contacted for research investigations. The		Power analyses

							requirement for participation was a current Facebook membership.		
(Boursier et al., 2020)	Quantitative	Survey	None	Italy	N=578; F=361; M=217; Age=13-21	Social media	High school students who were social media users	None	ANOVA
(Gong et al., 2020a)	Quantitative	Online survey	FT; SOT; SST	China	N=351; M=146; F=205	WeChat	WeChat users who were chiness	This study employed a professional survey and data collection company in China.	PLS-SEM; FA
(Bouffard et al., 2021)	Quantitative	Survey	None	United States	N=234	Instagram	Instagram users who were college students from Lasell University, Newton in USA	None	PLS-SEM
(Naranjo-Zolotov et al., 2021)	Quantitative	Online survey	SOVC	Latin-American	N=237; M=162; F=75	Social media	Social media users who were Latin-American university students	Facebook and WhatsApp	SEM; FA
(Qaisar et al., 2021)	Quantitative	Online survey	CLT	China	N=371; M=185; F=186	Social media	Social media users who were Chinese university students	Not mentioned	ANOVA; FA
(Purohit and Holzer, 2021)	Qualitative	Experimental	None	Switzerland	N=20	Instagram	Active Instagram users (at least ten minutes of usage per day) who were students of University of Neuchâtel in Switzerland	None	Paired sample t-test
(Abbasi and Dibble, 2021)	Quantitative	Online survey	None	United States	N=243, F=187; M=30	Social media	Social media users who were university students	Website SurveyMonkey	Multiple linear regression
(Zhao, 2021)	Quantitative	Survey	None	China	N=370; M=162; F=208; Age ≥17	Social media	Social media user who were undergraduate and graduate students of Hefei University of Technology, Hefei, Anhui, China	None	PLS-SEM
(Maqableh et al., 2021)	Quantitative	Survey	ConBT	Jordan	N=572; M=178; F=394; Age ≥17	Facebook	Experienced Facebook users who were undergraduate business students at the University of Jordan	None	FA; SEM

(Monacis et al., 2021)	Quantitative	Survey	None	Italy	N=490; M=228; F=262	Social media	Social media user who were students of university in Southern Italy.	None	SEM
(Malak et al., 2022)	Quantitative	Survey	None	Jordan	N=510; M=160; F=350; Age=18-35	Social media	Experienced social media user who were university students from two universities (public and private), in Amman the capital of Jordan.	None	PLS-SEM
(Tian et al., 2022)	Quantitative	Online survey	OPT	China	N=382; M=172; F=210	TikTok	Loyal users of TikTok who were Chinese	Chinese online survey platform, WJX	PLS-SEM
(Xu et al., 2022)	Quantitative	Online survey	IST	United States	N=34,979 N=230	Social media	34,979 social network site (SNSs) users who were undergraduate students born between 1985 and 1990 from 10 US universities.	SNS database	SEM
(Chidambar am et al., 2022)	Quantitative	Survey	FST; AT	India	N=185; Age=15-19	Social media	Social media user who were students in one of the Southern parts of India	None	Hayes PROCESS
(Al-Busaidi et al., 2022)	Quantitative	Online survey	TCI	Oman	N=120; N=300	Social media	Active social media user who were undergraduate students enrolled in different private and public colleges and universities in Oman	None	FA; SEM
(Salehi et al., 2022)	Quantitative	Online survey	None	Iran	N=943; M=503; F=440; Age ≥17	Social media	Active social media user who were Iranian university students in Iran	None	Hierarchic al regression analyses
(Soh et al., 2022)	Quantitative	Online survey	None	United States	N=412; M=260; F=152; Age ≥18	Social media	Social media users in the United States	Amazon Mechanical Turk	FA; SEM

DEMATEL: Decision Making Trial and Evaluation Laboratory; TIM: Theory of intrinsic motivation; NST: Neural sensitization theory; U&G Theory: Uses and Gratifications theory; TRA: Theory of rational addiction; CLT: Cognitive load theory; BRT: Bounded rationality theory; HIT: Human interruption theory; NTBT: Need-to-belong theory; TPB: Theory of planned behaviour; DST: Dual system theory; CBT: Cognitive behavioural theory; SDT: Self-determination theory; AT: Attachment theory; TTF: Theory of technology frames; CoBT: Coping behaviour theory; SNSs: Social network sites; CA: Correlational analysis; FA: Factor analysis; RA: Regression analysis; TA: Thematic analysis; DA: Descriptive analysis; ClA: Cluster analysis; MA: Mediation analysis; MetaA: Meta-analysis; SEM: structural equational modelling; WSRT: Wilcoxon signed-rank test; FT: Flow theory; SOT: Social orientation theory; SST: Socioemotional selectivity theory; PLS: partial least squares, SEM: Structural equation modelling; SOVC: Theory of sense of virtual community (SOVC); CLT: Cognitive load theory; ConBT: continuance behaviours theory; OPT: opponent process theory; IST: incentive sensitization theory, FTS: family system theory; TCI: theory of compensatory internet

5.4. Characteristics of Social Media Addiction

We needed to identify the characteristics of social media addiction in order to address the first research question. Skowronek and McKinney (2010) state that the attribute values, quality, or features belonging typically to a concept define the characteristics of that concept. According to the existing scattered literature on addiction to social media use, this negative phenomenon can be characterised by its definition, predictors/influential factors, symptoms, and maybe its negative consequences.

Definition: The concept of addiction in IT use (e.g. social media, Internet, computer game, online gambling, and online auction) has been the focus of recent studies, especially in health and psychology disciplines. Terms such as "excessive use", "habitual behaviour", "dependency", "problematic use", "maladaptive behaviour", have often been used interchangeably to refer to IT addiction in general and social media addiction in particular. However, IT addiction goes beyond the concepts such as technology overuse, habitual behaviour, high engagement with technologies, or problematic behaviour (Charlton and Danforth, 2007).

Through the SLR, some definition of IT/social media addiction was extracted from the reviewed literature as shown in Table 5.3. However, there is a lack of uniform and consistent definition not only in IS discipline but in psychopathology because different studies have used different meaningful terms to describe IT/social media addiction.

This study was informed by all outlined studies in Table 5.2 and consequently has proposed a comprehensive definition for IT/social media addiction. Addiction, as a self-control problem and maladaptive behaviour (Marlatt et al., 1988, Müller et al., 2016), can be defined as a maladaptive psychological state (Turel and Serenko, 2012, Vaghefi and Lapointe, 2013, Islam et al., 2019, Lin et al., 2019) of strong dependency on IT/social media use (Turel and Serenko, 2012, Xu and Tan, 2012, Balakrishnan and Shamim, 2013, Vaghefi and Lapointe, 2013, Wang et al., 2015, Nikbin et al., 2020, Błachnio et al., 2017) caused by some factors such as habitual (Wang et al., 2015, Ryan et al., 2016), or excessive/intensive use of IT/social media (Koc and Gulyagci, 2013, Müller et al., 2016, Choi and Lim, 2016, Ryan et al., 2016, Chen, 2019, Foroughi et al., 2019) and manifested by some psychological disorders pattern (Dalvi-Esfahani et al., 2019) like obsessive-compulsive disorder (Vaghefi and Lapointe, 2013) and problematic behaviours (Ryan et

al., 2016) of social media use that take place at the expense of other important responsibilities (Turel and Serenko, 2012).

Table 5-3. Definition/Description of addiction to social media use

References	Definition/Description of Addiction to Social media use
(Turel and Serenko, 2012)	"We define technology addiction as a user's maladaptive psychological state of dependency on the IT use which is manifested through an obsessive pattern of IT-seeking and IT-use behaviours that take place at the expense of other important activities and infringe normal functioning (i.e., it produces a range of typical behavioural addiction symptoms)" (p. 4)
(Xu and Tan, 2012)	SNS addiction just refers to strong psychological dependency on SNS use and manifested by core addiction symptoms, such as conflict or withdrawal.
(Balakrishnan and Shamim, 2013)	Addictive behaviour can be defined as an over-attachment to an object or activity with indicators such as withdrawal, loss of control and salience.
(Vaghefi and Lapointe, 2013)	IT addiction can be defined as a user's maladaptive psychological status of dependency on any IT artefacts use which is revealed through an obsessive pattern of IT use behaviours. This maladaptive behaviour infringes normal functioning even at the cost of ignoring important activities.
(Koc and Gulyagci, 2013)	Facebook addiction can be defined as a specific form of Internet addiction applicable to individuals who excessively use Facebook as a social media for social interactions and consequently experience detrimental effects on their lives.
(Wang et al., 2015)	Social media addiction can be defined as a soft addiction which refers to social media dependence that has been developed into irrational behaviour patterns by habitual or rational usage patterns.
(Müller et al., 2016)	The term internet addiction refers to a concept of non-substance related addictions (Frascella, Potenza, Brown, & Childress, 2010) that describes a phenomenon of excessive and uncontrolled usage of specific online applications such as social media platforms, online pornography, and online gaming.
(Choi and Lim, 2016)	SNS addiction as a cyber-relationship addiction applicable to users who spend too much time on SNSs and display behavioural addiction symptoms such as salience (behavioural, cognitive, and emotional concentration), generosity (SNS usage continues to increase), withdrawal (unpleasant feelings with suspension of SNS usage), conflict (between people or internally), and regression (rapid return to SNS usage once the period of abstinence is over).
(Ryan et al., 2016)	SNSs addiction can be defined as a problematic behaviour caused by habitual or excessive use of SNS in order to desire for social interaction, entertainment, or passing time.
(Błachnio et al., 2017)	According to prior research, Facebook addiction as a type of technology addiction has six typical symptoms of addiction (i.e. salience, mood modification, tolerance, withdrawal, conflict, and relapse) and can be defined as excessive attachment to Facebook that leads to disturbances in everyday activities.

(Pontes et al., 2018)	SNS addiction can be defined as addictive behaviour, reflected by symptoms of addiction namely, tolerance, conflict, mood modification, and cognitive and behavioural salience.
(Leong et al., 2019)	Social media addiction refers to a subcategory of Internet addiction which includes other context-related addictions such as smartphone addiction, internet gaming addiction, online shopping addiction, cyber sexual addiction, and online auction addiction.
(Foroughi et al., 2019)	SNSs addiction in general and Facebook addiction in particular as a subcategory of Internet addiction is defined as intensive usage of SNS platforms with undesirable outcomes in professional, personal, and family life
(Dalvi-Esfahani et al., 2019)	Social media addiction refers to a psychosocial disorder characterized by symptoms of withdrawal, emotional disturbances, and interruptions of social relationships.
(Chen, 2019)	"Social media addiction is defined as the excessive social media use driven by psychological dependency, notwithstanding the negative consequences on physical, mental, professional, and financial well-being." (P. 89)
(Islam et al., 2019)	NS addiction can be conceptualized as maladaptive psychological dependency on using SNS, revealed through obsessive SNS-use behaviours, and it is reflected by behavioural addiction symptoms.
(Lin et al., 2019)	SNSs addiction can be defined as a user's maladaptive psychological status of dependency on SNSs use which is revealed through an obsessive pattern of SNSs use behaviours. This maladaptive behaviour infringes normal functioning even at the cost of ignoring important activities.
(Yahya et al., 2019)	Technology addiction can be originated from the development of strong IS use manifested by the core symptoms of addiction, conflict, withdrawal, behavioural salience, and relapse and reinstatement.
(Nikbin et al., 2020)	SNS addiction can be defined as being overly concerned about SNSs, driven by a strong motivation to log on to or use SNSs, and to allocate so much time and effort to such use that it ruins other social activities, performance, interpersonal relationships, and/or psychological health and well-being (Schou Andreassen and Pallesen, 2014).

Symptoms/Criteria of addiction: In 1997, Brown introduce a framework to measure behavioural symptoms/indicators of addiction. This framework is considered as one of the most popular frameworks to measure the symptoms of addiction because it emphasises on both psychological and behavioural symptoms of addiction (Balakrishnan and Shamim, 2013). The symptoms/criteria of addiction used in Brown's framework comprise salience, conflict, euphoria, loss of control, tolerance, withdrawal, and relapse and reinstatement (Brown, 1997). So this framework has been used by most of the studies on addiction to technology use such as online game addiction (Charlton and Danforth, 2007), online auction addiction (Turel et al., 2011), internet addiction (Müller et al., 2014), and social network sites addiction (Turel and Serenko, 2012, Vaghefi and

Lapointe, 2013, Yang et al., 2016, Hwang, 2017, Kanat-Maymon et al., 2018, Brailovskaia et al., 2018a, Brailovskaia et al., 2018b, Osatuyi and Turel, 2018, Chen, 2019, Islam et al., 2019, Dalvi-Esfahani et al., 2019, Leong et al., 2019). These symptoms can be defined as follows:

Table 0-4. Symptoms/Criteria of addiction to social media use

Symptoms of Addiction	Definition/Description
Salience	This symptom refers to when a particular activity becomes the most important activity in an individual's life and dominates her/his feeling, thinking, and behaviour. It is worth noting that some addictive behaviours such as smoking and drinking alcohol that can be done simultaneously with other activities do not dominate other activities of the addicted person. However, If that person was unable to smoke for any reason for a long time (e.g. long-haul flights), smoking will be the most important thing in that person's life that will totally dominate her/his thoughts and behaviour (Griffiths, 2005). Therefore, using social media use dominate users' behaviour and thinking (Leong et al., 2019). According to Brailovskaia et al. (2018a), social media users permanently think on use their favourite applications such as Facebook, and how they can spend more time to use these sites and applications.
Mood modification (Euphoria)	This criterion refers to a subjective experience reported as a consequence of engaging in a particular activity (Griffiths, 2005). This experience paradoxically is along with a tranquilizing and/or distressing feeling of escape or numbing. Therefore, the addicted persons can have the capacity to attain different mood modifying effects at different times (Griffiths, 2005). Accordingly, social media users usually use these media platforms to reduce their feelings of restlessness, guilt, anxiety, depression, and as well as to forget their personal problems (Chen, 2019, Dalvi-Esfahani et al., 2019, Osatuyi and Turel, 2018).
Tolerance	This refers to a process that needed to be increased gradually by increasing amounts of a particular activity to achieve the former effects (Griffiths, 2005). In gambling, for example, tolerance refers to when gamblers may need to increase the size of the bet to experience a mood-modifying effect that was obtained by a much smaller bet at the beginning of their gambling experiences (Griffiths, 2005). Accordingly, social media users increase their social media use to maintain or achieve positive emotions (Leong et al., 2019). With the mentioned approach, they usually spend more time on their favourite media than their initial intention, because they feel an urgent need for more and more use to achieve the same level of enjoyment. Therefore, tolerance refers to an increasing amount of specific activity that a user needs to do to remain satisfied such as requiring increasing time on Facebook to achieve the previous positive using effect (Elaheebocus et al., 2018).

Sense of Withdrawal	This refers to an unpleasant feeling (e.g. extreme moodiness and irritability) and/or physical effects (e.g. headaches, insomnia, and other stress-related reactions) that occur when a particular activity is suddenly reduced or discontinued (Griffiths, 2005). Rosenthal and Lesieur (1992), for example, found that the health examinations of 65% of studied gamblers reported at least on physical side-effect during withdrawal including headaches, loss of appetite, insomnia, upset stomach, muscle aches, physical weakness, heart racing, and breathing difficulty. In the context of social media, withdrawal meant that when social media users are restricted or blocked to use, their negative emotions arise due to a lack of using social media. Consequently, addicted users are often distracted, restless, disturbed, irritable, and feel uncomfortable once they cannot reengage in the application/s that they had involved in (Dalvi-Esfahani et al., 2019, Osatuyi and Turel, 2018, Islam et al., 2019).
Conflict	This concept refers to conflicts (i.e. interpersonal conflict and intrapsychic conflict) between the addict and their other tasks which impair their normal functioning (Griffiths, 2005). Involving short-term pleasures of some activities leads to disregard the negative effects of those activities and their long-term damage. So that the apparent need for the addictive activity as a coping strategy is increased. Therefore, the conflict in the addict's life means that they allocate less priority to hobbies, studies, work, recreational activities, sports, and ignore their spouse, family members, and friends. (Griffiths, 2005). Therefore, in IS discipline this concept refers to circumstances when using technology conflicts with other tasks, which impair users' normal functions (Vaghefi and Lapointe, 2013).
Relapse and reinstatement	This refers to the tendency to repeat earlier or the most extreme patterns of particular activities which cause the addiction to be quickly restored even after many years of abstinence or control (Griffiths, 2005). A tangible example of relapse behaviour is in some smokers who often give up for a period of time and then return to full-time smoking, only after a few cigarettes. According to Griffiths (2005), addicted persons do not listen to the proposed advice to reduce the time spent on social media. They usually fail to manage the direction to reduce their social media use (Dalvi-Esfahani et al., 2019). Therefor an addicted person: • is unable to voluntarily reduce the use of social media (Osatuyi and Turel, 2018) • quickly return to the overuse of social media after a period of abstinence (Hwang, 2017)

Influential factors/predictors/drivers of addiction to social media use:

Based on the reviewed research, the primary risk factors that predict social media addiction symptoms or cause this problem are called influential factors (Boroon et al., 2019, Keldal and Kılıç, 2021), drivers (Ponnusamy et al., 2020, Naranjo-Zolotov et al.,

2021) or predictors of addiction (Meier et al., 2016, Vaghefi and Qahri-Saremi, 2018). As Table 5.5 indicates, the conducted SLR led this study to gather 86 influential factors of social media addiction identified by scatter prior IS research and also Appendix 3 represents a comprehensive overview of these factors. These factors synthesised (summarised and linked) into 6 different categories based on the reviewed literature on social media addiction (Ahmed and Vaghefi, 2021). Consequently, influential factors of addiction as one dimension of the characteristics of social media addiction can be presented by the following categories:

Psychological factors: Psychological factors refer to some conditions that cause distress and interfere with a person's ability to function. These conditions negatively impact on how individuals think, feel and behave (Carter, 2014), so that these factors can affect how a person is able to perform at job, education, in relationships, and in other crucial spheres of his/her life. A person with a psychological condition may experience some symptoms such as anxiety, changes in mood, difficulty sleeping, social withdrawal or isolation, and depression (Carter, 2014). According to Carter (2014) and Muhamad et al. (2023), people who experience one or some of these psychological factors are more prone to be addicted to use something like alcohol, drugs or IT.

Personality traits: People's distinctive thought, feeling, and behaviour patterns are reflected in their personality traits (Hong et al., 2014, Błachnio and Przepiorka, 2016, Ho et al., 2017, Hawi and Samaha, 2019, Nikbin et al., 2020). Accordingly, personality traits refer to internal characteristic, consistent, relatively stable behaviour, which can be deduced from a person's pattern of actions, attitudes, emotions, and habits such as agreeableness, extraversion, self-steam, and narcissism (Psychology, 2022).

Demographics: Demographic information refers to a statistical description of a population's life, health, and/or social variables, such as age, gender, income, birth, death, and marital status (insider, 2022).

Enjoyment: Enjoyment is described as a positive hedonic experience that can lead to increase the level of willingness to accept specific information systems (IS) like social media (Hong and Tam, 2006). According to the reviewed literature, some enjoyment factors such as arousal (Huang et al., 2014), pleasure, escapism (Gao et al., 2017), flow

(Gong et al., 2020a) and immersion (Naranjo-Zolotov et al., 2021) have been identified as influential factors/causes of social media addiction.

Socio-Environmental factors: These factors refer to feelings or needs that come from within and motivate individuals to engage in some activities because they will get personal satisfaction from doing those activities, or arise from external factors and motivate individuals to do something in order to gain an external reward. (Chang and Wang, 2008). For instance, some factors such as maintaining online social interaction (Tang et al., 2016, Pontes et al., 2018), social needs (Ponnusamy et al., 2020), and entertainment needs (Foroughi et al., 2019, Zhao, 2021) motivate social media users to increasingly use their social media platforms to get more pleasure. In addition, social media users are extrinsically motivated by some factors such as social pressures (subjective norms) (Ho et al., 2017), social monitoring (Ryan et al., 2016), communication overload (Qaisar et al., 2021), and social capital bonding (Soh et al., 2022), to intensively engage with their social media platforms in order to gain more information about their families, friends or their social group members.

Technology related factors: Technology-related factors in social media platforms refer to production techniques, information, and communication resources, which affect the performance of social media users so that they can easily operate, communicate, generate and gather information (Vaghefi and Lapointe, 2013, Zhang et al., 2019, Cao et al., 2020).

Table 0-5. Synthesised influential factors of social media addiction Identified by the prior studies

#	Influential Factors/Predictors	Reference	Category
1	Habit	(Turel and Serenko, 2012) (Xu and Tan, 2012) (Yang et al., 2016) (Polites et al., 2018) (Yahya et al., 2019)	Psychological Factors
2	Anxiety/social anxiety	(Koc and Gulyagci, 2013) (Wang et al., 2015) (James et al., 2017) (Atroszko et al., 2018) (Brailovskaia et al., 2018b) (de Bérail et al., 2019)	
3	Insomnia	(Koc and Gulyagci, 2013)	

4	Depression	(Koc and Gulyagci, 2013) (Vaghefi and Lapointe, 2013) (Brailovskaia et al., 2018b) (Jasso-Medrano and Lopez-Rosales, 2018) (Dalvi-Esfahani et al., 2019)	
5	Loneliness	(Atroszko et al., 2018) (Dalvi-Esfahani et al., 2019) (Aparicio-Martínez et al., 2020)	
6	Low life satisfaction	(Błachnio and Przepiorka, 2016) (Dalvi-Esfahani et al., 2019)	
7	Chronic daily stress	(Brailovskaia et al., 2018b) (Li et al., 2018a)	
8	Psychiatric distress	(Pontes et al., 2018)	
9	Psychopathy	(Lee, 2019)	
10	Procrastination	(Ryan et al., 2016) (Müller et al., 2020)	
11	Mental illness	(Abbasi and Dibble, 2019) (Abbasi and Dibble, 2021)	
12	Impulsivity	(Vaghefi and Lapointe, 2013) (Dalvi-Esfahani et al., 2019)	
13	Attention deficit disorder	(Dalvi-Esfahani et al., 2019)	
14	Low quality romantic relationships	(Bouffard et al., 2021)	
15	Social appearance anxiety	(Boursier et al., 2020)	
16	Insecure attachment	(Salehi et al., 2022)	
17	Envy	(James et al., 2017)	Personality traits
18	Deficient of social self-regulation	(Wang et al., 2015) (Osatuyi and Turel, 2018)	
19	Low level of agreeableness	(Błachnio and Przepiorka, 2016) (Hawi and Samaha, 2019) (Leong et al., 2019)	
20	High neuroticism	(Hong et al., 2014) (Tang et al., 2016) (Ho et al., 2017) (Hwang, 2017) (Dalvi-Esfahani et al., 2019) (Leong et al., 2019) (Nikbin et al., 2020)	
21	Low level of conscientiousness	(Błachnio and Przepiorka, 2016) (Müller et al., 2016) (Dalvi-Esfahani et al., 2019) (Hawi and Samaha, 2019) (Nikbin et al., 2020)	
22	Low level of openness to experience	(Błachnio and Przepiorka, 2016) (James et al., 2017)	

		(Dalvi-Esfahani et al., 2019)	
		(Hawi and Samaha, 2019)	
		(Nikbin et al., 2020)	
23	High extraversion	(Ho et al., 2017)	
		(Hwang, 2017)	
		(Atroszko et al., 2018)	
		(Kanat-Maymon et al., 2018)	
		(Nikbin et al., 2020)	
24	Narcissism	(Casale et al., 2016)	
		(Atroszko et al., 2018)	
		(Brailovskaia et al., 2018a)	
		(Dalvi-Esfahani et al., 2019)	
25	Low self-esteem	(Vaghefi and Lapointe, 2013)	
		(Hong et al., 2014)	
		(Błachnio et al., 2016)	
		(Baturay and Toker, 2017)	
		(Ho et al., 2017)	
		(Dalvi-Esfahani et al., 2019)	
		(Hawi and Samaha, 2019)	
		(Hou et al., 2019)	
		(Aparicio-Martínez et al., 2020)	
26	Low sense of self-efficacy	(Atroszko et al., 2018)	
27	Lower optimism (low level of positive orientation)	(Błachnio and Przepiorka, 2016)	
28	Selfitis behaviour	(Monacis et al., 2021)	
29	Gender	(Wang and Wang, 2013)	Demographics
		(Müller et al., 2016)	
		(Hawi and Samaha, 2019)	
		(Leong et al., 2019)	
		(Aparicio-Martínez et al., 2020)	
30	Age	(Błachnio and Przepiorka, 2016)	
		(Atroszko et al., 2018)	
		(Salehi et al., 2022)	
31	Self-identity	(Ho et al., 2017)	
32	Arousal	(Huang et al., 2014)	Enjoyment
33	Perceived enjoyment	(Yang et al., 2016)	
		(Tian et al., 2022)	
34	Pleasure	(Gao et al., 2017)	
35	Escapism	(Gao et al., 2017)	
36	Subjective happiness	(Brailovskaia et al., 2018b)	
37	Hedonic benefits	(Gong et al., 2019a)	
38	Social media related infidelity behaviour	(Abbasi and Dibble, 2019)	
		(Abbasi and Dibble, 2021)	
39	Positive users' inner feelings or states (flow)	(Gong et al., 2020a)	
40	Immersion	(Naranjo-Zolotov et al., 2021)	

41	Maintain parasocial relationships	(Baek et al., 2013) (de Bérail et al., 2019)	Socio-Environmental factors
42	Maintain social relationships (Reciprocal relationships)	(Baek et al., 2013) (Tang et al., 2016)	
43	Online social enhancement	(Ryan et al., 2016) (James et al., 2017)	
44	Online social interaction/networking	(Balakrishnan and Shamim, 2013) (Wang and Wang, 2013) (Pontes et al., 2018)	
45	Online social support	(Wang and Wang, 2013) (Tang et al., 2016)	
46	Recognition needs	(Foroughi et al., 2019) (Ponnusamy et al., 2020)	
47	Social needs	(Ponnusamy et al., 2020)	
48	Entertainment needs	(Balakrishnan and Shamim, 2013) (Ryan et al., 2016) (Foroughi et al., 2019) (Zhao, 2021)	
49	Need to belong	(Ho et al., 2017)	
50	Satisfaction of the need for relatedness	(Chen, 2019)	
51	Satisfaction of the need for self-presentation	(Balakrishnan and Shamim, 2013) (Chen, 2019)	
52	Interpersonal attachment	(Zhang et al., 2019)	
53	Emotional attachment	(Cao et al., 2020)	
54	Empathy	(Dalvi-Esfahani et al., 2019)	
55	Social overload	(Choi and Lim, 2016)	
56	Gratification sought	(Lin et al., 2019)	
57	Psychological Benefits	(Balakrishnan and Shamim, 2013)	
58	Social benefits	(Gong et al., 2019a)	
59	Skill Enhancement	(Balakrishnan and Shamim, 2013)	
60	Number of friends	(Luke and Evelina, 2017) (Hawi and Samaha, 2019)	
61	Number of social media groups joined	(Luke and Evelina, 2017)	
62	Number of platforms for accessing social media	(Luke and Evelina, 2017)	
63	Cognitive absorption	(Barnes et al., 2019)	
64	Maladaptive cognitions	(Pontes et al., 2018)	
65	Positive attitudes toward social media	(Ho et al., 2017)	
66	Subjective norms	(Ho et al., 2017)	
67	Social media purposive value	(James et al., 2017)	

68	Distraction within social media platforms	(Tarafdar et al., 2020)	
69	self-promotion	(Islam et al., 2019)	
70	Social monitoring	(Ryan et al., 2016)	
71	Posting updates	(Hawi and Samaha, 2019)	
72	Independent self-construal	(Hawi and Samaha, 2019)	
73	Continuance intention	(Maqableh et al., 2021)	
74	Communication overload	(Qaisar et al., 2021)	
75	Social capital bonding	(Soh et al., 2022)	
76	Fear of Missing Out (FOMO)	(James et al., 2017) (Pontes et al., 2018) (Dalvi-Esfahani et al., 2019) (Al-Busaidi et al., 2022)	
77	Parental neglect	(Chidambaram et al., 2022)	
78	Site/Functional attachment	(Zhang et al., 2019) (Cao et al., 2020)	Technology-related Factors
79	Technology overload	(Choi and Lim, 2016)	
80	Internet addiction	(Błachnio et al., 2017)	
81	Social Features	(Vaghefi and Lapointe, 2013)	
82	Manipulation & control features	(Vaghefi and Lapointe, 2013)	
83	Presentation features	(Vaghefi and Lapointe, 2013)	
84	Reward & punishment features	(Vaghefi and Lapointe, 2013)	
85	Extent of usage/high intensity of usage	(Hong et al., 2014) (Błachnio et al., 2016) (Müller et al., 2016) (Baturay and Toker, 2017) (Luke and Evelina, 2017) (Moghavvemi et al., 2017) (Brailovskaia et al., 2018a) (Jasso-Medrano and Lopez-Rosales, 2018) (Kanat-Maymon et al., 2018) (Osatuyi and Turel, 2018)	
86	Information overload	(Qaisar et al., 2021)	

Negative consequences of addiction to social media use: As mentioned above, social media addiction is one of the most important negative consequences of excessively using IS, because it can have detrimental impacts on the users' performance both academic (Osatuyi and Turel, 2018) and job (Ho et al., 2017), mental and physical health of users in different level of individuals, organisations, and societies (Brooks et al., 2017, Vaghefi and Qahri-Saremi, 2017, Vaghefi et al., 2017, Vaghefi and Qahri-Saremi, 2018, Hou et

al., 2019). This maladaptive behaviour infringes normal functioning even at the cost of ignoring important activities. Table 5.6 provides an overview about some identified negative consequences of social media addiction identified by the prior studies.

Table 0-6. Negative consequences of addiction to Social media use

Negative consequence	Description	Reference
Interpersonal relationship problems	It refers to any type of harmful situation in terms of destroying a relationship such as loss of relationships, relationship dissatisfaction, and decline in the quality of interpersonal relationships	(Turel and Serenko, 2012) (Vaghefi and Lapointe, 2013) (Ho et al., 2017) (Kanat-Maymon et al., 2018) (Lee, 2019)
Social relationship problem	IT addiction (e.g. social media addiction) undermines an individual's social life and is usually associated with difficulties such as a lack of communication with others.	(Vaghefi and Lapointe, 2013) (Osatuyi and Turel, 2018)
Low academic performance	There is a significant negative relationship between social media addiction and academic performance specially among university students. This because, excessive use of social media lead to educational attainments.	(Turel and Serenko, 2012) (Kanat-Maymon et al., 2018) (Osatuyi and Turel, 2018) (Ponnusamy et al., 2020) (Malak et al., 2022) (Al-Busaidi et al., 2022)
Low work performance	Social media addiction negatively impacts users' work performance because they spend additional time and energy in social media use and consequently they miss their main responsibilities.	(Turel and Serenko, 2012) (Vaghefi and Lapointe, 2013) (Ho et al., 2017)
Low Physical performance	Addicted users perform fewer physical activities because they spend most of their time and effort online, so that, they forget all other activities.	(Nikbin et al., 2020)
Depression	Depression refers to a mood disorder that, which is persistent feeling of sadness and hopelessness and lack of interest in performing activities (Seabrook et al., 2016). According to the reviewed literature, social media addiction positively	(Turel and Serenko, 2012) (Kanat-Maymon et al., 2018) (Foroughi et al., 2019) (Malak et al., 2022)

	related to depression. Psychological problems occur due to users' dependency on technology.	
Anxiety	Anxiety is an emotion that is triggered by the lack of control over lingering thoughts, and feelings of impending doom. This psychological state is associated with symptoms such as insomnia, restlessness, trouble concentrating, being irritable, easily becoming tired, high blood pressure, and muscle tension (Lin et al., 2019). Social media addiction positively related to anxiety because of users' dependency on technology.	(Kanat-Maymon et al., 2018) (Foroughi et al., 2019) (Malak et al., 2022)
Insomnia	Poor sleep quality or insomnia is another negative outcome caused by addiction. Addicted users spend additional time on their social media platforms to because of fear of missing out. Consequently, they gradually get sleep disorders.	(Atroszko et al., 2018) (Bulut and Tuncay, 2020)
Stress	In general, stress refers to bodily tension or reaction caused by physical, psychological, or emotional pressure or threatened (Li et al., 2018a). The mentioned studies state that excessive use of social media platforms especially Facebook is linked to stress because of 1) social pressure to reveal personal information, 2) having and maintaining a large number of friends and followers, 3) feeling resentful of individuals who post attractive snapshots to portray their lives as well-appointed ones, and 4) paying attention to the friends' expectations to respond to their messages. Therefore, social media addiction correlates positively to the stress levels among university's students.	(Turel and Serenko, 2012) (Atroszko et al., 2018) (Malak et al., 2022)
Loneliness	Loneliness is a negative emotional feeling that along with feeling disconnected from the world around. Since addict users spend a lot of time on their social media they will lose their normal connection and then will involve with loneliness	(Turel and Serenko, 2012) (Ponnusamy et al., 2020)
Reduced self-esteem	Since addicted users' connection to the real world is diminished, one of the detrimental effects of social media addiction on several	(Turel and Serenko, 2012) (Lee, 2019)

	domains of functioning is to reduce users' self-esteem.	(Hou et al., 2019)
Decrease in real-life communities	Addicted users tend to remain home to be able to access their social media platforms. Consequently, they lose their real-life communication.	(Osatuyi and Turel, 2018) (Kanat-Maymon et al., 2018)
Physical health	Physical health mostly refers to the lack of or poor-quality sleep as well as physical tiredness and fatigue. Physical health mostly refers to the lack of or poor-quality sleep as well as physical tiredness. Physical health is very important because it enables individuals to do their duties with minimum restrictions. Some researchers found that addiction to social media use strongly negatively affects users' physical health such as sleep quality and body health.	(Vaghefi and Lapointe, 2013) (Nikbin et al., 2020)
Low Life Satisfaction	Social media (e.g. Facebook) addiction can increases stress. Consequently, stressful situation generates negative emotion which decrease the level of life satisfaction.	(Błachnio et al., 2016) (Atroszko et al., 2018) (Lee, 2019) (Ponnusamy et al., 2020)
Lower subjective/emotional well-being	According to Huppert (2009), subjective well-being refers to an individual's overall perception and evaluation of his/her own life going well, which leads to a combination of feeling good and functioning effectively. Individuals who addicted to social media use for long periods feel overloaded, and subsequently, their well-being deteriorates. In another word, social media addiction means that users spend a lot of time on social media platforms and, consequently ignore people and things around them, which affects their physical and mental health, and reduces their subjective well-being.	(Choi and Lim, 2016) (Atroszko et al., 2018) (Lee, 2019) (Zhao, 2021) (Chidambaram et al., 2022)
Suicide related outcomes	Suicide related outcomes refers to suicidal ideation and attempts, which can be caused by addiction to social media use. Today, young adults aged 18-25 engage in less face-to-face social interactions with peers and spend a lot of time on their social media platforms, which negatively impact	(Brailovskaia et al., 2020)

	their well-being. Therefore, addictive users have lower subjective well-being and higher level of suicide-related outcomes than those who engaged in less media use.	
Romantic relationship conflicts	Excessive time spent on social media impacts relationship quality and prospect. This because individuals who are constantly distracted by using their Instagram, they ignore their partners and consequently they experience less relationship satisfaction, more conflicts and also negative relationship outcomes such as infidelity.	(Bouffard et al., 2021)

5.5. Mitigation Strategies

There is a lack of study on exploring the mitigation mechanisms (Tarafdar et al., 2015b, Salo et al., 2018, Karmakar, 2020). This shortcoming led us to identify the mechanisms or strategies that have emerged so far through prior research. Surprisingly, among all reviewed papers, except Brailovskaia et al. (2018b), Osatuyi and Turel (2018), Purohit and Holzer (2021), Qaisar et al. (2021), and Soh et al. (2022) research, which empirically investigated the mitigation strategies for combating social media addiction, other articles just suggested some potential mitigation strategies for future research. Table 5.7 outlines the identified both supported and potential mitigation strategies that each of them has enough potential for a separate study. The strategies labelled 'supported' refers to the strategies that were investigated empirically; and the strategies labelled 'potential' refers to those ones that have been suggested by the existing literature to be further investigated.

Table 0-7. Potential and supported mitigation strategies for combating social media addiction

Mitigation strategy	Description	Reference
Monitoring or online tracking programs (Potential)	Individuals with low self-efficacy, who do not believe their abilities to cope with a wide range of situations, usually cannot cope with stress or social anxiety (Yang et al., 2016). Therefore, they could get involved with social media platforms' activities to escape from their problems. So low self-efficacy plays a significant role to causes social media addiction. Yang et al. (2016) suggest that	(Yang et al., 2016)

	monitoring strategies such as parental monitoring or online tracking programs for mobile SNS users with low social self-efficacy to prevent harmful consequences.	
Organising offline social activities/interaction (Potential)	Since self-efficacy is modifiable (Gist and Mitchell, 1992), the high level of this ability can be considered as a useful intervention to control or mitigate addiction. Therefore, social media users' self-efficacy should be reinforced. Yang et al. (2016) state that organising offline social activities help social media users to improve their social skills and maintain their health social relationship in the real world. Consequently, these users will be more capable to cope social media addiction behaviour. As well as, some researchers argue that offline social support and social interaction with family, colleagues, classmates, and friends decrease social media addiction (Gong et al., 2019a, Wang and Wang, 2013, Chen, 2019).	(Yang et al., 2016) (Wang and Wang, 2013) (Gong et al., 2019a) (Chen, 2019)
Develop system features that would monitor and detect (Potential)	• It is suggested that social media service providers develop system features to monitor and detect exhibitionistic usage patterns such as excessive status updates, and inform users about the possible negative consequences(Islam et al., 2019). • Furthermore, another possible intervention strategy is to set a feature to limit the allowed number of possible social media activities at a given timeframe (Islam et al., 2019, Tarafdar et al., 2020). • In another word, digital monitors can be designed to track the habitual use of social media and warn users accordingly (Osatuyi and Turel, 2018). • Mobile social media operators can warn users about their continued use time or excessive usage by using pop-up windows (Yang et al., 2016, Gong et al., 2019a). • Social media service providers should allow their users to personalise their social media platforms to control establish some rules to prevent excessive use of social media (Gong et al., 2019a). • System designers can design and channel digital nudges to combat social media addiction (Purohit et al., 2020). Digital nudging refers to the user-interface elements, which guide users how to behave in digital choice environments. So that, these digital features encourage users to follow the	(Yang et al., 2016) (Osatuyi and Turel, 2018) (Islam et al., 2019) (Gong et al., 2019a) (Tarafdar et al., 2020) (Purohit et al., 2020)

	designer's preferred paths in their decision making relevant to their social media usage (Purohit et al., 2020).	
Restrict use (Potential)	Mobile usage time should be restricted for teenagers by their parents. It can be helpful intervention to control social media addiction.	(Gong et al., 2019a)
Strengthen education (Potential)	Educational institutions and the government should strengthen the education system in order to train users with low self-control on how to appropriately use mobile SNS platforms	(Gong et al., 2019a) (Cao et al., 2020)
Informative mobile app (Potential)	An informative mobile app is a practical application that records mobile social media application usage to its user. It could be very useful for self-regulation.	(Barnes et al., 2019)
Physical activity (Supported)	Physical activity is negatively related to social media (e.g. Facebook) addiction, this because, physical activity negatively impacts daily stress. Since stress is an influential factor in addiction to social media use. Consequently, physical activity moderates the relationship between daily stress and social media addiction.	(Brailovskaia et al., 2018b)
Increasing social self-regulation (supported)	In this study social self-regulation refers to social pressure self-efficacy, which measures an individual's ability to resist or reject the pressure from others in a social media platform to use that platform. Osatuyi and Turel (2018) posit that the symptoms of social media addiction can be moderated by the impact of social self-regulation. Therefore, individuals with high levels of social self-regulation are more prone to do not be involved with the negative consequences of social media use such as addiction.	(Osatuyi and Turel, 2018)
Awareness (Potential)	• Most social media users especially young generation are often unaware of the possible negative consequences of social media activities on their mental health. In this regard, users' awareness should be increased in terms of what and how social media activity such as Facebook threatened their health (Brailovskaia et al., 2018b). • For older adults with low self-regulation, awareness as an intervention can be provided in the form of workshops, seminars, and self-development classes to inform them on how to combat social media addiction (Osatuyi and Turel, 2018). While, to create awareness in the young adult population, informative information can be	(Moghavvemi et al., 2017) (Brailovskaia et al., 2018b) (Osatuyi and Turel, 2018) (Gong et al., 2019a) (Islam et al., 2019) (Cao et al., 2020)

	posted on social media platforms (Osatuyi and Turel, 2018). • Increasing awareness can be consider as a useful intervention for combating addiction to social media use (Islam et al., 2019, Gong et al., 2019a, Moghavvemi et al., 2017, Cao et al., 2020)	
Developing users and developer's policy (Potential)	Developing possible regulations about the design of social media platforms as well as the education of users around behavioural patterns of use can be a very helpful intervention to mitigate social media addiction (Abbasi and Dibble, 2019, Tarafdar et al., 2020, Nikbin et al., 2020)	(Abbasi and Dibble, 2019) (Nikbin et al., 2020) (Tarafdar et al., 2020)
Self-efficacy (supported)	According to self-efficacy theory, an individual believes in how she/he can handle a certain situation to successfully perform a task (Qaisar et al., 2021). Also, social cognitive theory (SCT) suggests that a social media user with high level of self-efficacy is adequately confident about his/her capabilities to perform certain tasks on social media. Accordingly, self-efficacy plays a significant part in how well a person able to approach goals, deal with difficulties, increase self-control and emphasises the importance of social connections by observing others for the development of the users' personalities (Qaisar et al., 2021, Soh et al., 2022). Therefore, High self-efficacy users have mastered using social media to complete difficult tasks effectively. So that, social media self-efficacy positively influences users' perceived behaviours, and self-control and also lead the users to enhances their capability to assess the quality of information quickly. Consequently, social media self-efficacy positively moderates the association between information and communication overload (as two drivers of social media addiction) and social media addiction (Qaisar et al., 2021, Soh et al., 2022).	(Qaisar et al., 2021) (Soh et al., 2022)
Automating Digital Nudges (supported)	Digital nudging mechanisms refer to A subtle method of influencing user behaviour in digital settings without limiting personal freedom of choice through design, content, and interaction factors. According to the existing literature on social media addiction, social media users tend to spend too much time on social media mindlessly, which may negatively affect the users. To reduce the duration of social media use, one solution is to lead the users to be more mindful. In the same direction, digital	(Purohit and Holzer, 2021)

	nudging interventions can help users to stop or reduce their mindless scrolling across social media. Purohit and Holzer (2021) argue that a usable, privacy-sensitive, and ethical digital nudging intervention can effectively make social media users more mindful to reduce their time on social media platform.	

Chapter 6: Findings of Quantitative Data Analysis

6.1. Overview

This chapter presents findings of the quantitative phase of the study, which follows the systematic literature review according to the research design described in Chapter 3. A cross-sectional online survey was administered to Australian university students who were experienced social media user and active Instagram users with at least 6 months experience. The survey was released through Qualtrics website with UTS license. Finally, 452 samples were collected, but only 332 were used in the data analysis due to their completeness. Then Confirmatory factor analysis (CFA) and structural equation modeling (SEM) techniques were used respectively as data analysis method through IBM SPSS Statistics 28 and SmartPLS 3.

The chapter reports 1) findings of preliminary analysis, 2) CFA or dimension reduction technique result, 3) validation of the measurement model by assessing the factor loadings, as well as evaluating validity and reliability, and 4) confirmation of the structural model by testing hypotheses and relationships between constructs. Therefore, it analysed the mediating role of IT/social media identity yielded by reflective (i.e. attitude, personal norms, and social norms/pressures) and reflexive (i.e. habit) systems, and their effect on social media addiction. In addition, this data analysis covers the assessment of the moderating role of self-regulation on the relationship between reflective (i.e. attitude, personal norms, and social norms/pressures) and reflexive (i.e. habit) systems and IT/social media identity to combat addiction.

6.2. Preliminary analysis

This section describes the characteristics of survey respondents, the handling of missing values, normality tests that evaluate the distribution of the data, sample size, and convergence checks.

6.2.1. Missing Values

The use of a survey almost always yields missing data, especially during Covid 19 pandemic period because the volume of online responsibilities had increased, so that the online surveys were either ignored or the respondents stopped completing the

questionnaire after answering a few questions. In addition, in general, respondents may consciously or unintentionally skip and not answer the questions because they find the questions difficult or they hesitate to respond with an explanation. Therefore, a data set should be cleaned to ensure that all questions have answers before running analyses (Hair Jr et al., 2017).

According to Hair Jr et al. (2017), there are three possible techniques for dealing with missing values 1) replacing them with the mean of provided values, 2) using whatever values are available to compute the model parameters, and 3) removing all incomplete samples known as Listwise deletion technique. While the first approach is more likely to reduce the likelihood of discovering important associations, the second strategy can skew results since it uses different sample sizes (included with missing values) (Hair Jr et al., 2017).

Hair Jr et al. (2017) recommend Listwise deletion, which advises researchers first explore the dataset to ensure that the incomplete questionnaires do not belong to a certain category of respondents otherwise, results will be biased. Additionally, researchers need to make sure there are still a sufficient quantity of responses after deletion.

Accordingly, this study employed the third approach called Listwise deletion. Thus, entire records were excluded from analysis, which had even one single missing value. Consequently, following this recommendation, out of the 452 questionnaires retrieved from the online survey, 120 questionnaires were invalidated and discarded due to missing values. With 332 valid and useable samples, the response rate was 73.45%.

6.2.2. Sample Size

In SEM, a variety of techniques such as "Monte Carlo simulations" (Paxton et al., 2001), "10-times" (Hair et al., 2011, Goodhue et al., 2012) and "minimum R-squared" (Hair et al., 2011) methods can be used to estimate the minimal sample size (Kock and Hadaya, 2018). This research adopted the '10-times rule' method because 1) it has been widely utilized in IS research as well as other fields (Hair et al., 2011), 2) the minimum R-squared method has been proposed as an alternative to the 10-times rule method (Hair et al., 2017), and 3) the Monte Carlo simulation method often requires two or more simulations, which

are experimental, to define an appropriate set of sample size points (Kock and Hadaya, 2018), but this one was out of the scope of this study.

The most prevalent application of this method is based on the requirement that the sample size must be more than 10 times the number of inner or outer model linkages that can point at any latent variable in the research model (Goodhue et al., 2012). Unlike in the Monte Carlo simulation method, in 10-times rule method, it is not important how strong the path coefficients are, but the main wheel of this method revolves on the number of connections among the latent variables (Kock and Hadaya, 2018). Accordingly, the sample size is predicted to be $10 \times 10 = 100$ using the study's model, which has ten structural paths leading to the empowerment construct. However, as mentioned above, this research managed to collect 332 valid samples.

6.2.3. Descriptive Statistics

As Table 6.1 illustrates the description of the study population is as follows:

With a small difference, the number of female (approximately 55%) participants was more compared to the males (approximately 45%). The dominant age group was 18-25 years (77.9%), then, with a very large difference, the next age groups respectively were 26-30 (10.3%), 31-35 (7.6%), and 36-40 (4.2%) years old. The result also shows that the majority of participants were undergrad students (approximately 82%), while the remaining percentage were postgrad students including both master course work and research and also Ph.D. students. It was also found that most of respondents (65.7%) were old users who have been active on Instagram for more than four years, while 11.7% of them created their profile for more than 3 years to 4 years, 7.8% of them for more than 2 years to 3 years, 4.5% for more than 1 year to 2 years and 10.2% of them have started their activity on Instagram from 6 months to 1 year. Meanwhile, very few participants reported that they use Instagram excessively, 0.6% from more than 8 hours, 0.9% from 7-8 hours, 1.2% from 5-6 hours, 17.5% from 3-4 hours. However, most of them (55%) had allocated less than one hour per day to check their Instagram.

Table 6-1. Participants' demographics

Participants' Demographics	Category	Number of Valid Responses	Percentage of Valid Responses
Gender	Female	182	54.8%
	Male	150	45.2%
Age	18-25	259	77.9%
	26-30	34	10.3%
	31-35	25	7.6%
	36-40	14	4.2%
Education	Bachelor	272	81.9%
	Master (Course work)	32	9.6%
	Master by research	9	2.7%
	Doctorate	19	5.7%
Instagram Experience	From 6 months to 1 year	34	10.2%
	More than 1 year to 2 years	15	4.5%
	More than 2 years to 3 years	26	7.8%
	More than 3 years to 4 years	39	11.7%
	More than 4 years	218	65.7%
Usage	30 minutes or less	98	29.5%
	31-60 minutes	88	26.5%
	1-2 hours	79	23.8%
	3-4 hours	58	17.5%
	5-6 hours	4	1.2%
	7-8 hours	3	0.9%
	More than 8 hours	2	0.6%
Total		332	100.0

6.2.4. Assessment of Normality of Data Distributions

One of the first few things that researchers need to consider is to test whether the distribution of their variables is normal or not. Hair Jr et al. (2017) state that there are two standard normality tests namely, "Skewness & Kurtosis and" and "Kolmogorov- Smirnov and Shapiro-Wilk" tests, which are used to evaluate the extent to which data are non-

normal. Following the criteria below, given the number of collected samples, not only will researchers be able to choose the appropriate normality test, but also how to check the validity (Hair Jr et al., 2017, Kline, 2015).

- Skewness & Kurtosis
  - Samples <50: use the z value between -1.96 and +1.96 (z value is calculated through dividing Skewness & Kurtosis by standard error)
  - Samples 50<N<300: use a more liberal z range, which is between -3.29 and +3.29
  - Large samples more than 300: a
    - Absolute skewness value is between -2 and +2
    - Absolute Kurtosis value is between -7 and +7
- Kolmogorov- Smirnov and Shapiro-Wilk test
  - Use with samples below 300
  - For samples larger than 300, they may be unreliable

Given the number of collected samples was greater than 300, this study employed the Skewness & Kurtosis test. Skewness refers to a measure of symmetry of a distribution. When the left and right sides of a distribution are not mirror reflections, it is asymmetrical. Right (or positive), left (or negative), or zero skewness can all apply to a distribution. Kurtosis is a measure of peakedness of a distribution relative to the centre of the distribution (Hair Jr et al., 2017, Kline, 2015). According to the aforementioned criteria, as shown in Appendix 11, all variables' skewness values were between -2 and +2 and also their Kurtosis values were between -7 and +7.

6.3. Factor Analysis

Factor analysis is a method for investigating whether a number of variables of interest are related to a smaller number of unobservable factors (Brown, 2015). It takes a large number of variables and reduce or summarises those variables to represent them in different factors/components/latent variables. Therefore, it can be used to find hidden constraints or dimensions that may or may not be visible through direct analysis.

This study needed to conduct the factor analysis before employing the structural equation modelling for testing the hypotheses. This is because one of the latent variables in this

research model called "self-regulation" was measured via 34 observed variables of which none of them had been categorised into similar groups based on their conceptual similarities. Therefore, this study uses a FA to identify the relationship between the observed variables and their underlying latent constructs.

As explained in Chapter 3, to be able to interpret the outcome of a FA, the value of the following factors must be considered (Brown, 2015, Hair et al., 2017):

- *Standard Deviation (SD)* : $-2 \leq$ Acceptable SD $\leq +2$
- *Communalities or R square (R^2)*: $0.4 \leq$ Acceptable Communality ≤ 1
- *KMO and Bartlett's Test*: $0.7 \leq$ Kaiser-Meyer-Olkin Measure of Sampling < 1 and $0 \leq$ significance value ≤ 0.05
- *Total Variance Explained*: The number of Initial Eigenvalues that their calculated total value is greater than 1 reveals the number of underlying sub-construct/latent variables.

Rotated Component Matrix: The highest correlation value is acceptable.

6.3.1. Standard Deviation (SD)

As illustrated in Table 6.2, the calculated SD of all listed observed variable is within ± 2. It means that the value of all observed variables is clustered close to the mean value.

Table 6-2. Standard Deviation (SD) of the selected observed variables, which measure a latent variable called "self-regulation"

	Mean	Std. Deviation	Analysis N
Self_Regulation1	3.27	1.182	332
Self_Regulation2	3.31	1.172	332
Self_Regulation3	3.07	1.488	332
Self_Regulation4	2.52	1.447	332
Self_Regulation5	2.93	1.500	332
Self_Regulation6	2.92	1.208	332
Self_Regulation7	3.13	1.156	332
Self_Regulation8	2.70	1.306	332
Self_Regulation9	2.56	1.277	332
Self_Regulation10	2.99	1.315	332
Self_Regulation11	3.23	1.237	332
Self_Regulation12	3.21	1.359	332

Self_Regulation13	2.83	1.342	332
Self_Regulation14	2.90	1.322	332
Self_Regulation15	2.94	1.319	332
Self_Regulation16	3.29	1.329	332
Self_Regulation17	2.53	1.382	332
Self_Regulation18	3.52	1.396	332
Self_Regulation19	2.87	1.368	332
Self_Regulation20	3.10	1.209	332
Self_Regulation21	2.87	1.227	332
Self_Regulation22	3.18	1.153	332
Self_Regulation23	2.79	1.292	332
Self_Regulation24	3.38	1.301	332
Self_Regulation25	3.42	1.283	332
Self_Regulation26	3.54	1.190	332
Self_Regulation27	3.52	1.200	332
Self_Regulation28	3.46	1.227	332
Self_Regulation29	3.36	1.215	332
Self_Regulation30	3.41	1.166	332
Self_Regulation31	3.35	1.223	332
Self_Regulation32	3.27	1.191	332
Self_Regulation33	3.39	1.125	332
Self_Regulation34	3.38	1.266	332

6.3.2. Communalities or R square (R2)

The amount of variance in each variable that is accounted for is indicated by communities (Brown, 2015, Hair et al., 2017). Following the aforementioned criteria, an observed variable can be counted on to identify the hidden latent variables, when its communality is greater than 0.4 and less than 1. As Table 6.3 shows, the extraction communalities of all listed observed variables are greater than 0.4 and less than 1, which acknowledge that all these variables are sufficiently reliable to contribute for discovering the hidden latent variables.

Table 6-3. Communalities of the selected observed variables, which measure a latent variable called "self-regulation"

Communalities		
	Initial	Extraction
Self_Regulation1	1.000	.691

Self_Regulation2	1.000	.722
Self_Regulation3	1.000	.656
Self_Regulation4	1.000	.691
Self_Regulation5	1.000	.661
Self_Regulation6	1.000	.628
Self_Regulation7	1.000	.475
Self_Regulation8	1.000	.668
Self_Regulation9	1.000	.694
Self_Regulation10	1.000	.499
Self_Regulation11	1.000	.706
Self_Regulation12	1.000	.677
Self_Regulation13	1.000	.660
Self_Regulation14	1.000	.695
Self_Regulation15	1.000	.657
Self_Regulation16	1.000	.694
Self_Regulation17	1.000	.570
Self_Regulation18	1.000	.460
Self_Regulation19	1.000	.614
Self_Regulation20	1.000	.633
Self_Regulation21	1.000	.622
Self_Regulation22	1.000	.626
Self_Regulation23	1.000	.514
Self_Regulation24	1.000	.651
Self_Regulation25	1.000	.661
Self_Regulation26	1.000	.740
Self_Regulation27	1.000	.769
Self_Regulation28	1.000	.761
Self_Regulation29	1.000	.720
Self_Regulation30	1.000	.704
Self_Regulation31	1.000	.723
Self_Regulation32	1.000	.674
Self_Regulation33	1.000	.674
Self_Regulation34	1.000	.636

6.3.3. KMO and Bartlett's Test

This test calculates two values, which indicate the suitability of the data for structure detection (Brown, 2015, Hair et al., 2017). Following the abovementioned criteria, both calculated values Kaiser-Meyer-Olkin Measure of Sampling Adequacy and significance

of KMO and Bartlett's Test are acceptable because the former one is 0, which must be less than 0.05 and the latter one is 0.941, which must be equal or greater than 0.7 and less than 1 (Table 6.4).

Table 6-4. The result of KMO and Bartlett's Test

KMO and Bartlett's Test		
Kaiser-Meyer-Olkin Measure of Sampling Adequacy.		**.941**
Bartlett's Test of Sphericity	Approx. Chi-Square	8128.351
	df	561
	Sig.	**.000**

6.3.4. Total Variance Explained

As explained in Chapter 4, the "self-regulation" is a moderator construct measured by the 34 observed variables. The result of the factor analysis informed this study that these observed variables can be grouped into 4 different factors (underlying sub-constructs/latent variable). As Brown (2015) and Hair et al. (2017) recommend, to identify the acceptable factors, the total value of the calculated Initial Eigenvalues for each factor must be greater than one. Accordingly, this study was able to group the 34 self-regulation's observed variables in to 4 factors (Table 6.5). The content of each group shows that its observed variables were selected based on the similarity of their functions or concepts.

Table 0-5. The total variance which indicates the total number of identified the hidden latent variables/components/factors

	Total Variance Explained								
	Initial Eigenvalues			Extraction Sums of Squared Loadings			Rotation Sums of Squared Loadings		
Component	Total	% of Variance	Cumulative %	Total	% of Variance	Cumulative %	Total	% of Variance	Cumulative %
1	14.402	42.358	42.358	14.402	42.358	42.358	7.949	23.380	23.380
2	3.700	10.881	53.240	3.700	10.881	53.240	5.232	15.387	38.767
3	1.718	5.052	58.292	1.718	5.052	58.292	4.015	11.810	50.576
4	1.256	3.695	61.987	1.256	3.695	61.987	3.823	11.245	61.821
5	.985	2.984	65.367						
6	.952	2.800	68.168						
7	.843	2.479	70.647						

8	.800	2.354	73.001						
9	.699	2.057	75.058						
10	.655	1.926	76.984						
11	.630	1.853	78.836						
12	.575	1.691	80.527						
13	.526	1.546	82.073						
14	.519	1.527	83.600						
15	.481	1.415	85.015						
16	.434	1.276	86.291						
17	.406	1.194	87.485						
18	.383	1.127	88.612						
19	.359	1.057	89.670						
20	.348	1.024	90.694						
21	.328	.963	91.657						
22	.320	.941	92.598						
23	.304	.893	93.492						
24	.259	.762	94.254						
25	.244	.717	94.971						
26	.231	.680	95.651						
27	.222	.653	96.305						
28	.221	.649	96.954						
29	.216	.635	97.589						
30	.209	.614	98.203						
31	.178	.523	98.725						
32	.158	.465	99.190						
33	.150	.442	99.632						
34	.125	.368	100.000						

6.3.5. Rotated Component Matrix

The rotated component matrix helps researchers to determine what the components (factors/ hidden latent variables) represent. The rotated component matrix, sometimes referred to as the loadings, is the key output of principal components analysis. It contains estimates of the correlations between each of the observed variables and the estimated components.

Consequently, each of the 34 observed variables is transmitted to one of the identified components with the highest correlation value. As Table 6.6 shows, the highlighted

values show which observed variables belong to one of the four determined latent variable consists/components

Table 0-6. The identified hidden latent variables and their observed variables

Rotated Component Matrix

	Component			
	1	2	3	4
Self_Regulation1	.213	.777	.167	.006
Self_Regulation2	.205	.776	.193	.064
Self_Regulation3	.141	.633	-.071	.353
Self_Regulation4	.088	.727	-.058	.370
Self_Regulation5	.135	.747	-.003	.244
Self_Regulation6	.246	.666	.297	.153
Self_Regulation7	.184	.432	.414	.216
Self_Regulation8	.115	.569	.511	.195
Self_Regulation9	.104	.628	.443	.268
Self_Regulation10	.245	.461	.405	.209
Self_Regulation11	.461	.174	.673	.034
Self_Regulation12	.362	.027	.715	.138
Self_Regulation13	.087	.322	.593	.367
Self_Regulation14	.094	.364	.606	.373
Self_Regulation15	.157	.358	.610	.337
Self_Regulation16	.336	.083	.742	.145
Self_Regulation17	.078	.336	.522	.355
Self_Regulation18	.455	.240	.103	.431
Self_Regulation19	.247	.194	.184	.664
Self_Regulation20	.442	.343	.089	.412
Self_Regulation21	.399	.282	.185	.570
Self_Regulation22	.538	.253	.202	.457
Self_Regulation23	.356	.315	.017	.507
Self_Regulation24	.649	.168	.085	.422
Self_Regulation25	.732	.022	.170	.256
Self_Regulation26	.794	.092	.218	.219
Self_Regulation27	.813	.089	.153	.188
Self_Regulation28	.757	.074	.252	.237
Self_Regulation29	.781	.157	.116	.178
Self_Regulation30	.793	.120	.212	.110
Self_Regulation31	.787	.283	.077	.018
Self_Regulation32	.718	.245	.163	.062

Self_Regulation33	.766	.197	.170	.088
Self_Regulation34	.716	.120	.201	.029

The discovered underlying sub-constructs should be given names which is fit enough to each group from the authors' point of view (Brown, 2015, Hair et al., 2017). The former researchers advise that one method for naming the determined latent variables/components/factors is to use the first one or two loading items for each factor. A well labeled factor provides an accurate, useful description of the underlying blatant variables, improving the report's clarity. Accordingly, these four latent variables (underlying sub-constructs) were named based on the concept and functionalities of their items or observed variables, as follows:

- ***Self-regulation based on the prioritization of main tasks***: This name was adopted from the concept of the all items, which can measure this factor such as "*I stop my excessive use of Instagram by reminding myself that work is more important than Instagram*", "*I stop my excessive use of Instagram by thinking about passing my course*", and "*I stop my excessive use of Instagram by telling myself that there is an important test coming up*". This latent variable is measured via 13 items.

- ***Self-regulation through no direct access***: Some items, which measure the second discovered factor, such as "*I stop my excessive use of Instagram by leaving my phone in another room*", "*I stop my excessive use of Instagram by spending two days in an area with no internet service*", and "*I stop my excessive use of Instagram by charging my phone in a different room*" led this study to allocate this label to this factor. Consequently, this latent variable is measured via 10 items.

- ***Self-regulation via technology feature***: Based on the functioning of the items, which participate in the measurement of the third identified factor/latent variable, such as "*I stop my excessive use of Instagram by leaving my phone on mute at all times*", "*I stop my excessive use of Instagram by turning off notification sound*", and "*I stop my excessive use of Instagram by putting my phone on airplane mode*", this label is considered as a suitable and expressive name for the third factor. Therefore, this latent variable is measured via 7 items.

- ***Self-regulation based on certain times***: This name was formed by adopting concepts of some items such as "*I stop my excessive use of Instagram by planning to stop using*

Instagram after 11 pm", and "*I stop my excessive use of Instagram by taking 10 min breaks after every 1 hr of studying to use Instagram*", which measured the fourth identified latent variable. This latent variable is measured via 3 items.

The reliability of all these factors were assessed as the same as all other constructs. The results are presented in the next section.

6.4. Measurement Model Analysis

For each of the latent variables within the SEM, a measurement model has to be defined. The measurement models embody the relationship between the empirically observable variables and the latent variables through assessing their validity and their reliability (Hoyle, 1995, Gefen et al., 2000, Blunch, 2012, Hair et al., 2017).

Since this study research model's constructs are operationalized with reflective items, the analysis technique requires an evaluation of internal consistency, indicator reliability, and also validity based on both convergent, and discriminant validity (Hoyle, 1995, Gefen et al., 2000, Blunch, 2012, Hair et al., 2017). This section stablishes the reliability and validity of both the higher-order/second order and lower-order/underlying sub-constructs.

6.4.1. Reliability

As explained in Section 3, to assess the reliability of constructs and their observed variables/indicators, it is necessary to check the outcome of the internal consistency and indicator reliability tests.

6.4.1.1. Internal Consistency

Internal consistency refers to convergence between observed variables. As explained in Section 3, to assess the internal consistency, the following criteria should be checked (Boudreau et al., 2001, Taherdoost, 2016, Gefen et al., 2000, Hair et al., 2017):

- Composite reliability ≥ 0.7
- Cronbach's alpha ≥ 0.6
- $0.7 \leq Rho\_A \leq 1$

According to (Hair et al., 2017):

When the Cronbach's alpha of individual constructs exceeds the 0.60 - 0.70 threshold, a model has acceptable internal consistency reliability, while those ones less than 0.60

indicate a lack of reliability. This measurement has been recognised as a conservative model because when the value of Cronbach's alpha is not sufficiently reliable, it produces composite reliability as overestimated values of internal consistency reliability. Therefore, in order to find the true value of internal consistency reliability between their values, both Cronbach's alpha and composite reliability are utilised. Moreover, in PLS-SEM, there is another compromise value which is called rho_A and provides more accurate measure of internal consistency reliability.

Results across the three measurement models indicates that all constructs meet the acceptable internal consistency reliability (Table 6.7). The value of Cronbach's Alpha is within the acceptable range, as the minimum one is "habit" = 0.606 and the maximum one is for "self-regulation" = 0.958. The composite reliability values range from 0.835 for "Habit" to 0.930 for "self-regulation", which are all greater than 0.7. Furthermore, all values of rho_A are greater than 0.7 and less than 1 except "Habit". However, it is still acceptable because of the values of its Cronbach's Alpha and composite reliability.

Table 6-7. Internal consistency of the constructs

Constructs	Internal consistency reliability			Accepted
	Cronbach's Alpha	Rho_A	Composite Reliability	
Attitude	0.71	0.713	0.873	Yes
Habit	0.606	0.606	0.835	Yes
Personal Norm	0.715	0.721	0.875	Yes
Social Norm	0.869	0.876	0.911	Yes
IT/Social media identity	0.903	0.904	0.918	Yes
*Dependency	0.895	0.897	0.927	Yes
*Emotional energy	0.87	0.873	0.911	Yes
*Relatedness	0.892	0.893	0.925	Yes
Self-regulation	0.958	0.959	0.961	Yes
*Prioritisation-tasks	0.948	0.949	0.955	Yes
*No-Direct-access	0.894	0.896	0.917	Yes
*Technology-features	0.861	0.862	0.896	Yes
*Certain-time	0.738	0.749	0.852	Yes
Social media addiction	0.946	0.948	0.952	Yes
*Conflict	0.869	0.87	0.92	Yes
*Mood-Modification	0.853	0.854	0.911	Yes

*Relapse	0.897	0.903	0.936	Yes
*Salience	0.783	0.795	0.874	Yes
*Tolerance	0.835	0.849	0.901	Yes
*Withdrawal	0.888	0.889	0.931	Yes
*The underlying sub-constructs				

6.4.1.2. Indicator Reliability

Indicator reliability, which is shown by outer loading in the SEM approach, shows the degree of commonality of the related indicators/items represented by a latent variable. A construct should typically explain at least 50% of each item's variance (Hair et al., 2017). Consequently, the lowest loading for each item is 0.7 (Hair et al., 2017).

Outer loadings that are lower than 0.70 (the acceptable value) may result in the removal of the affected indicator. However, some researchers warn that such deletions should only be done when it improves the composite reliability (presented in Table 6.7) and the average variance extracted of the constructs (presented in Table 6.7) (MacKenzie et al., 2011). On the other hand, outer loadings with value higher than the threshold imply that there may be many commonalities among the indicators (Hair et al., 2017).

Table 6.8 presents outer loadings of all indicators/observed variables. Using guidance provided by Mackenzie et al. (2011), indicators Habit2, Attitude2, P-Norm3, P-Norm4, Prioritisation-T1, Prioritisation-T2, and T-Feature7 were dropped to improve composite reliability and average variance extracted. The improved values are reported later in the next section when validating the higher-order construct.

Table 6-8. Outer loading of indicators

Constructs	Items	Loadings
Attitude	Attitude1	0.881
	Attitude2	0.624
	Attitude 3	0.824
Habit	Habit1	0.861
	Habit2	0.629
	Habit3	0.811
Personal Norm	P-Norm1	0.848
	P-Norm2	0.875
	P-Norm3	0.491
	P-Norm4	0.365

Social Norm	S-Norm1	0.783
	S-Norm2	0.892
	S-Norm3	0.895
	S-Norm4	0.816
IT/Social media identity (Dependency)	Dependency1	0.858
	Dependency2	0.881
	Dependency3	0.875
	Dependency4	0.871
IT/Social media identity (Emotional Energy)	Emotion-E1	0.813
	Emotion-E2	0.825
	Emotion-E3	0.905
	Emotion-E4	0.849
IT/Social media identity (Relatedness)	Relatedness1	0.859
	Relatedness2	0.888
	Relatedness3	0.880
	Relatedness4	0.848
Social Media Addiction (Salience)	Salience1	0.685
	Salience2	0.556
	Salience3	0.695
Social Media Addiction (Tolerance)	Tolerance1	0.633
	Tolerance2	0.777
	Tolerance3	0.806
Social Media Addiction (Relapse)	Relapse1	0.751
	Relapse2	0.772
	Relapse3	0.726
Social Media Addiction (Withdrawal)	Withdrawal1	0.781
	Withdrawal2	0.731
	Withdrawal3	0.674
Social Media Addiction (Mood Modification)	Mood-M1	0.714
	Mood-M2	0.705
	Mood-M3	0.693
Social Media Addiction (Conflict)	Conflict1	0.746
	Conflict2	0.783
	Conflict3	0.754
Self-regulation (Prioritisation Task)	Prioritisation-T1	0.631
	Prioritisation-T2	0.664
	Prioritisation-T3	0.744
	Prioritisation-T4	0.709
	Prioritisation-T5	0.653
	Prioritisation-T6	0.732
	Prioritisation-T7	0.704
	Prioritisation-T8	0.721
	Prioritisation-T8	0.700
	Prioritisation-T10	0.698
	Prioritisation-T11	0.685

	Prioritisation-T12	0.675
	Prioritisation-T13	0.695
Self-regulation (No direct access)	No-Access1	0.601
	No-Access2	0.630
	No-Access3	0.531
	No-Access4	0.557
	No-Access5	0.567
	No-Access6	0.679
	No-Access7	0.590
	No-Access8	0.647
	No-Access9	0.674
	No-Access10	0.639
Self-regulation (Technology Features)	T-Feature1	0.666
	T-Feature2	0.588
	T-Feature3	0.614
	T-Feature4	0.646
	T-Feature5	0.666
	T-Feature6	0.613
	T-Feature7	0.595
Self-regulation (Certain Time)	Certain-Time1	0.607
	Certain-Time2	0.711
	Certain-Time3	0.607

6.4.2. Validity

In Section3, it was explained that construct validity refers to an instrument's capacity or ability to accurately measure specific concept or construct relevant to a research model (Carmines and Zeller, 1979). According to Taherdoost (2016) and Hair et al. (2017), construct validity has two components: convergent and discriminant validity.

6.4.2.1. Convergent Validity

A type of construct validity called convergent validity assesses the extent to which two constructs correlate or are theoretically related to each other. Convergent validity is evaluated by the average variance extracted (AVE). According to the reviewed literature, Average Variance Extracted (AVE) > 0.5 indicates that a construct achieved acceptable convergent validity (Boudreau et al., 2001, Taherdoost, 2016, Gefen et al., 2000, Hwang, 2017, Hair et al., 2017).

As Table 6.9 reports, the AVE values range from 0.423 (Self-regulation) to 0.829 (Relapse as a low-order latent variable for measuring social media addiction construct). Except for two constructs (i.e., IT/Social media identity, and Self-regulation), the AVE values for most are above 0.5. The constructs with AVE greater than 0.5 have good convergent validity, so they are reliable. Although, constructs with low AVE values are not reliable, those two constructs of this study (i.e. self-regulation and IT/social media identity), for which their AVE has low value, are still reliable in this study. This is because, according to Fornell and Larcker (1981) and Farrell (2010), if a construct's AVE is less than 0.5, but its composite reliability is higher than 0.6, the convergent validity of the construct can be adequate. As Table 6.7 indicates, the composite reliability of these two constructs respectively is equal to 0.961 and 0.918, so they are also reliable.

Table 0-9. Average Variance Extract (AVE) to examine the convergent validity of the constructs

Constructs	Average Variance Extract (AVE)	Accepted
Attitude	0.775	Yes
Habit	0.717	Yes
Personal Norm	0.778	Yes
Social Norm	0.719	Yes
IT/Social media identity	0.484	Yes
*Dependency	0.759	Yes
*Emotional energy	0.720	Yes
*Relatedness	0.775	Yes
Self-regulation	0.423	Yes
*Prioritisation-tasks	0.638	Yes
*No-Direct-access	0.563	Yes
*Technology-features	0.590	Yes
*Certain-time	0.658	Yes
Social media addiction	0.524	Yes
*Conflict	0.793	Yes
*Mood-Modification	0.774	Yes
*Relapse	0.829	Yes
*Salience	0.698	Yes

*Tolerance	0.752	Yes
*Withdrawal	0.817	Yes
*The underlying sub-constructs		

6.4.2.2. Discriminant Validity

Discriminant validity (also known as divergent validity) examines whether constructs that ought to be unrelated are, in fact, unrelated (Taherdoost, 2016, Hair et al., 2017). Different methods, some of which are regarded as conventional while others as contemporary, are used to evaluate discriminant validity. As explained in Section 3, cross-loadings and the Fornell-Larker criterion are 'classical approach' and Heterotrait-monotrait (HTMT) is the modern one that can be used for assessing the discriminant validity (Henseler et al., 2015). This section summarises and discusses all three techniques as determinants of discriminant validity in PLS-SEM to take advantage of the traditional and contemporary methodologies.

a) Heterotrait-monotrait (HTMT): Henseler et al. (2015) state that HTMT < 0.90 is regarded as the appropriate indicator of discriminant validity because it is included in the bias-corrected and accelerated confidence interval approach, which is obtained from complete bootstrapping. As Table 6.10 shows, most of the constructs exhibit conceptual dissimilarity, as they have HTMT<=0.85. Even though experiential expertise and nurturant support constructs have values above 0.85, they are still below the required threshold of 0.90, and are, therefore, conceptually dissimilar. However, there is no discriminant validity between IT/social media identity and emotional energy (0.916), IT/social media identity and relatedness (0.910), self-regulation and certain-time (0.938), self-regulation and prioritization-task (0.909), self-regulation and technology feature (0.905), social media addiction and mood-modification (0.945), social media addiction and salience (0.907), social media addiction and tolerance (0.959), and finally social media addiction and withdrawal (0.914).

Table 6-10. Discriminant validity using HTMT

Constructs	Attitude	*Certain-Time	*Conflict	*Dependency	*Emotional-Energy	Habit	IT/Social media identity	*Mood-Modification	*No-Direct-Access	Personal-Norm	*Prioritisation-Tasks	*Relapse	*Relatedness	*Salience	Self-Regulation	Social Media Addiction	Social-Norm	*Technology-Features	*Tolerance	*Withdrawal
Attitude																				
*Certain-Time	0.104																			
*Conflict	0.3	0.113																		
*Dependency	0.359	0.127	0.51																	
*Emotional-Energy	0.464	0.084	0.332	0.512																
Habit	0.629	0.166	0.551	0.279	0.332															
IT/Social media identity	0.503	0.136	0.5	0.878	0.916	0.405														
*Mood-Modification	0.206	0.123	0.673	0.494	0.257	0.545	0.445													
*No-Direct-Access	0.082	0.747	0.053	0.089	0.074	0.079	0.115	0.073												
Personal-Norm	0.656	0.152	0.348	0.253	0.397	0.751	0.46	0.254	0.099											
*Prioritisation-Tasks	0.051	0.75	0.059	0.076	0.043	0.102	0.113	0.077	0.529	0.055										
*Relapse	0.215	0.104	0.57	0.537	0.34	0.378	0.501	0.71	0.067	0.179	0.068									
*Relatedness	0.406	0.12	0.375	0.505	0.591	0.377	0.91	0.331	0.118	0.474	0.156	0.344								
*Salience	0.447	0.094	0.689	0.591	0.447	0.574	0.631	0.661	0.088	0.425	0.151	0.7	0.5							
Self-Regulation	0.088	0.938	0.072	0.096	0.07	0.12	0.132	0.089	0.881	0.097	0.909	0.088	0.154	0.125						
Social Media Addiction	0.294	0.13	0.875	0.585	0.366	0.572	0.563	0.945	0.083	0.324	0.108	0.868	0.421	0.907	0.111					
Social-Norm	0.397	0.118	0.399	0.424	0.388	0.446	0.51	0.305	0.053	0.604	0.057	0.396	0.432	0.523	0.072	0.433				
*Technology-Features	0.082	0.737	0.056	0.061	0.054	0.114	0.095	0.053	0.727	0.088	0.675	0.086	0.116	0.061	0.905	0.079	0.063			
*Tolerance	0.295	0.135	0.812	0.482	0.281	0.583	0.464	0.827	0.088	0.369	0.119	0.616	0.365	0.799	0.116	0.959	0.409	0.074		
*Withdrawal	0.084	0.104	0.631	0.417	0.246	0.35	0.387	0.838	0.064	0.128	0.092	0.749	0.278	0.624	0.089	0.914	0.224	0.075	0.729	

* The underlying sub-constructs

b) Fornell-Larcker: Table 6.11 indicates the result of the discriminant validity using Fornell-Larcker criterion where the bolded values are the square roots of AVEs and the ones below are the construct correlations (Henseler et al., 2015). As the results demonstrate, all square root values are larger, showing that discriminant validity using the Fornell-Larcker criterion is met. However, there are two low-order latent constructs "relapse" and "withdrawal" have respectively a value of 0.911 and 0.904, which are greater than 0.90, so there is no discriminant validity.

Table 0-11. Discriminant Validity using Fornell-Larcker

Constructs	Attitude	*Certain-Time	*Conflict	*Dependency	*Emotional-Energy	Habit	IT/Social media identity	*Mood-Modification	*No-Direct-Access	Personal-Norm	*Prioritisation-Tasks	*Relapse	*Relatedness	*Salience	Self-Regulation	Social Media Addiction	Social-Norm	*Technology-Features	*Tolerance	*Withdrawal
Attitude	0.88																			
*Certain-Time	0.053	0.811																		
*Conflict	0.233	0.016	0.891																	
*Dependency	0.288	0.008	0.45	0.871																
*Emotional-Energy	0.367	0.065	0.29	0.457	0.849															
Habit	0.409	-0.007	0.399	0.207	0.241	0.847														
IT/Social media identity	0.404	0.01	0.442	0.788	0.809	0.3	0.696													
*Mood-Modification	0.157	0.098	0.579	0.431	0.221	0.392	0.39	0.88												
*No-Direct-Access	0.06	0.611	-0.01	-0.069	0.025	0.021	-0.064	0.014	0.751											
Personal-Norm	0.467	0.062	0.273	0.205	0.315	0.494	0.372	0.199	0.05	0.882										
*Prioritisation-Tasks	0.027	0.632	-0.033	-0.054	-0.002	-0.009	-0.084	-0.005	0.494	-0.033	0.798									
*Relapse	0.173	0.08	0.504	0.479	0.3	0.28	0.449	0.625	-0.022	0.149	-0.048	0.911								
*Relatedness	0.324	-0.044	0.329	0.453	0.522	0.277	0.824	0.289	-0.105	0.378	-0.142	0.308	0.869							
*Salience	0.335	0.027	0.577	0.501	0.37	0.406	0.536	0.545	-0.044	0.325	-0.129	0.587	0.425	0.835						
Self-Regulation	0.06	0.794	-0.02	-0.048	0.011	0.015	-0.074	0.026	0.815	0.023	0.872	-0.004	-0.135	-0.066	0.651					
Social Media Addiction	0.234	0.061	0.791	0.536	0.329	0.431	0.517	0.853	-0.03	0.265	-0.079	0.802	0.384	0.777	-0.033	0.724				
Social-Norm	0.312	0.081	0.347	0.376	0.341	0.322	0.454	0.263	0.006	0.476	0.012	0.351	0.38	0.434	0.025	0.389	0.848			
*Technology-Features	0.059	0.591	-0.014	-0.017	-0.029	0.051	-0.062	0.027	0.65	0.052	0.612	0.051	-0.101	0	0.825	0.01	0.038	0.768		
*Tolerance	0.224	-0.012	0.694	0.423	0.243	0.405	0.406	0.7	-0.065	0.279	-0.104	0.547	0.314	0.658	-0.081	0.858	0.35	-0.048	0.867	
*Withdrawal	0.059	0.082	0.555	0.37	0.216	0.258	0.344	0.73	-0.023	0.104	-0.08	0.669	0.247	0.523	-0.024	0.842	0.198	0.028	0.634	0.904

* The underlying sub-constructs

c) Cross Loadings: According to cross loadings, a specific component should have larger loadings on its own parent construct than on any other constructs in the study (Henseler et al., 2015), so that, there are problems with discriminant validity if an item loads well onto another construct compared to its own parent construct. In other words, the loading of individual blocks is greater than loadings found in similar columns and rows. As Table 6.12 and Table 6.13 shows the cross-loading values for both high and low order latent constructs, it is a result that the measurement model has discriminant validity.

Table 0-12. Discriminant validity with cross loadings for the low-order latent variable

Constructs	*Certain-Time	*Conflict	*Dependency	*Emotional-Energy	*Mood-Modification	*No-Direct-Access	*Prioritisation-Tasks	*Relapse	*Relatedness	*Salience	*Technology-Features	*Tolerance	*Withdrawal
Self_Regulation19	**0.78**	-0.085	-0.097	0.009	-0.073	-0.146	-0.143	0.034	0.468	-0.058	-0.037	0.607	-0.018
Self_Regulation21	**0.875**	0.005	-0.001	0.038	0.083	0.54	0.579	0.035	-0.035	-0.003	0.54	-0.021	0.035
Self_Regulation23	**0.774**	0.12	0.119	0.114	0.122	0.476	0.497	0.161	0.064	0.11	0.417	0.099	0.087
Conflict1	0.06	**0.746**	0.329	0.16	0.004	-0.014	0.099	0.668	-0.021	0.102	0.45	-0.017	0.446
Conflict2	0.094	**0.783**	0.342	0.195	0.011	0.008	0.115	0.676	-0.018	0.112	0.49	-0.013	0.549
Conflict3	0.068	**0.754**	0.331	0.231	-0.021	0.003	0.075	0.635	-0.022	0.067	0.479	-0.036	0.448
Dependency1	-0.035	0.433	**0.858**	0.466	0.017	0.06	0.134	0.384	-0.065	0.192	0.442	-0.053	0.47
Dependency2	0.048	0.359	**0.881**	0.453	-0.005	0.041	0.041	0.351	-0.026	0.186	0.462	-0.003	0.435
Dependency3	0.015	0.401	**0.875**	0.306	-0.076	-0.004	-0.027	0.41	-0.018	0.208	0.399	-0.022	0.487
Dependency4	0	0.375	**0.871**	0.351	-0.048	-0.008	0.056	0.358	-0.134	0.128	0.441	-0.093	0.48
Emotion_E1	0.034	0.28	0.406	**0.813**	-0.078	0.017	0.073	0.221	-0.005	0.216	0.326	-0.001	0.314
Emotion_E2	0.018	0.172	0.353	**0.825**	-0.097	-0.002	-0.029	0.179	0.036	0.281	0.29	0.001	0.241
Emotion_E3	0.094	0.272	0.414	**0.905**	-0.122	-0.038	-0.031	0.165	0.027	0.308	0.338	0.019	0.285
Emotion_E4	0.071	0.256	0.375	**0.849**	-0.081	-0.002	0.008	0.186	0.027	0.264	0.3	0.018	0.277
Mood_Modification1	0.047	0.822	0.41	0.242	**0913**	0.021	-0.006	0.452	0.299	0.516	0.023	0.637	0.514
Mood_Modification2	-0.008	0.532	0.425	0.3	**0.907**	-0.05	-0.036	0.439	0.285	0.52	-0.048	0.596	0.492
Mood_Modification3	0.003	0.518	0.366	0.232	**0.851**	0	-0.048	0.456	0.296	0.504	-0.013	0.62	0.476
Self_Regulation1	0.404	-0.039	-0.127	-0.088	-0.039	**0.779**	0.376	-0.065	-0.125	-0.089	0.447	-0.033	-0.017
Self_Regulation2	0.435	0.006	-0.061	-0.008	-0.037	**0.803**	0.384	-0.038	-0.055	-0.061	0.5	-0.047	-0.06
Self_Regulation3	0.424	-0.003	-0.038	-0.004	0.039	**0.675**	0.32	-0.091	0.01	-0.053	0.381	-0.047	-0.007

Self_Regulation4	0.482	0.009	-0.02	0.097	0.022	**0.737**	0.302	0.014	-0.045	-0.033	0.389	-0.048	0.034
Self_Regulation5	0.408	0.05	-0.007	0.05	0.012	**0.753**	0.327	-0.023	-0.038	-0.01	0.405	0.014	-0.039
Self_Regulation6	0.497	0.018	-0.001	0.075	0.012	**0.791**	0.446	-0.017	-0.069	-0.006	0.536	-0.042	-0.051
Self_Regulation7	0.446	-0.011	-0.071	0.035	-0.027	**0.652**	0.391	-0.036	-0.111	-0.056	0.493	-0.069	-0.074
Self_Regulation8	0.484	-0.024	-0.064	0.019	0.073	**0.756**	0.378	0.042	-0.13	0.028	0.59	-0.067	0.04
Self_Regulation9	0.533	-0.066	-0.074	-0.005	0.038	**0.794**	0.388	0.046	-0.127	-0.03	0.601	-0.091	0.019
Self_Regulation10	0.496	-0.038	-0.026	0.034	0.034	**0.597**	0.448	0.001	-0.077	0.01	0.537	-0.05	0.051
Self_Regulation18	0.513	-0.041	-0.105	-0.079	0.011	0.471	**0.561**	-0.074	-0.106	-0.104	0.463	-0.04	-0.027
Self_Regulation20	0.556	0.075	0.067	0.073	0.076	0.516	**0.642**	0.08	-0.059	0.041	0.442	0.038	0.01
Self_Regulation22	0.663	0.012	-0.032	-0.003	0.027	0.514	**0.711**	0.005	-0.089	-0.061	0.557	-0.077	-0.053
Self_Regulation24	0.568	0.008	0.032	0.043	0.018	0.441	**0.768**	0.028	-0.071	-0.05	0.497	-0.071	-0.025
Self_Regulation25	0.467	-0.034	-0.055	-0.021	0.015	0.324	**0.79**	-0.037	-0.072	-0.116	0.46	-0.095	-0.015
Self_Regulation26	0.515	0.017	-0.021	0.002	0.022	0.392	**0.849**	-0.083	-0.081	-0.131	0.519	-0.072	-0.056
Self_Regulation27	0.477	-0.002	-0.03	-0.003	0.034	0.364	**0.853**	-0.035	-0.077	-0.117	0.49	-0.033	-0.021
Self_Regulation28	0.52	-0.027	-0.024	-0.054	0.039	0.384	**0.832**	-0.001	-0.093	-0.09	0.556	-0.064	-0.002
Self_Regulation29	0.51	-0.065	0.004	0.028	0.044	0.395	**0.829**	-0.027	-0.091	-0.098	0.476	-0.093	-0.052
Self_Regulation30	0.474	-0.068	-0.023	-0.029	-0.047	0.363	**0.831**	-0.066	-0.132	-0.114	0.514	-0.12	-0.092
Self_Regulation31	0.474	0.004	-0.075	0.044	-0.011	0.422	**0.8**	-0.056	-0.139	-0.114	0.421	-0.078	-0.074
Self_Regulation32	0.486	-0.02	-0.099	0.018	-0.06	0.402	**0.763**	0	-0.179	-0.106	0.451	-0.099	-0.074
Self_Regulation33	0.469	-0.052	-0.12	-0.019	-0.072	0.385	**0.807**	-0.08	-0.179	-0.106	0.488	-0.079	-0.145
Self_Regulation34	0.402	-0.108	-0.09	-0.022	-0.075	0.318	**0.733**	-0.127	-0.168	-0.143	0.408	-0.119	-0.169
Relapse1	0.08	0.543	0.423	0.186	0.573	0.004	-0.07	**0.843**	0.252	0.471	-0.008	0.583	0.663
Relapse2	0.11	0.497	0.353	0.214	0.562	0.063	0.039	**0.914**	0.278	0.517	0.046	0.646	0.648
Relapse3	0.068	0.487	0.36	0.181	0.513	-0.033	0.017	**0.88**	0.232	0.448	0.034	0.616	0.613
Relatedness1	-0.033	0.321	0.404	0.457	0.269	-0.092	-0.123	0.304	**0.859**	0.376	-0.104	0.285	0.221
Relatedness2	-0.027	0.25	0.401	0.472	0.279	-0.094	-0.13	0.287	**0.888**	0.401	-0.099	0.245	0.207
Relatedness3	-0.03	0.283	0.373	0.496	0.242	-0.088	-0.116	0.237	**0.88**	0.334	-0.08	0.267	0.217
Relatedness4	-0.064	0.291	0.397	0.386	0.213	-0.093	-0.125	0.241	**0.848**	0.364	-0.067	0.298	0.213
Salience1	-0.005	0.523	0.436	0.283	0.48	-0.048	-0.176	0.538	0.388	**0.844**	-0.01	0.581	0.457
Salience2	0.022	0.356	0.337	0.282	0.38	-0.031	-0.095	0.454	0.253	**0.78**	0.038	0.433	0.386

Salience3	0.051	0.546	0.472	0.36	0.495	-0.031	-0.052	0.478	0.407	**0.879**	-0.02	0.617	0.463
Self_Regulation11	0.411	-0.073	-0.041	0.005	-0.023	0.457	0.592	-0.021	-0.05	-0.035	**0.767**	-0.096	-0.058
Self_Regulation12	0.373	0.004	0.035	-0.029	0.006	0.348	0.505	0.091	-0.087	-0.024	**0.769**	-0.035	0.029
Self_Regulation13	0.524	0.009	-0.018	-0.031	0.025	0.562	0.383	0.063	-0.101	0.045	**0.729**	-0.033	0.062
Self_Regulation14	0.544	0.028	0.039	-0.005	0.079	0.597	0.393	0.101	-0.038	0.042	**0.759**	0.03	0.085
Self_Regulation15	0.482	-0.013	-0.078	-0.016	0.034	0.613	0.438	0.013	-0.094	-0.021	**0.807**	-0.03	-0.023
Self_Regulation16	0.381	-0.018	-0.006	-0.061	0.003	0.398	0.507	-0.005	-0.099	-0.007	**0.774**	-0.058	0.043
Self_Regulation17	0.504	-0.017	0.014	0.034	0.032	0.401	0.344	0.068	-0.119	0.056	**0.635**	-0.065	0.005
Tolerance1	0.021	0.539	0.236	0.156	0.545	-0.021	-0.032	0.312	0.257	0.478	-0.009	**0.799**	0.455
Tolerance2	-0.042	0.612	0.419	0.204	0.636	-0.063	-0.12	0.509	0.276	0.607	-0.05	**0.926**	0.544
Tolerance3	-0.003	0.646	0.424	0.263	0.633	-0.079	-0.108	0.574	0.284	0.613	-0.06	**0.872**	0.635
Withdrawal1	0.076	0.482	0.436	0.268	0.655	-0.043	-0.055	0.643	0.306	0.55	0.009	0.574	**0.923**
Withdrawal2	0.057	0.459	0.426	0.265	0.572	-0.002	-0.055	0.614	0.259	0.533	0.066	0.478	**0.928**
Withdrawal3	0.087	0.434	0.448	0.288	0.47	-0.014	-0.02	0.567	0.274	0.522	0.069	0.434	**0.88**

Table 6-13. Discriminant validity with Cross loadings for the high-order latent constructs

Constructs	Attitude	Habit	IT/Social media identity	Personal-Norm	Self-Regulation	Social Media Addiction	Social-Norm
Attitude1	**0.891**	0.294	0.37	-0.084	0.026	0.163	0.29
Attitude3	**0.87**	0.432	0.341	-0.068	0.023	0.141	0.28
Habit1	0.381	**0.85**	0.257	-0.006	-0.069	0.23	0.262
Habit3	0.311	**0.844**	0.252	0.034	0.056	0.246	0.207
Dependency1	0.274	0.24	**0.722**	0.085	-0.054	0.405	0.427
Dependency2	0.294	0.147	**0.727**	0.074	-0.012	0.384	0.429
Dependency3	0.223	0.178	**0.639**	-0.032	-0.049	0.446	0.362
Dependency4	0.207	0.153	**0.65**	0.002	-0.077	0.438	0.352
Emotion_E1	0.276	0.197	**0.686**	0.007	-0.001	0.281	0.458
Emotion_E2	0.322	0.228	**0.655**	-0.056	-0.021	0.223	0.425
Emotion_E3	0.375	0.236	**0.738**	-0.072	0.004	0.251	0.486
Emotion_E4	0.271	0.157	**0.663**	-0.012	0.012	0.263	0.401
Relatedness1	0.237	0.194	**0.717**	0.322	-0.122	0.357	0.34
Relatedness2	0.313	0.243	**0.734**	0.332	-0.122	0.335	0.341
Relatedness3	0.315	0.267	**0.729**	0.368	-0.108	0.318	0.343
Relatedness4	0.259	0.261	**0.681**	0.29	-0.119	0.325	0.296
P_Norm1	0.383	0.435	0.309	**0.868**	0.069	0.207	0.375
P_Norm2	0.438	0.437	0.346	**0.896**	-0.022	0.257	0.46
Self_Regulation1	0.045	0.031	-0.141	0.02	**0.601**	-0.056	-0.029
Self_Regulation2	0.065	-0.009	-0.052	0.009	**0.63**	-0.048	0.001
Self_Regulation3	0.037	0.086	-0.013	0.063	**0.532**	-0.032	0.019
Self_Regulation4	-0.024	-0.032	0.011	0.041	**0.558**	0.001	0.025
Self_Regulation5	0.025	0.096	0.001	0.054	**0.567**	0	-0.054
Self_Regulation6	0.06	-0.011	0	0.067	**0.678**	-0.018	0.033
Self_Regulation7	0.087	-0.029	-0.063	0.072	**0.591**	-0.055	0.033
Self_Regulation8	0.053	0.027	-0.075	0.029	**0.647**	0.019	0.019
Self_Regulation9	0.05	-0.001	-0.087	-0.011	**0.674**	-0.016	-0.012
Self_Regulation10	0.058	0.03	-0.03	0.077	**0.639**	0.002	-0.02
Self_Regulation11	0.052	-0.005	-0.037	0.061	**0.666**	-0.062	0.02
Self_Regulation12	0.07	-0.005	-0.035	0.008	**0.588**	0.016	0.081
Self_Regulation13	0.026	0.052	-0.063	0.033	**0.614**	0.035	0.027
Self_Regulation14	0.087	0.136	-0.002	0.103	**0.646**	0.075	0.036
Self_Regulation15	0.049	0.061	-0.079	0.053	**0.666**	-0.008	-0.004
Self_Regulation16	-0.013	-0.009	-0.069	-0.025	**0.613**	-0.008	0.023
Self_Regulation17	0.049	-0.011	-0.032	0.007	**0.596**	0.015	0.043
Self_Regulation18	-0.01	-0.027	-0.12	-0.014	**0.632**	-0.054	-0.036
Self_Regulation19	-0.017	-0.124	-0.095	-0.118	**0.456**	0.006	-0.137
Self_Regulation20	0.155	0.07	0.032	0.047	**0.664**	0.065	0.023
Self_Regulation21	0.031	-0.018	0	0.046	**0.711**	0.028	0.061
Self_Regulation22	0.008	0.05	-0.053	0.022	**0.744**	-0.029	0.04
Self_Regulation23	0.117	0.127	0.122	0.163	**0.607**	0.142	0.152

Self_Regulation24	0.084	0.038	0	-0.025	**0.709**	-0.018	0.026
Self_Regulation25	-0.006	-0.044	-0.062	-0.074	**0.653**	-0.055	0.005
Self_Regulation26	0.035	-0.014	-0.043	-0.04	**0.732**	-0.059	0.028
Self_Regulation27	-0.018	-0.035	-0.047	-0.055	**0.704**	-0.033	-0.055
Self_Regulation28	-0.01	-0.045	-0.071	-0.015	**0.721**	-0.027	-0.02
Self_Regulation29	-0.01	-0.042	-0.026	-0.027	**0.7**	-0.057	0.026
Self_Regulation30	-0.014	-0.011	-0.078	-0.039	**0.698**	-0.102	-0.014
Self_Regulation31	0	0.052	-0.073	-0.034	**0.685**	-0.065	0.047
Self_Regulation32	0.086	-0.045	-0.111	0.004	**0.674**	-0.071	0.029
Self_Regulation33	0.068	0.036	-0.134	-0.017	**0.694**	-0.108	0.028
Self_Regulation34	0.041	-0.031	-0.118	-0.024	**0.61**	-0.15	-0.033
Conflict1	0.027	0.242	0.295	0.016	-0.06	**0.597**	0.223
Conflict2	0.053	0.261	0.31	0	-0.062	**0.582**	0.213
Conflict3	0.079	0.195	0.329	0.028	-0.095	**0.637**	0.234
Mood_Modification1	0.185	0.351	0.394	0.255	0.018	**0.714**	0.307
Mood_Modification2	0.176	0.308	0.417	0.213	-0.048	**0.705**	0.283
Mood_Modification3	0.263	0.41	0.37	0.261	-0.023	**0.693**	0.336
Relapse1	0.083	0.252	0.357	0.137	-0.017	**0.751**	0.208
Relapse2	0.173	0.405	0.35	0.199	0.068	**0.772**	0.246
Relapse3	0.159	0.378	0.32	0.188	0.016	**0.726**	0.238
Salience1	0.292	0.429	0.459	0.294	-0.101	**0.685**	0.37
Salience2	0.223	0.19	0.359	0.202	-0.035	**0.556**	0.31
Salience3	0.317	0.372	0.512	0.309	-0.028	**0.695**	0.401
Tolerance1	0.175	0.446	0.27	0.297	-0.02	**0.633**	0.248
Tolerance2	0.221	0.365	0.373	0.252	-0.093	**0.777**	0.328
Tolerance3	0.185	0.268	0.401	0.192	-0.089	**0.806**	0.327
Withdrawal1	0.198	0.308	0.418	0.173	-0.024	**0.781**	0.325
Withdrawal2	0.116	0.236	0.392	0.104	0.001	**0.731**	0.302
Withdrawal3	0.156	0.216	0.417	0.127	0.015	**0.674**	0.334
S_Norm1	0.224	0.214	0.365	0.354	0.013	0.307	**0.783**
S_Norm2	0.294	0.272	0.395	0.422	-0.014	0.325	**0.892**
S_Norm3	0.277	0.286	0.426	0.395	0.042	0.368	**0.895**
S_Norm4	0.26	0.323	0.347	0.448	0.045	0.316	**0.816**

The preceding analyses establish that the measurement model has acceptable reliability and validity. The following section briefly describes the significance of a model's predictive features, which contribute to the subsequent discussion of the structural model.

6.5. Structural Model Analysis

As explained in Section 3, PLS-SEM is a second-generation data analysis technique, which lead researchers to determine research aims, to specify both measurement and structural model, to estimate a model and also to evaluate the results (Hair et al., 2017). The structural model analysis as a part of SEM evaluates and interprets the hypotheses results based on the path coefficients and their significance, the predictive capabilities as explained by effect size (f^2), the predictive relevance (Q^2), and also the coefficient of determination (R^2) (Gefen et al., 2011, Hair et al., 2017). Moreover, this technique evaluates the standard root mean square residual (SRMR), which is used to determine a measure of fit.

6.5.1. Predictive Capabilities of the Model

i) *Coefficient of Determination (R^2)*

The coefficient of determination of a dependent variable as a measure of a model's predictive power, is used to evaluate a model. R-squared/ R^2 is the percentage of the endogenous/dependent variable variation that a linear model explains. In another word, R^2 is a measure that represents the percentage of the variance for a dependent variable, which is explained by an independent variable. Falk and Miller (1992) recommended that R^2 values should be equal to or greater than 0.10 in order for the variance explained of a particular dependent construct to be deemed adequate. This means, the goodness of a model is recognized by the strength of its structural paths where $R^2 \geq 0.1$ (Hair et al., 2017).

The output of structural model analysis presented in Appendix 12 illustrates that both reflective system (i.e. attitude, personal norm and social norm) and reflexive one (i.e. habit) in the presence of facilitator support explain 34 percent (0.340) of the variance in IT/social media identity. This model has just one dependent and mediator variable called IT/social media identity. Consequently, all aforementioned independent ((i.e. attitude, personal norm, social norm and habit) variables and the mediator combine to explain 26.8 percent (0.268) of the variance in social media addiction. Since, all R^2 values are greater than 0.1 or 10 percent the model has a good predictive capability.

The R^2 values are summarised in Table 6.14.

ii) *Predictive Relevance (Q^2)*

The predictive relevance metric, Q-square, determines whether a model is predictively relevant or not (Hair et al., 2019). Further, Q^2 establishes the predictive relevance of the dependent latent variables. PLS-SEM accurately predicts the data points of indicators when it demonstrates predictive relevance (Hair et al., 2019, Hair et al., 2017). For a certain dependent latent variable, a Q^2 value greater than 0 denotes that the PLS-SEM path model has predictive relevance for this construct (Hair et al., 2017). It means, values above zero indicate that the latent variables are well reconstructed and the model has predictive relevance. Further, it is advised that a good value for Q^2 is a value that is close to the R^2 because Q^2 is the R^2 when the PLS constructed on a training set is applied to a test set (Hair et al., 2017). Table 6.14 indicates that all the calculated Q^2 are acceptable.

Table 0-14. The R^2 and Q^2 values

Construct	R Square (R^2)	Q Square (Q^2)
IT/Social media identity	0.340	0.163
*Dependency	0.628	0.470
*Emotional-Energy	0.653	0.413
*Relatedness	0.674	0.503
Social Media Addiction	0.268	0.141
*Conflict	0.626	0.543
*Mood-Modification	0.728	0.572
*Relapse	0.644	0.538
*Salience	0.604	0.327
*Tolerance	0.736	0.602
*Withdrawal	0.709	0.560
*Certain-Time	0.630	0.512
*No-Direct-Access	0.669	0.378
*Prioritisation-Tasks	0.757	0.504
*Technology-Features	0.674	0.433
* The underlying sub-constructs		

iii) *Effect Size (f^2)*

Effect size is a measure of the strength of the relationship between independent and dependent latent variables (Cohen, 1988b). Effect sizes of 0.02, 0.15, and 0.35 are respectively termed small, medium, and large (Cohen, 1988b). Therefore, f^2 of less than

0.02 shows no effect. In circumstances when the effect sizes may be too small and insignificant, there is a supportive approach for using a standard, which suggests more realistic, lower values, such as 0.005, 0.01, and 0.025 to indicate small, medium, and large effect sizes, respectively (Ramayah et al., 2018). This study employs Ramayah's et al. (2018) suggestion. Accordingly, as Table 6.15 reports, all calculated f^2 were in the acceptable range except three, an independent construct called habit, and moderating habit and personal norm.

Table 0-15. The F² values

Constructs	IT/Social media identity	*Dependency	*Emotional-Energy	*Relatedness	*Certain-Time	*No-Direct-Access	*Prioritisation-Tasks	*Technology-Features	*Conflict	*Mood-Modification	*Relapse	*Salience	*Tolerance	*Withdrawal	Social Media Addiction
Attitude	0.069														
Habit	0.003														
Personal-Norm	0.005														
Social-Norm	0.108														
Moderating-Attitude	0.006														
Moderating-Habit	0.001														
Moderating-Personal-Norm	0														
Moderating-Social-Norm	0.015														
IT/Social media identity		1.64	1.897	2.112											0.364
Self-Regulation	0.012				1.703	1.98	3.162	2.13							
Social Media Addiction									1.671	2.671	1.809	1.528	2.785	2.436	
* The underlying sub-constructs															

iv) *Standardised Root Mean Square Residual (SRMR)*

The average of the standardised residuals between the observed and the hypothesised covariance is represented by the term "standardised root mean square residual" (SRMR) (Hair et al., 2017). It is used to find out a measure of fit. A good fit is a value less than 0.10, and the employment of bootstrap-based tests in SmartPLS measures this value. In this study the SRMR for the model was reported equal to 0.085. Therefore, the model has a good and acceptable fit because its SRMR is below the value of 0.10 (Hair et al., 2017).

6.5.2. Hypotheses Testing

In order to further assess the goodness of fit, hypotheses are tested to ascertain the significance of the correlations in the model. For this purpose, the structural model path coefficients, which represent route location and size of hypothesised relationships between constructs, are assessed. The acceptable value for the path coefficient should be greater than -1 and less than 1 (-1< path coefficient<1). Therefore, path coefficients > 1 or < -1 indicate a collinearity problem (Wong, 2013, Hair et al., 2017). Applying bootstrapping procedures will reveal the standard error, which determines whether a coefficient is significant or not (Hair et al., 2017). Moreover, the bootstrapping procedures enable the computation of p-values and t-values for all path coefficients.

The difference between the means of the two sample sets divided by the variation within the sample sets yields the t-value. A t-value is significant if the absolute t-value is equal to or higher than 1.65 (Hair et al., 2017). A statistical measurement known as a p-value is employed to check a hypothesis' validity against actual data. A p-value measures the probability of getting the outcomes that were observed, presuming that the null hypothesis is correct (Hair et al., 2017). Given the significance threshold of 5% utilised in this investigation recommended by Hair et al. (2017), the p-values must be lower than 0.05 for the association to be declared significant. The results of the path coefficient were calculated with a one-tailed test (it is used when researchers know their hypotheses are positive or negative (Wong, 2013, Hair et al., 2017)).

The effect of the both reflective (i.e. attitude, personal norm and social norm) and reflexive (i.e. habit) systems/behaviours on social media addiction are tested through a mediator called IT/social media identity (H1-H4). Also, the effect of IT/social media

identity on social media addiction is tested directly (H5). Further, the effect of self-regulation as a moderator variable on IT/social media identity is examined directly (H6). Finally, the effect of the moderator on the relationship between the independent constructs and the dependent one is tested through the hypotheses labelled 'a, b. c, and d'. Figure 6.1 demonstrates the relationship obtained through testing these hypotheses. A comprehensive view of the structural model SmartPLS3 including all calculated criteria also is shown in Appendix 12 and 13.
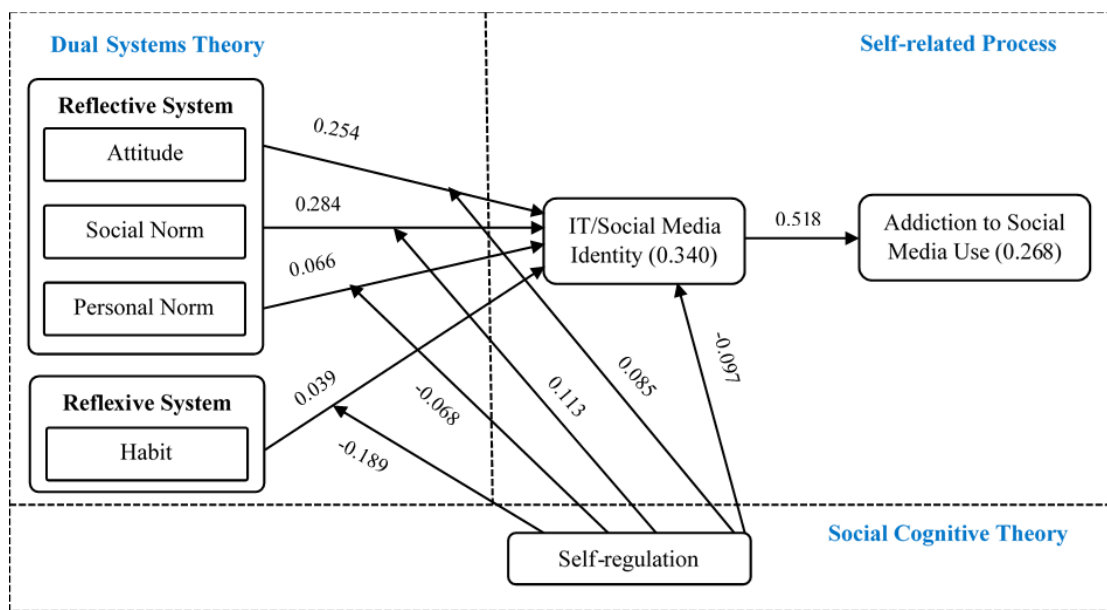
Figure 6-1. The results of testing the hypotheses (Theoretical research model)

6.5.2.1. Independent, Mediator and Dependant Constructs Analysis

MacKinnon et al. (2002) reviewed 14 tests to assess mediation and indirect effect of independent constructs on dependent one. As a result, the aforementioned study highly recommends focusing on the product of coefficient of indirect effect (X→M, M→Y) as the most appropriate technique for testing simple mediation, where there is just one mediator between independent and dependent constructs. This approach focuses on the indirect effect of independent variables on the dependent one through the mediator.

There are different methods to test indirect effects of independent constructs on the dependent one (Hayes and Scharkow, 2013, Hayes and Preacher, 2014) as follows:

- Delta methods (Sobel tests): It assesses the confidence of product of coefficient or indirect effect based on Sobel test. This test calculates the direct effect (X

(independent construct) →Y (dependent)) and indirect affects (X→M (mediator) and M→Y)

- Percentile and bias-corrected bootstrap CIs (Confidence Intervals): this method calculates the confidence interval based on bias-corrected bootstrapping or percentile bootstrapping. Considering the results of a simulation study, Hayes and Scharkow (2013) recommend the following methods for mediator assessment:
  - The bias-corrected bootstrap CI as the most trustworthy test if power is utmost concern
  - The Percentile bootstrap CI: this is a good comparison test.

According these two methods, it is not compulsory to check the direct effects of independent variables to a dependent variable (X→Y) for assessing a mediator. Instead, a study just needs to assess the product of path coefficients and indirect effect based on bootstrap CIs.

After calculating the Bootsrapp in SmartPLS 3, the 'total indirect effects' and the 'specific indirect effects' are resulted. These two results are different when there is more than one mediator between the independent variables and the dependent one. However, since this research model has just one mediator between independent and dependent variables, the result of both the 'total indirect effects' and 'specific indirect effects' is exactly the same. For the indirect effects to be significant, both the lower and higher level of confidence interval must be greater than zero or less than zero (Hayes and Scharkow, 2013, Hair et al., 2017). In other words, a mediator cannot mediate the relationship between an independent and a dependent variable if the lower level of confidence interval is less than 0 and the higher level of confidence interval is greater than 0.

Given all descriptions above, a hypothesis is supported if it meets all considered criteria as follows:

- -1< Path coefficient <1
- t-value > 1.645
- P-value < 0.05
- Lower and higher level of confidence interval > 0 or Lower and higher level of confidence interval < 0

Using this method led this thesis to calculate indirect effects (Table 6.16) of the independent variables (i.e. Attitude, Personal Norm, Social Norm, Habit and self-regulation) on the dependent variable (i.e. social media addiction) through the mediator variable (i.e. social media identity). Table 6.16 demonstrates a summary of supported and rejected Hypotheses. In addition, Table 6.17 provides a summary about some specific indirect effects of the independent variables on the dependent ones All details relevant to direct and indirect effects of the independent variables on the dependent variable and also the moderator is captured in Appendix 14.

Table 6-16. The result of testing the hypotheses (indirect effects of the independent variables on the dependent one via a mediator)

Hypothesis	β=Path Coefficient	Confidence Interval Bias Corrected		t-value	P-value	Supported
		5% (Lower level)	95% (Higher level)			
H1: Attitude -> IT/Social media identity	0.228	0.133	0.315	4.127	0	Yes
H2: Social-Norm -> IT/Social media identity	0.297	-0.192	-0.382	5.16	0	Yes
H3: Personal-Norm -> IT/Social media identity	0.089	-0.003	0.211	1.392	0.082	No
H4: Habit -> IT/Social media identity	0.055	-0.034	0.148	1	0.159	No
H5: IT/Social media identity -> Social Media Addiction	0.519	0.444	0.585	12.282	0	Yes
H6: Self-Regulation -> IT/Social media identity	-0.097	-0.184	-0.015	1.852	0.032	Yes

Table 6-17. Specific indirect effects of the independent variables (attitude, social norm, personal norm, habit and self-regulation) on the dependent one (social media addiction)

Path	β=Path Coefficient	Confidence Interval Bias Corrected		t-value	P-value
		5% (Lower level)	95% (Higher level)		
Attitude -> IT/Social media identity -> Social Media Addiction	0.118	0.069	0.167	3.929	0
Social-Norm -> IT/Social media identity -> Social Media Addiction	0.154	0.094	0.21	4.383	0
Personal-Norm -> IT/Social media identity -> Social Media Addiction	0.046	-0.001	0.108	1.377	0.084

Habit -> IT/Social media identity -> Social Media Addiction	0.029	-0.018	0.076	0.996	0.16
Self-Regulation -> IT/Social media identity -> Social Media Addiction	-0.051	-0.097	-0.009	1.83	0.034
Moderating-Attitude -> IT/Social media identity -> Social Media Addiction	-0.035	-0.131	-0.057	1.66	0.04
Moderating-Social-Norm -> IT/Social media identity -> Social Media Addiction	-0.044	-0.159	-0.123	1.617	0.02
Moderating-Personal-Norm -> IT/Social media identity -> Social Media Addiction	0.059	0.011	0.197	1.008	0.157
Moderating-Habit -> IT/Social media identity -> Social Media Addiction	-0.098	-0.179	0.045	1.046	0.148

H1: *Attitude has a positive effect on IT/social media identity to make it stronger.*

H1 evaluated whether attitude as a conscious behaviour has a positive effect on IT/social media identity to make it strong. H1 is supported because the result (Table 6.16) confirms that this hypothesis met all considered criteria (β = 0.254, lower level of CI= 0.152, higher level of CI= 0.372, t-value = 4.318 and p-value = 0). In addition, the statistically significant results about specific indirect effects of the independent variables on the dependent one calculated by bootstrapping procedure (Table 6.17) confirm that attitude positively affects IT/social media identity and subsequently IT/social media identity positively affects social media addiction.

H2: Social norm has a positive effect on IT/social media identity to make it stronger.

H2 evaluated whether social norm as a conscious behaviour has a positive effect on IT/social media identity to make it strong. Given the results obtained (Table 6.16), H2 is supported because it met all considered criteria (β= 0.284, lower level of CI= 0.191, higher level of CI= 0.373, t-value = 5.094 and p-value = 0). In addition, the statistically significant results about specific indirect effects of the independent variables on the dependent one calculated by bootstrapping procedure (Table 6.17) confirm that social norm has a positive effect on IT/social media identity and subsequently IT/social media identity positively affects social media addiction.

H3: *Personal norm has a positive effect on IT/social media identity to make it stronger.*

H3 evaluated whether personal norm as a conscious behaviour has a positive effect on IT/social media identity to make it strong. According to the outputs (Table 6.16), H3 is unsupported because it did not meet some of the considered criteria for having a significant relationship (β= 0.066, lower level of CI= -0.023, higher level of CI= 0.124, t-value = 0.720 and p-value = 0.236). In addition, the statistically significant results about specific indirect effects of the independent variables on the dependent one calculated by bootstrapping procedure (Table 6.17) does not confirm that personal norm has a positive effect on IT/social media identity. Since zero is between the lower and upper level of confidence interval, the interaction effect of the personal norm is not significant.

H4: *Habit has a positive effect on IT/social media identity to make it stronger.*

H4 evaluated whether habit as an unconscious/uncontrol behaviour has a positive effect on IT/social media identity to make it strong. As results shown in Table 6.16, H3 is unsupported because it did not meet some of the considered criteria for having a significant relationship (β= 0.039, lower level of CI= -0.055, higher level of CI= 0.124, t-value = 0.720 and p-value = 0.236). In addition, the statistically significant results about specific indirect effects of the independent variables on the dependent one calculated by bootstrapping procedure (Table 6.17) does not confirm that habit has a positive effect on IT/social media identity. Since zero is between the lower and upper level of confidence interval, the interaction effect of the habit is not significant.

H5: *IT/social media identity has a positive effect on social media addiction.*

H5 evaluated whether IT/social media identity as a self-identity factor has a positive effect on social media addiction. H1 is supported because the result shown in Table 6.16 confirms that this hypothesis met all considered criteria for having a significant relationship (β= 0.518, lower level of CI= 0.447, higher level of CI= 0.582, t-value = 12.352 and p-value = 0).

H6: *Self-regulation has a negative effect on IT/social media identity.*

H6 evaluated whether Self-regulation as a conscious behaviour and a mitigation strategy has a negative effect on IT/social media identity to make it weak. H6 is supported because the result demonstrated in Table 6.16 confirms that this hypothesis met all considered criteria for having a significant relationship (β= -0.065, lower level of CI= -0.179, higher

level of CI= -0.009, t-value = 1.839 and p-value = 0.033). In addition, the statistically significant results about specific indirect effects of the independent variables on the dependent one calculated by bootstrapping procedure (Table 6.17) confirm that self-regulation has a negative effect on IT/social media identity and subsequently IT/social media identity negatively affects social media addiction.

6.5.2.2. Moderation Analysis

Many theories in different discipline rely on moderating variables. These variables affect the strength or nature of the relationship between two other latent variables (Ramayah et al., 2018). A moderator can be a categorical (e.g., sex, ethnicity, class) or quantitative (e.g., self-regulation) variable that affects the direction and/or strength of the relation between dependent and independent variables (Ramayah et al., 2018). The effect of a moderating variable is referred to in statistics as an interaction. Thus, the moderating connection is tested by evaluating the impact of the interaction term, in SmartPLS (Ramayah et al., 2018, Chin et al., 2003).

Moderation analysis, which entails the use of interaction terms, can be assessed utilising three different approaches: product-indicator, two-stage and orthogonalizing (Chin et al., 2003). The product-indicator approach, which multiplies the indicator of each independent construct (i.e. attitude, social norm, personal norm and habit) by individual indicators of the moderator (i.e. self-regulation), is used in this study. This approach is most appropriate for a study involving reflective constructs and also it has a greater prediction accuracy than the other two approach (Chin et al., 2003).

The change in R^2 is important in the analysis of moderation with interaction effect approach. Table 6.18 below shows the change in R^2 when the model is run with the interaction terms, 'attitude * self-regulation', 'personal norm * self-regulation', 'social norm * self-regulation' and 'habit * self-regulation', (R^2 included), when it is run without the interaction term (R^2 excluded), showing the interaction effect. This change offers the moderation effect size, which is an estimation of a manually calculated f^2 created using the formula below (Ramayah et al., 2018):

$$f^2 = \frac{R^2 \text{ included} - R^2 \text{ excluded}}{1 - R^2 \text{included}}$$

After calculating f², the effect size needs to be estimated. For this purpose, the ranking technique suggested by (Cohen, 1988a) is used to assess the effect size of interaction terms. According to this ranking system as Table 6.18 shows, an effect of 0.02 is small, 0.15 is medium, and 0.35 is large; at less than 0.02, there is no effect. Then to be able to determine that the interaction effect of a moderator on the relationship between independent and dependent variable is significant and supported, t-value should be calculated. By employing a bootstrapping procedure and noting the calculated t-values, it is possible to evaluate the significance of the interaction effect. A t-value is significant if the absolute t-value is equal to or greater than 1.645 (Hair et al., 2017).

Table 0-18. Effect size ranking system adopted from (Cohen, 1988a)

	Ranking range			
	0	0.02	0.15	0.35
Ranking effect	None	Small	Medium	Large

Table 6.19 displays the resulting R^2, f² and t-values. This result shows that the variables attitude and social norm have significant effects because their effects size is large and their t-values are respectively 1.66 and 1.647, which are in the range of a significant t-value, while two other variables, personal norm and habit do not have significant effects because of their small effect size and the t-values, which do not meet the criteria to being a significant t-value (>1.645).

However, Chin et al. (2003) proposes that if the resulting beta coefficients are significant, then moderating effects might be as well. Thus, since the beta coefficients of both personal norm and habit still are significant, they are considered in the examination of the rest of hypotheses (H7a, H7b, H7c, H7d).

Table 0-19. The effect size of moderation

product-indicator	R^2, included	R^2, excluded	f²	Effect size	t-value
Attitude * Self-regulation → IT/Social media identity	0.340	0.278	0.939	Large	1.66
Social norm * Self-regulation → IT/Social media identity	0.340	0.266	1.121	Large	1.617

Personal norm * Self-regulation → IT/Social media identity	0.340	0.337	0.01	Small	0.357
Habit * Self-regulation → IT/Social media identity	0.340	0.312	0.042	Small	0.024

In addition to Table 6.20, which provides some details about the result of testing the hypotheses relevant to the moderator, the output of the slope analysis generated by Smart PLS is also illustrated. Therefore, to further explain the effect of the moderator on the relationships between the independent and dependent variables, interaction graphs are plotted to display the impact of two-way interactions.

Guild line: In every single slope, three different lines are shown for every single moderating effect as follows:

The red line represents the relationship between the independent variable (i.e. attitude, social norm, personal norm and habit) and the dependent one (i.e. IT/social media identity) at the lower level of the moderator variable (i.e. Self-regulation).

The blue line represents the relationship between the independent variable (i.e. attitude, social norm, personal norm and habit) and the dependent one (i.e. IT/social media identity) at the mean level of the moderator variable (i.e. Self-regulation). It shows the normal relationship between the independent and dependent variables without the effect of the moderator.

The green line represents the relationship between the independent variable (i.e. attitude, social norm, personal norm and habit) and the dependent one (i.e. IT/social media identity) at the higher level of the moderator variable (i.e. Self-regulation).
It means, the effect of the moderator variable (Self-regulation) on the relationship between the independent variable/s (attitude, habit, personal-norms and social-norms) and the dependent variable (IT/social media identity) is assessed by comparing three different levels of the interaction effects of that moderator.

Table 0-20. The result of testing the hypotheses (Moderators)

Hypothesis (Moderator)	β=Path Coefficient	Confidence Interval Bias Corrected		t-value	P-value	Supported
		5%	95%			

		(Lower level)	(Higher level)			
H7a: Moderating-Attitude -> IT/Social media identity	-0.068	-0.180	-0.002	1.66	0.04	Yes
H7b: Moderating-Social-Norm -> IT/Social media identity	-0.85	-0.031	-0.083	1.647	0.02	Yes
H7c: Moderating-Personal-Norm -> IT/Social media identity	0.113	-0.035	0.111	1.008	0.157	No
H7d: Moderating-Habit -> IT/Social media identity	-0.189	1.027	0.152	1.040	0.149	No

H7a: The positive relationship between attitude and IT/social media identity is weaker at high level of self-regulation.

The hypothesis seeks to ascertain the moderating role of self-regulation between attitude and IT/social media identity. The result (β=-0.068, t=1.66, p=0.04) reveals that self-regulation moderates the relationship between attitude and IT/social media identity. Therefore, H7b is supported. Figure 6.2 confirms this conclusion, so that, in the higher level of self-regulation, the effect of attitude on IT/social media identity is significantly decreased. The effect of attitude on IT/social media identity is in the greatest possible state when the moderating role of self-regulation is not considered.
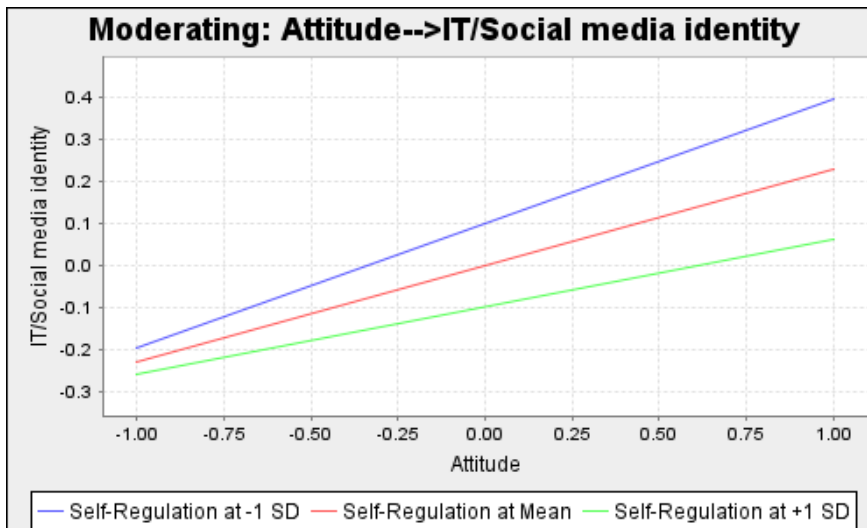
Figure 6-2. Moderating effect of attitude on IT/social media identity

H7b: The positive relationship between social norms and IT/social media identity is weaker at high level of self-regulation.

The hypothesis seeks to ascertain the moderating role of self-regulation between social norm and IT/social media identity. The result (β=0.113, t=1.008, p=0.157) reveals that self-regulation moderates the relationship between social norms and IT/social media identity. Therefore, H7b is supported. Given Figure 6.3, the strength of IT/social media identity is decreased by weakening social norms at higher levels of self-regulation.
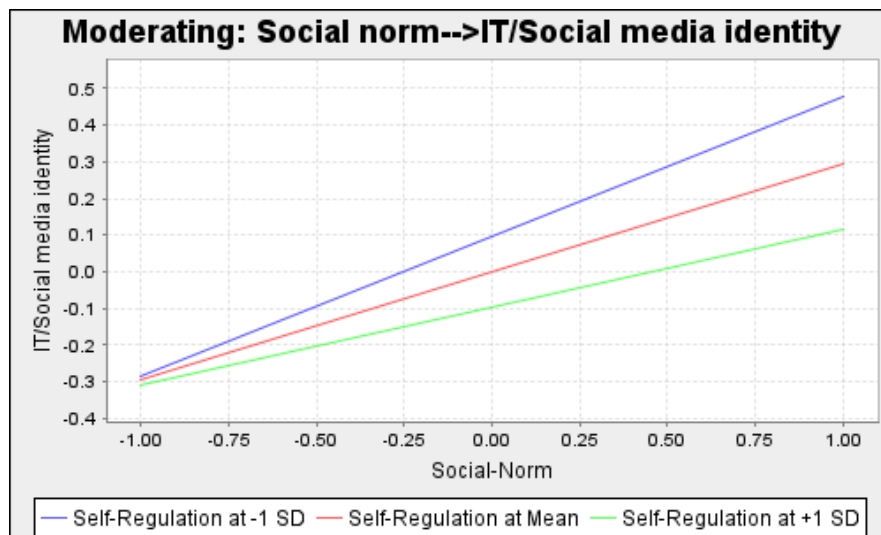
Figure 6-3. Moderating effect of social norm on IT/social media identity

As the blue line demonstrates, the effect of social norm on IT/social media identity is in the greatest possible state when the moderating role of self-regulation is not considered.

H7c: The positive relationship between personal norm and IT/social media identity is weaker at high level of self-regulation.

The hypothesis seeks to ascertain the moderating role of self-regulation between personal norm and IT/social media identity. The result (β=-0.068, t=1.66, p=0.04) reveals that self-regulation effect is not significant on the relationship between personal norm and IT/social media identity because t-value is less than 1.645 and p-value is greater than 0.05. Therefore, H7c is not supported. As Figure 6.4 displays, by increasing the level of Personal norm, IT/social media identity is becoming more assertive, even at the mean and high level of self-regulation effect. It means that self-regulation cannot moderate the relationship between personal norm and IT/social media identity.
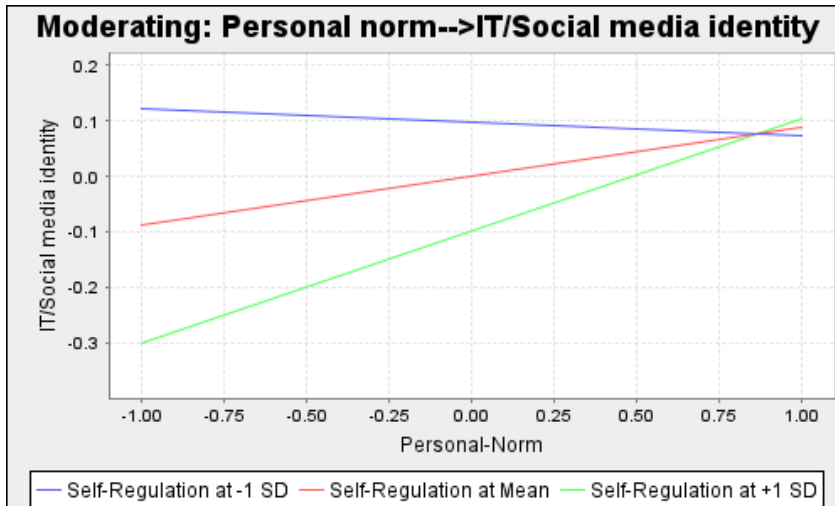
Figure 0-4. Moderating effect of personal norm on IT/social media identity

H7d: The positive relationship between habit and IT/social media identity is weaker at high level of self-regulation.

The hypothesis seeks to ascertain the moderating role of self-regulation between habit and IT/social media identity. The result (β=-0.189, t=1.040, p=0.149) reveals that self-regulation effect is not significant on the relationship between habit and IT/social media identity because t-value is less than 1.645 and p-value is greater than 0.05. Therefore, H7d is not supported. Figure 6.5 shows that self-regulation only at its lowest level can play as a moderator. This result confirms the existing literature that habit as an unconscious behaviour is very hard to be controlled.
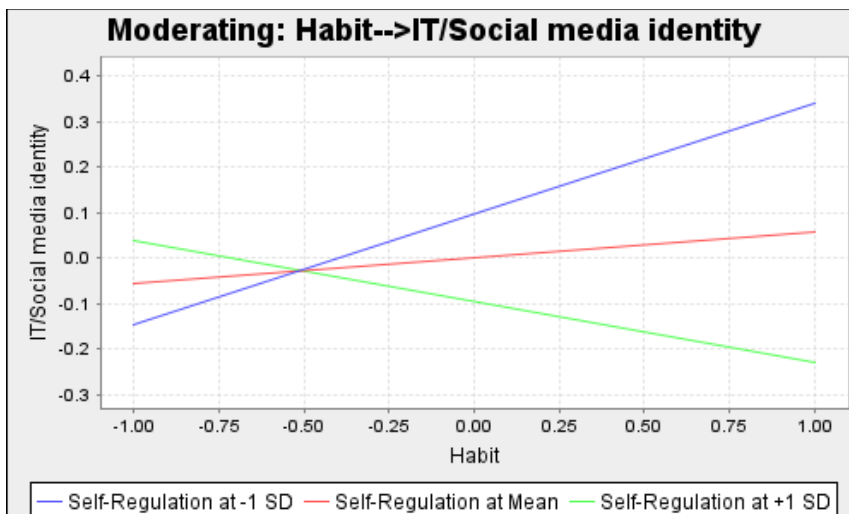
Figure 6-5. Moderating effect of habit on IT/social media identity

Table 6.21 provides a summary of hypotheses and the path relationships, with an indication of whether the hypotheses are supported or not. From the foregoing

presentation of results, H1, H2, H5, H6, H7a and H7b are the supported hypotheses. The result shows that self-regulation just moderates the relationships between the attitude and social norm (which identified as two influential factors that positively impact on IT/social media identity) and IT/social media identity.

Table 6-21. Results showing the hypotheses (H1-H7), path relationships, β (path coefficient), Lower and higher level of confidence interval, t-values and p-values

Hypothesis & Path Relationship	β	Confidence Interval Bias Corrected		t-value	p-value	Supported?
		5%	95%			
H1: Attitude has a positive effect on IT/social media identity to make it stronger. Attitude → IT/social media identity	0.228	0.133	0.315	4.127	0	Yes
H2: Social norm has a positive effect on IT/social media identity to make it stronger. Social norm → IT/social media identity	0.297	-0.192	-0.382	5.16	0	Yes
H3: Personal norm has a positive effect on IT/social media identity to make it stronger. Personal norm → IT/social media identity	0.089	-0.003	0.211	1.392	0.082	No
H4: Habit has a positive effect on IT/social media identity to make it stronger. Habit → IT/social media identity	0.055	-0.034	0.148	1	0.159	No
H5: IT/social media identity has a positive effect on social media addiction. IT/social media identity → Social media addiction	0.519	0.444	0.585	12.282	0	Yes
H6: Self-regulation has a negative effect on IT/social media identity. Self-regulation → IT/social media identity	-0.097	-0.184	-0.015	1.852	0.032	Yes
H7a: The positive relationship between attitude and IT/social media identity is weaker at high level of self-regulation. Attitude * Self-regulation → IT/Social media identity	-0.068	-0.180	-0.002	1.66	0.04	Yes
H7b: The positive relationship between social norm and IT/social media identity is weaker at high level of self-regulation.	-0.85	-0.031	-0.083	1.647	0.02	Yes

Social norm * Self-regulation → IT/Social media identity						
H7c: The positive relationship between personal norm and IT/social media identity is weaker at high level of self-regulation.	0.113	-0.035	0.111	1.008	0.157	No
Personal norm * Self-regulation → IT/Social media identity						
H7d: The positive relationship between habit and IT/social media identity is weaker at high level of self-regulation.	-0.189	1.027	0.152	1.040	0.149	No
habit * Self-regulation → IT/Social media identity						

To summarize the findings of this chapter, this research confirms that attitude and social norms make the IT identity stronger. However personal norms and habits do not have a significant effect on IT identity. Furthermore, it was found that a strong IT/social media identity played a significant role in social media addiction. Prior IS and psychopathological studies have not investigated this particular factor as an influential addiction factor. For example, IT/social media identity was explored by 1) Polites et al. (2018) as an influential factor on social network site use and 2) Gong et al. (2020b) as a driver of negative consequences of online gaming such as maladaptive cognitions, and maladaptive emotions. In addition, attitude (Ho et al., 2017), social norms (Ho et al., 2017), personal norms (Ho et al., 2017), and habit ((Turel and Serenko, 2012), (Xu and Tan, 2012), (Yang et al., 2016), (Polites et al., 2018), (Yahya et al., 2019), (Xu et al., 2022)) have been examined by prior studies as influential factors that have a direct positive effect on social media addiction. Surprisingly, some of the findings of this research contradict those found in previous studies. For example, contrary to the previous studies, this research found that personal norms and habits do not positively affect social media addiction.

Moreover, this study has found self-regulation as a mitigation strategy for dealing with social media addiction. Interestingly, Khan et al. (2021) also identified self-regulation as a mitigation strategy for combating social media addiction but their study was limited to Facebook users. However, this thesis has focused on Instagram users.

The quantitative phase confirmed self-regulation as a mitigation strategy. However, prior literature does not offer any conceptual framework to understand how this strategy works.

Therefore, it was necessary to conduct the qualitative phase in order to develop better understanding of the self-regulation concept, as described in the next chapter.

Chapter 7: Findings of Qualitative Data Analysis

7.1. Overview

The chapter presents the results of the qualitative phase of the study, which includes interviews and thematic analysis as highlighted in the research design (Chapter 4). The interview research was carried out to propose a conceptual structure as the answer to the following question as a part of the third research question:

RQ3: How the identified mitigation strategy deals with social media addiction?

As explained in Chapter 6, the self-regulation was approved as a mitigation strategy to deal with social media addiction. Moreover, this study was informed by social cognitive theory that 'self-regulation' is operated by three different functions, namely, 'self-monitoring', 'self-judgment' and 'self-reaction'. However, it was not yet clear how these functions work together. Subsequently, it was still not clear how social media addiction can be dealt through utilizing this strategy.

Therefore, the necessity of knowing the behaviors or experiences that correspond to these functions became serious for this research. For this purpose, an interview research was conducted because interviews are the most effective method to better explain, understand, and explore the target groups' opinions, experiences, experimental knowledge and behavior about the subject researched (Creswell et al., 2003, Creswell, 2011).

The interview questions were informed by extant literature as shown in Appendix 16, while the thematic analysis was based on identifying and interpreting patterns of meaning within qualitative data collected through interviews.

7.2. Interviews

Following Yin (2009) recommendations for considering the validity of research constructs, this study was led by the SLR to identify reliable and validated instruments to investigate how self-regulation as a mitigation strategy can be used. Moreover, internal validity was addressed by careful interviewee selection, reliable data collection techniques, appropriate theory selection, and a literature assessment.

7.2.1. Demographic of the Interviewees

Forty-two Australian university students who were experienced and active Instagram users participated in this study. Most of these interviewees (88%) had their Instagram profiles for more than four years. 35% percent of the participants stated that they are active on their Instagram between 1 and 2 hours a day and 39% between 3 to 4 hours per day. Surprisingly, one out of the 41 interviewees reported that she spends more than eight hours per day on Instagram. Even more strangely, she explained that she spends all this time searching and viewing other users' posts and has not created any content herself.

Recruitment terminated when the data gathered from a sufficiently diverse sample started to repeat across interviewees and new themes stopped emerging (Francis et al., 2010). This point occurred during the 41th interview. Table 7.1 provide a summary of demographics of the interviewees.

Table 0-1. Demographics of the interviewees

Participants' Demographics	Category	Number	Percentage of Interviewees
Gender	Female	32	78%
	Male	9	22%
Age	18-25	14	35.9%
	26-30	3	7%
	31-35	3	7 %
	36-40	21	51%
Education	Bachelor	19	46.5%
	Master (Course work)	2	4.7%
	Master by research	1	2.3%
	Doctorate	19	46.5%
Instagram Experience	From 6 months to 1 year	2	5%
	More than 1 year to 2 years	1	2%
	More than 2 years to 3 years	0	0%
	More than 3 years to 4 years	2	5%
	More than 4 years	36	88%
Usage	30 minutes or less	4	9.5%
	31-60 minutes	4	9.5%
	1-2 hours	14	35%
	3-4 hours	16	39%
	5-6 hours	2	5%

	7-8 hours	0	0%
	More than 8 hours	1	2%
Total		41	100%

7.2.2. Data Collection

The semi-structured interviews were chosen to create flexible situations in proceeding with interviews, which allows interviewers to modify the format and order of questions as appropriate (Creswell et al., 2003). The interviews were conducted via face-to-face and Zoom meetings depending on participant preference, from October 2021 to February 2022. As Appendix 8 shows, interviewees were asked 5 open-ended questions to provide their personal opinions and experience on how they perform the self-regulation strategy to control their Instagram usage. Interviews took between 20 minutes and 1 hour and all interview sessions were voice-recorded with interviewees' permission. While interview research was being conducted, the interviews transcription process was started in order to not only analyze the collected data qualitatively but also to determine the saturation point of data. Therefore, every single interview recorded was transcribed in the format of text data and analyzed and coded.

7.3. Thematic Analysis

As explained in Chapter 4 (phase III), this thesis utilized the thematic analysis to determine how the self-regulation works as a mitigation strategy in order to propose a conceptual structure of this strategy's function. Thematic analysis refers to a process for identifying different codes and creating relationships between the codes to stablish appropriate themes relevant to the topic researched. This thesis experienced practically the following steps recommended by Nowell et al. (2017) for conducting the thematic analysis process.

7.3.1. Familiarising with Collected Data

41 experienced Instagram users were interviewed, which resulted in the saturation point. The interviews time, date and type (i.e. online and face-to-face) were scheduled based on participants preference.

Voice of every single interview session was recorded, stored in my external hard drive, UTS device and UTS cloud storage called 'UTS OneDrive' and also archived based on the interview date. Then each recorded voice file was transcribed and saved in the format of a Microsoft Word file. To have much organized and readable raw data, all transcriptions files were then organized into 5 files, corresponding to open-ended interview questions. In this way, each file contained 41 answers to one of those questions. Then 5 Word files with a consistent structure were imported to NVivo (version 12).

7.3.2. Generating initial codes

In thematic analysis, the selection of an analytical unit for developing a concept/code is essential. The unit of analysis should be both substantial enough to be taken into account as a whole and manageable enough to serve as a backdrop for the meaning unit (Nowell et al., 2017). In this study, a meaning unit was defined as a group of sentences or words that have elements in common based on their context and content.

Accordingly, the content of every single of 5 uploaded files into NVivo was marked into meaning units based on theoretical assumptions derived from the literature. Next, the condensed meaning units were extracted from every single meaning unit. Then the condensed meaning units were abstracted and labelled with codes. Subsequently, the different codes were compared and organized into nodes in NVivo 12. Table 7.2 demonstrates examples of extracted meaning units, condensed meaning units and codes.

Table 0-2. Examples of meaning units, condensed meaning units and codes

Meaning unit	Condensed meaning unit	Code
I always make sure to first take care of my responsibilities. My main responsibilities in both my personal and professional life have the highest priority in my daily life. Once I finish my main works if I find any free time then start searching my Instagram. If I notice that, I am wasting my time and has no advantage for me, I put away my phone and never check my Instagram in rest of the day.	Checking main responsibilities and free time	Monitoring daily responsibilities
	Understanding of non-receipt of advantages and time wasting	Achievement or lack of achievement
		Paying attention to time, or wasting it
	Putting away phone	Putting away phone
I always check my exams calendar, then I delete the social media apps during the exam	Checking the exams calendar	Checking assessments dates

season. This is because it is really important for me to get high distinction marks. I always talk to myself if I ignore my Instagram and focus on my assessment to successfully pass them I will have a deep happiness rather than Intermittent entertainment without losing my priorities.	Having Intermittent entertainments or elevating academic performance	Being a successful student, or a failure one
	Deleting the social media apps during the exam season.	Deleting Instagram
When I use my mobile phone to check my Instagram, I notice that my daughter is following me and she use her mobile phone as well. I want to be a good role model for her; it is always a strong reminder and makes me put my phone away immediately. I turn off my Wi-Fi.	Observing your children's behaviour while you are busy with your Instagram	Observing the effect of parents' behavioural patterns on children
	Being a good role model for children or misleading them	Being a good role model for children
	Turning off Wi-Fi	Turning off Wi-Fi
I consider all my main responsibilities, my family and friends times, and I always talk to myself that if I spend my time on Instagram the quality of my work and communication will be dropped. Therefore, I put away my phone somewhere else and I do not check my Instagram while I am doing my job or I am with my friends or family.	Giving importance to main responsibilities, family and friend times	Monitoring work times
		Considering family time
		Considering friends time
	Giving importance to the quality of work and communication	Paying attention to the quality of job performance or ignoring that one
		Paying attention to the quality of communication or ignoring that one
	Putting away phone somewhere else	No direct access
I spend more time on Instagram when I feel depressed and constantly visit celebrities' pages. When I realize that I have spent too much time on Instagram, I tell myself, you should stop it right now if you want to be successful similar to these celebrities! Then I stop checking my Instagram by muting all my notifications.	Checking Instagram daily report	Monitoring daily usage
	Comparing yourself with successful and expert people	Being an expert person or an ordinary one
	Muting Instagram notifications	Muting notifications
	Setting Instagram daily time limit	Setting daily time limit
I allocate specific time to stop my social media platforms by calling "time out"	Allocation specific time for using Instagram	Monitoring allocated time for using Instagram

feature, once that time is over then I stop my Instagram use. Once I spend a lot of time in Instagram, I feel guilty about being too engaged in Instagram and forgetting my children, then I stop using social media.	Feeling guilty for forgetting important responsibilities	Responsible mother or irresponsible one
	Calling "time out" feature to block the screen	Blocking the screen
I always list my daily tasks and I tick one by one the task done. To prevent excessive use of Instagram, I keep thinking that I have other responsibilities and I need to keep my body healthy. So, I do exercise or walk in the nature rather than spending my time on Instagram. I would like to keep a balance in my daily life, I don't want to be an extremist.	Listing and ticking daily tasks	Checking daily tasks
	Keeping daily life balance	Balanced or extreme person
	Doing exercise or walk in the nature	Physical activity rather than using Instagram
I always remind myself to regulate my Instagram usage. I always compare my own usage to someone else whose is one of my family member or close friends and her/his usage is less than mine. This comparison motivates me to control the time I spend on Instagram.	Observed someone else Instagram usage	Monitoring several users' usage time
	Comparing the duration of using Instagram among some users	Winer or loser

Codes that had close conceptual relationship were grouped into the same category. In addition, the similar categories were grouped into the same sub-theme. Then Themes were developed from the latent content, or the underlying meaning, of categories (Nowell et al., 2017, Braun and Clarke, 2006).

7.3.3. Identifying, Reviewing and Naming Themes

A theme is an abstract concept that gives a recurring experience and its various expressions meaning and identity (Nowell et al., 2017, Braun and Clarke, 2006). This study adopted the technique recommended by Braun and Clarke (2006) to identify the appropriate themes generated deductively from theory and prior research.

Braun and Clarke (2006) advise that the validity of every single theme should be considered to assess whether the themes accurately capture the meanings visible in the data set as a whole. Accordingly, my supervision team and I examined the coded data extracts for each sub-theme/category to see if a consistent pattern emerged. Therefore,

themes were examined to compare and resolve conflicts, and consequently, codes with a similar meaning were joined in matching nodes. To ensure that all participants' experiences were covered during this process, the codes and theme descriptions were constantly reviewed and updated.

Moreover, in terms of the allocated name to every single theme, it was needed to determine what aspect of the data is captured by each theme and also identify what interesting things are about the generated themes and why (Braun and Clarke, 2006). Thus, all descriptions for each theme provided by the existing literature were re-examined to ensure that each theme was consistent with the overarching narrative about the complete data set in connection to the research questions. Figure 6.1 and Appendix 15 show codes, categories, sub-themes and themes from data analysis.

This study adopted the appropriate themes named 'self-monitoring',' self-judgment', and 'self-reaction' from the lens of social cognitive theory (Bandura, 1991). Accordingly, a theme manual (Table 7.3) that included definitions of those functions was particularly useful for extracting the relevant codes for each theme. Therefore, in the data analysis process, for identifying the relevant codes, the interviewees' behaviours or opinions or experiences were searched which corresponded to one of these three major themes as the functions of self-regulation. NVivo was used to make three main nodes and subsequently develop subthemes by the meaning of the extracted codes.

Table 7-3. Identified themes from the lens of social cognitive theory

Function (Theme)	Description
Self-monitoring	It leads individuals to observe and gather information about the impact of their behaviour on themselves and also on others and the environment (Bandura, 1991).
Self-judgment	It evaluates individuals' observations based on personal standards and/or social standards (Bandura, 1991).
Self-reaction	It refers to individuals' capabilities to organize and execute the courses of action required to manage particular situations (Bandura, 1991).

7.3.4. Results

Analysis of interview data revealed three major themes 'self-monitoring', 'self-judgment' and 'self-reaction', which corresponds exactly in line with the definition of self-regulation introduced by social cognitive theory. The result reveals what opinions, experiences and behaviors correspond to these three interactive functions of self-regulation. Figure 7.1 represents the proposed conceptual structure, which includes emergent themes and the relationships between them. The blue circles show three major themes, the yellow circles illustrate the extracted sub-themes, the green circles represent the extracted categories and the white rectangles show the identified codes relevant to the research question.

Self-regulation

Self-judgment

Becoming a careful person or a careless one
- Becoming a careful mother or a careless one
  - Responsible mother or irresponsible one
  - Being a good role model for children
- Becoming a careful family member or a careless one
  - Taking care of family or neglecting them

Caring the quality of performance or neglecting that one
- Caring the quality of communication or neglecting that one
  - Having intimate social interactions or an annoying one
  - Caring the quality of communication or neglecting that one
  - Having respectful communication behavior or indifferent
  - Having high quality and interesting social interaction or a poor one
- Caring the quality of performance or neglecting that one
  - Caring the quality of job performance or neglecting that one
  - Avoiding to being blamed for low quality of performance

Being a successful person or an ordinary one
- Being a punctual person or a procrastinator one
  - Paying attention to the time spent on Instagram, or wasting that one
  - Excessive use of Instagram or natural usage
  - Being a balanced person or an extreme one
  - Punctual person or a procrastinator one
  - Punctual person or a time loser
- Being a responsible person or an irresponsible one
  - Taking care of responsibilities or losing their completion
  - Being a committed worker or a non-committal one
  - Passing exams successfully or failing
- Being a successful person or an ordinary one
  - Being an expert person or an ordinary one
  - Achievement or lack of achievement
  - Being a successful student or a failure one

Self-Monitoring

Monitoring the allocated time to family or friends
- Monitoring the allocated time to family or friends
  - Considering family time
  - Considering friends time
  - Considering presence of family members

Monitoring Instagram usage time
- Monitoring the allocated time for using Instagram
  - Monitoring allocated time for using Instagram
- Monitoring the comparison between the time spent by an individual on Instagram and her or his peers'
  - Monitoring the comparison between the time spent by yourself on Instagram and your peers' in the same period of time
- Monitoring the time spent on Instagram
  - Monitoring Instagram daily usage
  - Monitoring time spent on Instagram

Monitoring the deadline for the main tasks
- Monitoring 'assessment' or projects' due dates
  - Monitoring assessments' due dates
  - Monitoring projects' deadlines
- Monitoring the allocated time to the main responsibilities
  - Monitoring the time allocated to tasks of personal life
  - Monitoring the time allocated to tasks of professional life
- Monitoring the list of daily tasks or responsibilities
  - Monitoring daily professional responsibilities
  - Monitoring daily program
  - Monitoring daily tasks
  - Monitoring work hours

Self-reaction

Applying external motivations to stop Instagram use
- Applying external motivations to stop Instagram use
  - Competing with peers for not using Instagram excessively
  - Going to an encouraging environment to study or work
  - Joining to group-study for preventing interruptions

Blocking audio disturbance
- Blocking audio disturbance
  - Muting notifications
  - Silencing the phone

Cutting off the internet access
- Turning off the electronic device
  - Turning off tablet
  - Turning off the phone
  - Activating airplane mode
- Turning off the internet service
  - Moving to somewhere else without internet service
  - Turning off the mobile data
  - Turning off Wi-Fi

No direct access to Instagram
- Giving the control of the phone to someone else
  - Giving the phone to someone else during work time
  - Setting password by someone else
- Putting the phone somewhere else
  - Putting away the phone
  - Putting the phone in a bag
  - Putting the phone in a drawer
  - Putting the phone in a locker
  - Putting the phone in another room
  - Putting the phone in another place
  - Removing the phone from sight

Stopping access to Instagram
- Stopping access to Instagram
  - Deleting Instagram app
  - Deactivating Instagram account

Setting a certain time to stop Instagram
- Setting a certain time to stop Instagram
  - Setting time limits
  - Setting Instagram timer to be stopped
  - Activating the "Do Not Disturb" mode
  - Blocking the screen by calling "time out" feature

Replacing Instagram use with physical activities
- Replacing Instagram use with physical activities
  - Working out rather than using Instagram
  - Doing physical activity rather than using Instagram

Figure 0-1. Conceptual structure of the self-regulation (result of thematic analysis)

Self-monitoring

Self-monitoring is a personality attribute that entails the capacity to keep track of and control one's appearance, feelings, behaviors and actions in response to personal and social contexts and also circumstances (Bandura, 1991). It entails persons' awareness of their behavior and the impact they have on themselves and the environment around them (Kramarski and Gutman, 2006, Chen and Sun, 2016). Using a checklist to stay focused on the things you need to complete and keeping track of how frequently you get sidetracked with work-unrelated activities are two examples of self-monitoring (Kramarski and Gutman, 2006).

The data analysis revealed that this theme includes three sub-themes: 1) monitoring Instagram usage time, 2) monitoring the allocated time to family or friends, and 3) monitoring the deadline for the main tasks.

The first sub-theme was formed based on interviewees' opinions who always monitor their Instagram usage timespan. The following extracts illustrate this point:

'*I always put my phone on 'do not disturb' mode after 10 pm to stop all social media distraction special my Instagram.*' (Interviewee #24)

'*I would like to compete with my peers in terms of the length of time that we spend on Instagram. we always monitor our usage and compare it with each other. The winner is the one who spent less time on Instagram.*' (Interviewee #35)

The second sub-theme refers to monitoring the time allocated to family or friends. Some participants believed that they should not spend their time on Instagram during the time allocated to their family or friends such as meal time, family chat or traveling. For example, some interviewees noted that:

'*When I am with my family, I always tell myself that your husband and your children are around and you should respect them and stop Instagram use.*' (Interviewee #7)

'*I always care the time that I am with my friends. When I am communicating with my friends, I don't like the phone to interfere with my interactions with others*.' (Interviewee #32)

The third sub-theme covers all interviewees' opining who monitor the deadline of their main tasks. Some interviewees explained that they paid special attention to deadlines of their projects or tasks or the due date of the assessments. These interviewees mentioned that they always monitor their calendar or the list of their daily tasks. The following is an example of a participant's comment:

'I always record the timetable of my professional duties through my e-calendar. The calendar notifications remind me that I have important things to do, which pushes me to stop surfing Instagram.' (Interviewee #2)

Self-judgment

Self-judgment is the outcome of one's own views about oneself and the meanings associated with those thoughts (Bandura, 1991). Hence, self-judgment is when someone forms an opinion or comes to a decision based on their own values (Chen and Sun, 2016). Since self-judgment aims to protect one from failure and rejection, it is an effective tactic for success (Kramarski and Gutman, 2006, Sun and Kantor, 2006).

The data analysis manifested that this theme includes three sub-themes: 1) becoming a careful person or a careless one, 2) being a successful person or an ordinary one, and 3) caring about the quality of performance or neglecting that one.

The first sub-theme was formed from the statements of the interviewees who cared about the impact of their behavior on their family members, like a mother who cared about being a good role model for her children; or some other participants whose preference was paying attention to their family, when their family members are at home, not ignoring them. The following example shows two interviewee's experiences

'When I use my mobile phone to check my Instagram, I notice that my daughter is following me and she use her mobile phone as well. I want to be a good role model for her; it is always a strong reminder for me and makes me to put my phone away immediately.' (Interviewees #13)

'Once I spend a lot of time in Instagram, I feel guilty about being too engaged in Instagram and forgetting my children, then I stop using social media.' (Interviewees #18)

The second sub-theme represent the self-judgment behaviour of interviewees who were very sensitive about their time, responsibilities and success. Some interviewees stated that they constantly judge themselves whether they are punctual and responsible or a procrastinator and irresponsible person. Also, some of them explained that they always think if it is better to be a successful and popular person or just an ordinary one. For example, some interviewees noted that:

'*I spend more time on Instagram when I feel depressed and constantly visit celebrities' pages. When I realize that I have spent too much time on Instagram, I tell myself, you should stop using Instagram right now if you want to be successful person similar to these celebrities!*' (Interviewees #9)

'*When I excessively use Instagram, I feel guilty about it that I am wasting my time. I think to myself that I am an irresponsible and procrastinator person instead of on a punctual and responsible, while I should have devoted my time to my duties, I wasted it on Instagram.*' (Interviewees #37)

The last sub-theme was inspired by the statements of participants who cared about the quality of their professional, and academic performance, and also their social interactions. These interviewees had similar statements that we do not like others to judge the quality of our work or communications, so instead of wasting our time on social media, we devote the same time to our work, and interaction on our professional and social networks, so that, this way helps to elevate the quality of our life. The following is an example of an interviewee's self-judgment:

'*I consider all my main responsibilities, my family and friends times, and I always talk to myself that if I spend my time on Instagram the quality of my work and communication will be dropped. Therefore, I put away my phone.*' (Interviewees #11)

Self-reaction

Self-reaction is a reaction when oneself involves pausing to consider one's actions, thoughts, attitudes, motivations, behaviors and desires (Bandura, 1991, Chen and Sun, 2016). Self-reaction serves as the method via which standards govern how to proceed.

This Theme includes seven sub-themes: 1) applying external motivations to stop Instagram use, 2) blocking audio disturbance, 3) cutting off the internet access, 4) no direct access to Instagram, 5) replacing Instagram use with physical activities, 6) setting a certain time to stop Instagram, and 7) stopping access to Instagram.

The first sub-theme was taken from the statements of participants who had in common that they needed an external stimulus such as having peer pressures or environments where people focus on their tasks, to tempt them to stop using Instagram. This is because, such situations push them to compare themselves with someone else and attempt to not fall behind them. For instance, two interviewees stated that:

'*I always compare my own usage to someone else whose is one of my family members or a close friend that her/his usage is less than mine. This comparison motivates me to control the time I spend on Instagram.*' (Interviewees #17)

'*When I am in a library or my office and do not focusing on my tasks, I feel bad because I think that everyone knows that I am not working or studying. This situation positively affects me to stop exploring my Instagram.*' (Interviewees #30)

The second sub-theme was formed based on the interviewees' statements who explained that their notification alert always tempts them to check their messages and posts of their friends on Instagram. So, they prefer to stop this distracting/interrupting factor. The following are examples of two interviewees self-reaction to control their Instagram excessive use:

'*I am using a feature called time-out, which can block my screen and turns of all notification on a specific time.*' (Interviewees #10)

'*I stop checking my Instagram by muting all my notifications.*' (Interviewees #34)

The third sub-theme refers to the interviewees' approaches for stopping their Instagram use. Some of the participants explained that it is not easy for them to stop using Instagram. Consequently, they prefer to cut off their internet service when they have important tasks to be completed. The following extracts illustrate this point:

'*Sometimes my husband and I decide to go camping where does not have any receptions, only to get detached from our phones.*' (Interviewees #3)

'*When I want to focus on my assessment tasks, I prefer to put my phone on airplane mode, so like disconnecting my phone from the internet and helps me to stop using Instagram.*' (Interviewees #28)

The fourth sub-theme refers to the approaches that all have in common is no direct access to the mobile phones. They explained that the presence of our smartphones tempts us to constantly check it. Therefore, when we have to do some important tasks, keeping our phones out of our reach is almost the only way that help us not to excessively involve with Instagram. The following extracts illustrate this point:

'*It is really difficult for me to reduce my Instagram usage. What works for me is putting my phone in another room, or just give it to my husband when I want to focus on my thesis.*' (Interviewees #14)

'*When I'm working, I could easily be distracted, so I put my phone in a drawer or another room.*' (Interviewees #31)

The fifth sub-theme adopted from those interviewees' behaviours who care about their physical and mental health and prefer to exercise instead of wasting time on Instagram. This replacement helps them to spend less time on Instagram. The following quote shows how an interviewee actively stop the excessive usage of Instagram:

'*I do exercise or walk in the nature rather than spending my time on Instagram. I would like to keep a balance in my daily life, I don't want to be an extremist in anything.*' (Interviewees #5)

The sixth sub-theme refers to methods that all use setting a certain time to use or stop Instagram. Some interviewees explained that they manually or digitally set specific times to use Instagram or stop it. The following examples confirm this point:

'*I am using a feature called time-out, which can block my screen and turns of all notification on a specific time.*' (Interviewees #16)

'*I will either put my phone somewhere I can't see it, or I put it on "do not disturb" so I don't get notifications that distract me.*' (Interviewees #23)

'*My phone clock has a feature that can be set for sleeping time. I am using this feature when I want to focus on my study.*' (Interviewees #40)

The seventh sub-theme refers to lack of access to Instagram. Some of the interviewees mentioned that they tried various tactics to restrain their excessive use of Instagram, but none of them proved successful. Therefore, when they were in their project times or assessments season, they decided to use other methods which led them to totally have no access to Instagram such as deleting Instagram app or account. For example, one interviewee noted that:

'*I always check my exams calendar, then I delete the social media apps including Instagram to stop my Instagram use during my exam season.*' (Interviewees #2)

All interviewees believed that when they check their performance and judge themselves, they consciously decide to reduce the time that they spend on Instagram.

This research extends the existing literature on self-regulation by identifying three major themes (functions): self-monitoring, self-judgment, and self-reaction, and the associated human behaviours. While these themes align with the definition of self-regulation proposed by the social cognitive theory, the discovered human behaviours associated with each theme were not considered. In particular, this study explores the opinions, experiences, and behaviours associated with these interactive functions of self-regulation. The proposed conceptual structure, represented in Figure 6.1, illustrates the relationships between identified themes, sub-themes, categories, and codes relevant to the research question. Overall, this research contributes to the existing literature by providing a comprehensive understanding of how individuals self-regulate their Instagram usage. These findings enhance our knowledge of self-regulatory processes and can inform interventions aimed at promoting healthier social media habits and improving self-control as a mitigation strategy for dealing with social media addiction.

Chapter 8: Discussion

8.1. Overview

The aim of this study was to 1) provide a novel comprehensive picture of social media addiction, 2) investigate what are the influential factors/drivers/predictors of social media addiction from an IS perspective, and also 3) propose conceptual structure of a mitigation strategy to deal with addiction. To address these objectives, a mixed method including three phases namely, a systematic literature review, a quantitative online survey and a qualitative interview research were conducted respectively. This chapter interprets the findings presented in the previous Chapters 5 (systematic literature review), 6 (quantitative data analysis), and 7 (qualitative data analysis) and integrates them to give context while answering the research questions presented in Chapter 1. This chapter concludes with a suggestion of the theoretical contributions and also theoretical and practical implications of the findings.

Employing a mixed method consisting of an SLR, a quantitative approach alongside a qualitative one gave a deep understanding of social media addiction and also both influential factors/drivers and mitigation strategies. This hybrid approach paved the way for the study to identify the similarities and differences of the obtained results with the relevant extant literature. Therefore, responses to the following three key research questions are included in this section:

RQ1: What characterizes social media addiction and how it is manifested?

RQ2: What factors influence IT/social media identity and to what extent?

And to what extent IT/social media identity affects social media addiction?

RQ3: What are the mitigation strategies for dealing with social media addiction? To what extent a potential mitigation strategy affects social media addiction? How can social media addiction be dealt with (from IS perspective)?

Figure 8.1 demonstrates how the research questions were covered by the three different phases of the exploratory, complementary method to develop the research concept.

SLR Findings

Answering RQ1 & the first part of RQ3

- Identifying definition of social media addiction
- Identifying symptoms of social media addiction
- Identifying influential factors/drivers of social media addiction
- Identifying negative consequences of social media addiction
- proposing the self-regulation as a potential mitigation strategy
- Identifying the reliable and valid instruments for testing the research hypotheses

Quantitative Findings (Online Survey)

Answering RQ2 & the middle part of RQ3

- Supporting the positive relationship between 'attitude' and 'IT/social media identity'
- Supporting the positive relationship between 'social norms' and 'IT/social media identity'
- Supporting the positive relationship between 'IT/social media identity' and 'social media addiction'
- Supporting the negative impact of 'self-regulation' on the relationship between 'attitude' and 'IT/social media identity'
- Supporting the negative impact of 'self-regulation' on the relationship between 'social norms' and 'IT/social media identity'
- Supporting the negative impact of 'self-regulation' on relationship between 'IT/social media identity' and 'social media addiction'

Qualitative Findings (Interviews)

Answering the third part of RQ3

- Identifying the self-monitoring behaviours (The first step of implementing self-regulation)
- Identifying the self-judgment behaviours (The second step of implementing self-regulation)
- Identifying the self-reaction behaviours (The third step of implementing self-regulation)

Figure 8-1. Development of research concepts across SLR-quantitative-qualitative phases

8.2. Theoretical Contributions

8.2.1. SLR Findings

Given the identified gaps in the existing literature explained in Chapter 2, Section 2.3, this research reviewed the significant factors in the concept of social media addiction

consisting of definition, symptoms, influential factors (e.g., drivers, causes, or predictors), and negative consequences to understand what factors characterize social media addiction. In addition, the SLR led this study to identify what mitigation strategies or mechanisms have been proposed by the existing literature for dealing with addiction. The following paragraphs explain the SLR findings and the similarities and differences between these findings with the current literature.

Description of social media addiction: The SLR revealed that there is no unified or consistent definition for social media addiction; this outcome matches the findings and suggestions of extant literature (Turel et al., 2011, Moqbel and Kock, 2018, Agbaria, 2022). Therefore, this study proposes a comprehensive description of social media addiction by adopting the significant keywords of the definitions, provided by reviewed articles (Table 5.3). Accordingly, *social media addiction*, as an uncontrolled maladaptive behavior, can be manifested as a maladaptive psychological state of strong dependency on social media use caused by some factors such as habitual, or excessive/intensive use of social media and manifested by some psychological disorders like obsessive-compulsive disorder and problematic behaviors that are placed at the expense of other important responsibilities or tasks.

Symptoms of social media addiction: The SLR identified 6 symptoms of social media addiction namely, salience, mood modification, tolerance, relapse and reinstatement, sense of withdrawal, and conflict (Table 5.4). According to the existing literature, they are valid and reliable factors that are measured to diagnose addiction. This thesis concluded from this review that the symptoms of social media addiction are similar to other types of technology addiction. For example, online auction addiction (Turel et al., 2011, Peters and Bodkin, 2007), Internet addiction (Brooks et al., 2017, Lin et al., 2018, Liu et al., 2020) and online game addiction (Charlton and Danforth, 2007, Gong et al., 2019b) have been investigated based on these symptoms.

Given the existing literature, while in the most comprehensive possible state for measuring social media addiction, every single symptom of addiction is measured through three different observed variables (totally 18 items), majority of the reviewed studies either did not measure all the symptoms or they did not use all valid observed variables to measure each of the symptom. For example, Hong et al. (2014) and Müller

et al. (2016) measured Facebook addiction and social network site addiction respectively through only two symptoms, tolerance and withdrawal; TicTac addiction (Zhang et al., 2019), Facebook addiction (Kanat-Maymon et al., 2018, Brailovskaia et al., 2018a, Atroszko et al., 2018), social network site addiction (Lee, 2019, Pontes et al., 2018, Qaisar et al., 2021, Yahya et al., 2019) and social media addiction (Punyanunt-Carter et al., 2018) were tested by measuring all symptoms via one variable per each symptom; Lin et al. (2019) measured social network site addiction via five symptoms of addiction and one observed variable per each symptom.

Meanwhile, only a few studies used all addiction symptoms with all their observed variables to diagnose or measure Facebook or social network site addiction such as (Błachnio et al., 2016), (Błachnio et al., 2017), (Hwang, 2017) and (Xu et al., 2022)

Developing a comprehensive picture/overview of the characteristics of social media addiction: The limited understanding of the characteristics of social media addiction prompted this study to search for identified influential factors, negative consequences, symptoms of social media addiction and as well as mitigation strategies for dealing with addiction. Consequently, this study developed a comprehensive picture/overview of the characteristics of social media addiction by synthesizing 86 influential factors of social media addiction (Appendix 3) into 6 categories (i.e. *technology-related factors, socio-environmental factors, enjoyment, demographics, personality traits, and psychological factors*) (Table 5.5), 17 negative consequences of addiction (e.g. *social relationship problems, low academic, job, and physical performance, depression, anxiety, stress, insomnia, loneliness, reduced self-esteem, physical health, low Life Satisfaction, low subjective/emotional well-being, suicide-related outcomes, and romantic relationship conflicts*) (Table 5.6), 6 symptoms of addiction and 12 potential and supported mitigation strategies (e.g. *physical activity, increasing social self-regulation, automating digital nudges, and self-efficacy*) (Table 5.7).

This finding extends the current literature because the prior studies on characteristics of social media addiction and also on IT addiction are not as comprehensive as this study. For instance, Al-Samarraie et al. (2021) systematically reviewed just some significant factors such as gambling, sexing, gaming, and smartphone engagements that positively affect young users' social media addiction to distinguish the distribution of these

influential factors across three social media platforms, Facebook, Twitter, and Instagram. From the point of view of mitigation strategies to deal with addiction, the latter study only mentioned parental control strategies. Moreover, while another systematic review was conducted by Ahmed and Vaghefi (2021) to characterise social media addiction, they only covered the influential factors of social media addiction, which were psychopathological factors, and also 14 negative consequences of social media addiction. In addition, Karmakar (2020) identified influential factors of IT addiction related to personality traits and technology features, 7 negative consequences of addiction and 4 mitigation strategies to characterise IT addiction.

Alternatively, this study reviewed all IS publications on social media addiction without setting any filter on their target groups, the type of influential factor, or social media platforms. Furthermore, none of the aforementioned studies identified the symptoms of addiction as one of the most prominent dimensions of the characteristics of addiction, which enable researchers to measure the addiction construct.

8.2.2. Quantitative Research (Online Survey)

This research aimed to investigate the influential factors of social media addiction from an IS perspective rather than a psychopathological perspective. Based on the reviewed literature, IT/social media identity, which refers to one's self-concept, was identified as a potential influential factor on addiction (H5), because it has been already proved that who excessively use social media platforms have stronger IT/social media identity (Polites et al., 2018). Following this hypothesis, this research also aimed to identify what factors reinforce IT/social media identity.

Rooted in the dual system theory, this study designed a theory-based model of IT/social media identity's influential factors. It was informed by dual systems theory that individuals behave based on two reflective (intentional or conscious behaviors) and reflexive (unintentional or unconscious behaviors) systems; these two systems work in parallel together in good harmony. However, in either case, whenever these two reflective and reflexive systems conflicts with each other, the continuity of one's self-concept is threatened by internal conflict. Accordingly, four factors namely, attitude, social norm, personal norm, and habit, adopted from the lens of dual systems theory, were identified as potential influential factors on strong IT/social media identity. Then this thesis

proposed four hypotheses that these factors positively affect IT/social media identity and can make it more robust (H1, H2, H3, and H4).

Furthermore, this thesis aimed to identify a mitigation strategy to deal with addiction. By adopting the self-regulation factor, as a self-related process, from the lens of social cognitive theory, this thesis proposed five more hypotheses. The self-regulation not only could negatively affect the relationship between IT/social media identity and social media addiction (H6), but also it moderates the relationship between IT/social media identity and attitude, social norm, personal norm, and habit (H7a, H7b, H7c, and H7d).

This section presents the quantitative data analysis results and also the similarity and differences between these findings and findings of the reviewed literature.

The proposed theoretical model of investigation both influential factors of social media addiction and a mitigation strategy for dealing with addiction

The proposed theoretical model of investigation social media addiction is significant because it facilitates the understanding of both influential factors of addiction and a mitigation strategy for dealing with addiction from the IS perspective as per the given definitions and builds new knowledge. While there are very few articles that address both influential factors and mitigation strategies of addiction in the same study, each of them investigated its objectives through different conceptual or theoretical frameworks that are completely distinct from this study's theoretical model. For example:

Soh et al. (2022) designed a conceptual model to investigate the determinants of social media addiction by focusing on social capital bridging and social capital bonding. Furthermore, they posited that the relationship between social capital factors and social media addiction is moderated by social media user privacy self-efficacy. Qaisar et al. (2021) used cognitive load theory as a foundation of the model to examine the effect of information and communication overloads on social network sites addiction. In addition, they contributed to self-efficacy theory literature by emphasizing that social media self-efficacy negatively influences user's addicted behavior. Nikbin et al. (2020) designed a conceptual model to investigate whether some personality traits positively affect Facebook addiction. As well, they examined the role of psychological well-being as a moderator between Facebook addiction and its influential factors (personality traits).

Identifying IT/social media identity as an influential factor on social media addiction

The quantitative data analysis tested the effect of IT/social media identity on experienced Instagram users and found that users who have personal attachment and dependency on their Instagram and also think that they receive emotional energy from their Instagram, are more prone to be addicted to their Instagram. This result supported H5 that a strong IT/social media identity positively affects social media addiction.

This study extends the current IS literature on social media addiction by identifying IT/social media identity as an influential factor. This is because, it is a new concept in IS literature and has been already investigated in other contexts only by a few studies as follows:

IT identity has been explored by Shi et al. (2017) in cyber security context to examine the effect of IT identity on security behavioral intentions. They argued that people who perceive an IT artifact as a part of their identity are more likely to engage in protective behaviors than people who perceive IT artifacts as something apart from their identity (Shi et al., 2017). Moreover, Polites et al. (2018) studied the effect of IT/social media identity on deficient self-regulation of time and revealed that IT/social media identity positively influences perceived deficient self-regulation of time. An interesting result is that the findings of this study and Polites et al. (2018) confirm that strong IT/social media identity negatively affects self-related processes or behaviours. In addition Gong et al. (2020b) investigated the role of IT identity on problematic online gaming and revealed that IT identity positively influences the influential factors of problematic online gaming such as emotion irreplaceability, negative emotion anticipation, intrusive thought and thought suppression.

Given the existing literature on IT addiction, it is the first time that IT/social media identity is distinguished as an influential factor on social media addiction.

Novel application of the dual systems theory

Rooted in dual system theory, this study empirically tested a theory-based model of IT/social media identity's influential factors. Therefore, H1, H2, H3, and H4 were tested to investigate the positive effect of attitude, social norm, personal norm, and habit on IT/social media identity.

The result supported H1 because it demonstrated that attitude has a positive effect on IT/social media identity and makes it stronger. Surprisingly, since attitude has not been researched in any field of IT addiction, it was not possible to compare this result with other studies' findings.

The second hypothesis was empirically tested to discover the relationship between social norms and IT/social media identity. The result of quantitative data analysis supported H2, which means social norms positively affect IT/social media identity and make it stronger. The social norm has already been investigated as an influential factor to increase the extent of social media usage by Polites et al. (2018). That research resulted that social norm positively influences the extent of social media usage and increases it. The point of commonality between this thesis and Polites et al. (2018)'s research is that both concluded that the social norm has a positive effect on two drivers of social media addiction namely IT/social media identity and the excessive use of social media.

The third hypothesis investigated the positive effect of the personal norm on IT/social media identity. This hypothesis (H3) was not supported because the statistical data analysis results showed that the personal norm does not positively affect IT/social media identity. Given the reviewed literature, the personal norm has been investigated as an influential factor to increase the extent of social media usage by Polites et al. (2018). Based on their statistical data analysis outcomes, these authors argued that individuals with strong personal norms usually choose to spend more time on their favorite social media like Facebook.

Moreover, the relationship between habit and IT/social media identity was investigated (H4) to discover whether habitual use of social media positively affect IT/social media identity. The quantitative data analysis resulted that habit has no positive effect on IT/social media identity. Therefore, H4 was not supported. Surprisingly, this result was absolutely the opposite of the result obtained by Polites et al. (2018)'s study. The same as this study, Polites et al. (2018) investigated the relationship between habit and IT/social media identity and found that habit is a predictor of IT/social media identity because habit immersion increases individuals' feelings of emotional attachment and dependence (two dimensions of IT/social media identity) on their social media platforms. Several factors may be involved in creating such a difference. For example, this thesis focused on

experienced Instagram users who were Australian university students and also between 18 to 40 years old. Polites et al. (2018) studied experienced Facebook users who were employees and also between 16 to 33 years old. However, there might be some other reasons which was not easy to be discovered because of lack of further information.

Furthermore, some other IS papers such as Turel and Serenko (2012), Yang et al. (2016), (Osatuyi and Turel, 2018), Yahya et al. (2019), and Xu et al. (2022) studied the direct effect of habit on social media addiction. All of these studies partially confirmed that habit can be counted as an influential factor of social media addiction. For example, Xu et al. (2022) argued that habitual social media use can lead to social media addiction if a user has more friends and also active friend on social media platforms and if one's friends transmit information or posts through social media channels other than undirect communication channels. Or Yahya et al. (2019) stated that in comparison with males, females are more prone to be addicted to social media use because of their habitual social media use.

Therefore, this study placed IT/social media identity within a framework of dual-systems theory to investigate what factors positively influence IT/social media identity. Consequently, adopting the dual-systems theory led this study to identify four constructs of both reflective and reflexives systems namely, 'attitude', 'social norms', 'personal norms', and 'habit' as potential influential factors of IT/social media identity. The application of the dual systems theory to social media addiction in this study extends the existing IS literature in social media addiction because prior studies such as Osatuyi and Turel (2018) designed a part of their conceptual framework using the dual system theory to examine the positive effect of the reflexive system (i.e. habit) on social network sites addiction. In addition, Polites et al. (2018) were informed by dual systems theory to investigate the positive effect of reflective system (i.e. social norms and personal norms) on extent of social network sites usage. Moreover, Zahrai et al. (2022) by applying dual system theory investigated the positive effect of reflective system (i.e. attitude and social norms) on the impulsive behavior of users for excessive use of social media.

Novel application of the social cognitive theory to social media addiction

This research was investigating for a strategy that could weaken IT/social media identity and consequently treat or prevent social media addiction. Rooted in social cognitive

theory, this study identified self-regulation as a potential mitigation strategy for combating addiction (H6). Therefore, H6 was empirically tested to examine whether self-regulation can negatively influence IT/social media identity to weaken it. The results of the statistical analysis confirmed H6, which showed that self-regulation plays an important role in undermining IT/social media identity.

Further, this study empirically tested a theory-based model of the self-regulation moderating role. The quantitative data analysis outcomes revealed that H7a, and H7b were supported and H7c, and H7d were not supported. That means, the self-regulation can moderate the relationship between IT/social media identity and attitude and also social norms but it cannot moderate the relationship between IT/social media identity and personal norm and habit. These findings show a really interesting and logical relationship among some of the obtained results. The findings show that self-regulation only moderates the relationship between IT/social media identity and those factors that have been confirmed as its influential factors (i.e., attitude and social norms).

This result is also supported by the findings of prior research on self-regulation as a mitigation strategy for dealing with IT addiction. For example, Chen and Sun (2016) and Osatuyi and Turel (2018) investigated the direct effect of self-regulating on social network sites addiction and online game addiction respectively. Both latter studies affirmed that self-regulation is negatively associated with addiction. Moreover, Polites et al. (2018) has researched the positive effect of a strong IT/social media identity on deficient self-regulation of time, which is exactly the opposite of the theoretical model of this research. They found that a strong IT/social media identity has a negative effect on self-regulation and significantly reduces the level of one's self-regulation. It is worth noting that the result of this research and Polites et al. (2018)'s findings complement each other because this research proved that self-regulation significantly weakens IT/social media identity and Polites et al. (2018) demonstrated that a strong IT/social media identity significantly reduces the level of self-regulation.

 Novel application of the social cognitive theory to social media addiction extends the existing literature because the reviewed literature indicates that none of the studies to date have investigated whether self-regulation affects IT/social media identity. Therefore, it is a completely new conceptual research model that investigates the negative effect of self-

regulation on IT/social media identity and also the moderator role of self-regulation between this identity and its influential factors. In addition, Khan et al. (2021) was informed by this theory to investigate whether self-regulation moderates the relationship between social media addiction and two of its negative consequences namely, low self-esteem and work-technology conflict.

Classification 34 observed variables into four underlying sub-constructs for measuring self-regulation

One of the major latent variables/constructs in this study is 'self-regulation', which is measured via 34 observed variables. This instrument was developed and suggested by Brevers and Turel (2019) to investigate the role of self-regulation in preventing social media addiction symptoms. However, they did not categorize the 34 questions into some different groups based on the similarity of those questions' concept. While they argued that self-regulation is a complex construct that entails a broad range of different factors such as task, responsibilities, priorities, family and deadlines, they did not simplify variables based on the similarity of their functionalities.

Therefore, with the possibility that some of these observed variables may be related or correlated to each other, this study conducted a factor analysis to group variables based on the commonality among these variables. Consequently these 34 observer variables were grouped into four latent variables (underlying sub-constructs). Then the identified latent variables were named based on an advice proposed by Brown (2015) and Hair et al. (2017) that the discovered underlying sub-constructs should be given names which are fit enough to each group from the authors' point of view. Therefore, this research named the discovered latent variables based on the concept and functionalities of their items or observed variables, as follows: self-regulation based on the prioritization of main tasks, self-regulation through no direct access, self-regulation via technology feature and self-regulation based on certain times (Section 6.2.5).

8.2.3. Qualitative Research (Interviews)

This qualitative research was conducted to deeply understand the functioning of self-regulation in order to propose a conceptual structure of self-regulation, which represents how self-regulation can be used.

Conceptualization of the self-regulation phenomenon from the lens of social cognitive theory through a qualitative study

The thematic analysis discovered that interviewees behaviors to identify, prioritize and implement actions for mitigating social media addiction can be categorized into three major themes. From the lens of social cognitive theory, this study was informed that each of those three identified groups of interviewees behavior or experiences correspond to one of functions of self- regulation namely self-monitoring/observing, self-judgment, and self-reaction/response (Vohs and Baumeister, 2011, Bandura, 1991). Consequently, this study proposes a novel and holistic conceptual structure of self-regulation including three major themes to represent how this mitigation strategy works.

Conceptualization of the self-regulation phenomenon through a qualitative study extends the extant literature because self-regulation has been investigated on IT addiction scope by a few scattered studies, none of them provided a framework of this self-related process to explain how it can be used. For example, Chen and Sun (2016), and Osatuyi and Turel (2018) quantitively researched the direct effect of self-regulation on social network sites addiction and online game addiction and found that self-regulation negatively affect those types of IT addiction. Moreover, Khan et al. (2021) only argue that self-regulation moderates the positive association between social media addiction and its two adverse consequences work-technology conflict and low self-esteem, thereby increasing the level of self-regulation, this association becomes weak and vice versa. Gökçearslan et al. (2016) assert that self-regulation has a negative effect on smartphone addiction. However, they do not explain how it can be applied. In addition, it is reported that the positive relationship between Facebook addiction and its influential factors recognition needs, information needs, social needs, and entertainment needs will be lower for individuals with high self-regulation ability (Foroughi et al., 2019). However, it does not explain how self-regulation can moderate such relationships.

The common point of all these studies was that all of them proved that self-regulation is an effective mitigation strategy for dealing with IT addiction but none of them explained how self-regulation works. That is why the conceptual structure of self-regulation proposed by this study is a novel finding (Appendix 15 and Figure 7.1) that can be used as a foundation in future research.

8.3. Practical Contributions (Implications)

Informing counselors

The majority of the studies in this research area have been examined from a health and psychopathology perspective to identify what psychological issues or state contribute to social media addiction and also investigated psychopathology solutions to deal with addiction Raian et al. (2021). However, all the causes of technology addiction are not necessarily rooted in psychological problems. However, it is not easy to be distinguished because the distinction between normal, compulsive, and psychopathological use of technology is still blurred (Agbaria, 2022). Therefore, this area needs more research from the point of view of identifying the influential factors of addiction so that more appropriate treatment or interventions can be provided (Khan et al., 2021, Agbaria, 2022). Furthermore, understanding the causes of addiction to social media from an IS perspective is as important as psychopathological perspective because this manner helps to identify different interventions, and therefore effective solutions to treat or prevent this problem could be found (Polites et al., 2018, Carter, 2015).

Since this study discovered both non-psychology influential factor and mitigation strategy (i.e. IT/social media identity and self-regulation), it can be considered as a reliable scientific source to be used in clinical psychology services. The conceptual structure of self-regulation strategy proposed by this study can be practically used by counsellors to train their client on how to apply this strategy to control their excessive use of social media platforms or deal with addiction.

Informing application developers

In the analysis process of data collected through the interviews, this thesis's author found that most interviewees use a combination of observational, manual and technological features to apply the self-regulation for reducing their use of Instagram. Some of them, for example, explained that they always check their daily tasks' calendar to monitor the deadlines and ensure they do not miss them. Consequently, to avoid all the distractions coming from Instagram to be able to concentrate on their main responsibilities, they use some technology features (e.g. muting notification, using 'don't disturb me' app, using airplane mode, turning off Wi-Fi, and set daily time limit). Most of the interviewees

agreed that the use of technology features facilitate the implementation of their self-regulation process.

The findings or suggestions reported by the existing literature confirm the interviewee's opinion or experiences that IT features in the format of application or technology services can be useful as a mitigator or an intervention for applying a mitigation strategy. For example, Khan et al. (2021) state that IT interventions as facilitator of mitigation strategies for combating social media should be investigated. The World Health Organization (WHO) recently calls for further research into the: 1) understanding of addiction to technology use, and 2) finding solutions for treating/mitigating this negative phenomenon through artificial intelligence (AI) tools (Raian et al., 2021). AI tools for example can consider the stress level and measure it because this factor not only has been identified as a cause of social media addiction (Brailovskaia et al., 2018b, Pontes et al., 2018, Li et al., 2018a) but also as negative consequence of social media addiction (Turel and Serenko, 2012, Atroszko et al., 2018).

Therefore, this study highly recommends application providers to consider the conceptual structure of the self-regulation process proposed by this study to understand how this mitigation strategy works. Consequently, they may be able to develop an AI tool in a format of a mobile application which provides some features that allow social media users to accurately, consistently, and timely monitor themselves and gather information about their social media use. Thus, social media users will be more prone to judge their self-related behaviours/processes/states and consequently they will be more prone to make a right decision to control their social media usage.

Informing policy makers

Developing possible regulations about the design of social media platforms can be a very helpful intervention to mitigate social media addiction (Abbasi and Dibble, 2019, Nikbin et al., 2020, Tarafdar et al., 2020, Hou et al., 2019). Policy makers recently tried to address the social media mental health epidemic with proposed congressional bills, despite the fact that legislation is still tough to pass (Chan et al., 2022). The Social Media Addiction Reduction Technology (SMART) Act suggests stringent usage restrictions, such as prohibiting endless scrolling on social media networks and setting a daily default time limit of 30 minutes across all platforms (Stewart, 2019). The results of this study can be considered when formulating such proposed policies in order to boost the legislation's capacity to raise consumer happiness and well-being. Experience has shown

that excessive restrictions usually have adverse outcomes. Therefore, we specifically advocate policies that take into consideration the steps of knowledge and insight into understanding consumer motives and intentions for using social media and instead empower consumers instead of banning them. The results of this study can play an informative role in formulating policies, which are strategies, courses of action, or sets of rules issued by organisations, businesses, or other institutions to reduce, mitigate or eliminate undesirable situations and promote discipline.

Educational content for social media users

Informational digital guidelines are excellent approaches for users to learn about any problems or dangers that they can face when using any type of social media platform. These guidelines should organise the most important details regarding the known adverse consequences of social media use and incorporate them into engaging content. This study suggests two types of educational content: either 1) social media developers can add educational features with the content of what the negative effects of using social media are and how to control, prevent, and mitigate them, or 2) developing independent applications from social media platforms, which provide educational content to inform users about risks or negative consequences while they are using social media and practically train them how to deal with those adverse consequences. This is due to the fact that e-learning, or digital training, has gained popularity as a method of personalised training and has developed training methods, particularly during and following the Covid-19 Pandemic (Erragcha et al., 2022).

Increasing user awareness about social media addiction

Fox and Moreland (2015) state that IT users may not know or anticipate what influential factors or risks make them more vulnerable to excessive use of technology. In confirmation of the former statement, Chan et al. (2022) argue that most social media users especially the young generation are often unaware of the possible negative consequences of excessive use of social media on their mental and physical health. Increasing the users' awareness about internal and external stimuli for using social media and also negative outcomes of such use leads them to cultivate more conscious usage practices (Chan et al., 2022). In this regard, users' awareness should be increased in terms of what and how social media activity such as Facebook, Instagram and Twitter

threatened their health (Moghavvemi et al., 2017, Brailovskaia et al., 2018b, Osatuyi and Turel, 2018, Gong et al., 2019a, Islam et al., 2019, Cao et al., 2020, Chan et al., 2022).

Fortunately, a rising number of social media users who are suffering technological burnout are expressing a desire for a digital detox (Chan et al., 2022). Therefore, this study's findings as an informative source are highly recommended to all social media users regardless of their age, gender and the social media platforms they use. This study sheds light on what are the characteristics of social media addiction (i.e., 6 symptoms of addiction (Table 5.4), 86 different influential factors of addiction (Table 5.5), 17 different negative consequences of addiction (Table 5.6), and also 8 potential and 4 supported mitigation strategies (Table 5.7)) and also how to deal with this negative phenomenon by applying the proposed conceptual structure of self-regulation (Appendix 15).

Chapter 9: Future Research, Limitation and Conclusion

9.1. Overview

The study acknowledges its limitations and suggests future research directions. It proposes exploring other factors that contribute to IT/social media identity, such as enjoyment factors, personality traits, and technology-related factors. The study also suggests investigating other types of IT addiction and considering IT identity within different IT artifacts and platforms. To further understand social media addiction, the study emphasizes the need for experimental studies to identify addicted users and assess the impact of self-regulation as an intervention strategy. Longitudinal investigations are suggested to examine the timing and causality of addiction behavior formation.

In conclusion, the study highlights the increasing use of social media platforms and the potential negative consequences of excessive use and addiction. It explores the characteristics of social media addiction, and influential factors shaping identity formation, and proposes mitigation strategies. By employing a mixed-method approach, the study offers a comprehensive understanding of social media addiction through a systematic literature review, quantitative research, and qualitative research. The findings contribute to future research efforts and provide practical implications for mitigating and preventing social media addiction.

9.2. Future Research Resulted from the Limitation

This study's limitations must be taken into consideration when interpreting and using the results.

Adopting other theoretical lenses to investigate different influential factors of IT/social media identity: IT/social media identity was investigated as an influential factor of social media addiction. This study found that a strong IT/social media identity significantly affects social media addiction. Then it adopted four original constructs (e.g. attitude, social norms, personal norms and habit) from the lens of dual system theory to examine whether these constructs positively affect IT/social media identity. Since, IT/social media identity is a new concept in IS literature and has been investigated as an influential factor of social media addiction for the first time by this study, it still has

considerable potential to be investigated. Now that it has been proven that having a strong IT/social media identity causes social media addiction, further investigations from the lens of other theories can be conducted to identify what factors reinforce IT/social media identity. For example, future studies can research whether other factors or constructs such as enjoyment factors (e.g., arousal, gratification, and emersion), personality traits (e.g. low self-esteem, high extraversion, low conscientiousness), and technology related factors (e.g. social media features, and presentation features) positively influence a strong IT/social media identity.

Investigating other types of IT addiction: Since, it was not possible to focus on all types of IT addiction (e.g., Internet addiction, smart phone addiction, online game addiction, online auction addiction and cybersex addiction) in the same study, this research focused on social media addiction to investigate the effect of IT/social media identity on this type of IT addiction. IT identity is a dynamic self-identity and can be investigated in the context of all IT artifacts.

Investigating other social media platforms: This study has chosen Instagram as one of the famous social media platforms to conduct its quantitative and qualitative research. It is highly recommended to IS researchers to focus on other social media platforms such as YouTube, TicTac, and WhatsApp,

Conducting experimental study: This research empirically investigated its theoretical research model due to the time limitation and lack of budget for a Ph.D project. Alternatively, it would be more valuable if it could conduct an experimental study in order to 1) identify the addicted Instagram users, and 2) explore the effect of self-regulation as an intervention or mitigation strategy on both addicted and non-addicted users to be able to determine to how and to what extent this strategy effects addicted groups in comparison with non-addicted ones.

Longitudinal investigations of social media addiction

This research was conducted during specific time period (2 years) and in a specific situation (Covid-19 pandemic) that negatively affected the length of data collection. An ideal research design for social media addiction will require longitudinal analysis over different periods (Gong et al., 2019, Cao et al., 2020). Therefore, researchers are highly

recommended longitudinal prospective studies in order to i) investigate the timing aspect of the formation of users' addiction behaviour, and ii) make real causal statements (Brailovskaia et al., 2018a, Li et al., 2018a, Gong et al., 2019a, Cao et al., 2020).

Broadening research recruitments from different age of social media users

Current research was limited to a specific age group (between 18 to 40 years old). Future research could include participants from different ages and demographic groups such as adolescents in middle and high schools or among adults. The IS researchers can investigate the impact of age on social media addiction by considering IT/social media identity as an influential factor of addiction in order to be able to identify which age group is more prone to have a stronger IT/social media identity.

Focusing on other countries

Reviews of the 74 selected papers indicates that 37 of the studies were conducted in developed countries; the United States, China, and Germany have had the largest share ratio in this research, respectively. In addition, Asian countries (i.e. Malaysia, Taiwan, and Indonesia) have contributed well to this research area with 14 articles. As the result shows, developing countries, especially the Middle east, have been receiving the least attention in this research field. Surprisingly, Australia also has received less attention from IS researchers. Therefore, this study focused on Australia. However, more research is needed to learn how using social media platforms may impact on users' addictive behaviour in these countries due to their unique online atmosphere.

Generalization by research on different social and cultural backgrounds

Investigating the cultural environments was not in the scope of this research. However, the cultural differences may influence the consequences of technology use such as social media addiction (James et al., 2017, Islam et al., 2019, Cao et al., 2020, Nikbin et al., 2020). Therefore, further research is required to explore the impact of different culture on the formation and prevalence of social media addiction.

Investigating the influence of gender on social media addiction

This study did not examine the effect of gender on IT/social media identity as it was not within the scope of this research. Future studies are advised to examine their objectives

with a more representative sample with an equal gender ratio to determine whether gender has a positive effect on IT/social media identity and, if so, which gender is more prone to have a stronger IT/social media identity.

9.3. Conclusion

Using social media platforms is dramatically increasing and probably the number of their users will increase continuously in the years ahead; 4.12 billion out of 5.3 billion of the internet users will be social media users in 2023 (Statista, 2022b). While there are good reasons for using social media, excessive use can have negative effects like addiction and subsequently addiction drives some other adverse outcomes.

With the aim of reducing social media addiction, this study investigated 1) the characteristics of social media addiction discovered by prior studies, 2) the effect IT/social media identity has on social media addiction, 3) the influential factors on IT/social media identity, 4) what a mitigation strategy is and how it deals with addiction. Since, addiction is an uncontrolled self-related process, this study designed a conceptual framework by adopting different concepts from self-related processes, the dual systems theory and the social cognitive theory to investigate both influential factors of addiction and a mitigation strategy to deal with addiction.

To obtain the objectives above, a mixed method including a SLR, a quantitative research (online survey) and a qualitative one (interviews) were conducted in three phases respectively. The SLR led this thesis to provide a comprehensive picture of social media addiction. Furthermore, this thesis discovered that a strong IT/social media identity as a self-identity has a positive effect on social media addiction (quantitative research). Next by extending the boundary of the dual systems theory revealed that two reflective behaviors namely attitude and social norms positively influence IT/social media identity and make it strong (quantitative research). Then this study revealed the self-regulation as a mitigation strategy from the lens of social cognitive theory (quantitative research). Finally, it proposed a conceptual structure of self-regulation to present how this strategy works (qualitative research).

As the first IS research to focus on the role of 1) IT/social media identity in the formation of social media addiction, 2) reflective and reflexive systems on reinforcing IT/social

media identity, and 3) self-regulation in weakening IT/social media identity and moderating the relationship between this identity and its influential factors, it not only paves a way for future research but also provides some practical implications, so that, this study sets the preliminary foundation for the hypotheses of social media addiction, which can then be expanded upon in subsequent studies. Moreover, future studies can learn from the research model, instruments and scales used in this work regarding how to operationalize and relate such latent and observed variables. Therefore, studies like this one could contribute to societies by educating the vast and expanding social media user population about the risks of social media addiction as well as potential mitigation, prevention or intervention strategies.

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Appendix

Appendix 1: Criteria for the Quality Assessment

Criteria for quantitative studies	Criteria for qualitative studies
Q1. Question/objective sufficiently described?	**Q1.** Question/objective sufficiently described?
Q2. Study design evident and appropriate?	**Q2.** Study design evident and appropriate?
Q3. Method of subject/comparison group selection or source of information/input variables described and appropriate?	**Q3.** Context for the study clear?
Q4. Subject (and comparison group, if applicable) characteristics sufficiently described?	**Q4.** Connection to a theoretical framework/ wider body of knowledge?
Q5. Outcome and (if applicable) exposure measure(s) well defined and robust to measurement/misclassification bias? Means of assessment reported?	**Q5.** Sampling strategy described, relevant and justified?
Q6. Sample size appropriate?	**Q6.** Data collection methods clearly described and systematic?
Q7. Analytic methods described/justified and appropriate?	**Q7.** Data analysis clearly described and systematic?
Q8. Some estimate of variance is reported for the main results?	**Q8.** Use of verification procedure(s) to establish credibility?
Q9. Controlled for confounding?	**Q9.** Conclusions supported by the results?
Q10. Results reported in sufficient detail?	**Q10.** Reflexivity of the account?
Q11. Conclusions supported by the results?	

Appendix 2: Quality Assessment of the Selected Papers for SLR

Quality assessment quantitative studies											
Reference	Q1	Q2	Q3	Q4	Q5	Q6	Q7	Q8	Q9	Q10	Q11	Total Score
(Turel and Serenko, 2012)	2	1	2	2	2	2	2	2	2	2	2	21/22
(Balakrishnan and Shamim, 2013)	2	1	1	1	2	2	0	1	1	2	2	15/22
(Wang and Wang, 2013)	2	2	2	1	2	1	2	1	1	2	2	18/22
(Baek et al., 2013)	2	1	1	1	2	1	1	1	1	2	2	15/22
(Koc and Gulyagci, 2013)	2	1	2	1	2	1	2	1	1	1	2	16/22
(Vaghefi and Lapointe, 2013)	2	2	1	1	1	1	0	0	1	1	2	12/22
(Huang et al., 2014)	2	2	2	1	2	1	2	1	1	2	2	18/22
(Hong et al., 2014)	2	2	2	2	2	1	1	2	1	2	2	19/22
(Wang et al., 2015)	2	2	1	1	2	1	2	2	1	2	2	18/22
(Tang et al., 2016)	2	2	1	1	1	2	2	1	1	1	2	16/22
(Müller et al., 2016)	2	1	2	1	1	2	2	2	1	2	2	18/22
(Błachnio et al., 2016)	2	1	1	1	2	1	0	1	1	2	2	12/22
(Choi and Lim, 2016)	2	2	2	1	2	1	2	2	1	2	2	19/22
(Yang et al., 2016)	2	2	2	1	2	1	2	2	1	2	2	19/22
(Błachnio and Przepiorka, 2016)	2	2	2	2	2	2	2	1	1	2	2	20/22
(Ryan et al., 2016)	2	2	2	2	2	1	2	2	2	2	2	21/22
(Casale et al., 2016)	2	1	1	1	1	1	1	1	1	2	2	14/22

(Błachnio et al., 2017)	2	2	2	2	2	1	2	2	2	1	2	20/22
(Gao et al., 2017)	2	2	2	1	2	0	1	2	1	2	2	17/22
(Ho et al., 2017)	2	2	2	2	2	2	2	2	1	2	2	21/22
(James et al., 2017)	2	2	2	2	2	2	2	2	2	2	2	22/22
(Baturay and Toker, 2017)	2	2	2	1	1	0	2	1	1	2	2	16/22
(Moghavvemi et al., 2017)	2	1	1	2	1	2	1	1	1	1	2	15/22
(Kanat-Maymon et al., 2018)	1	1	2	1	2	2	2	1	1	2	2	17/22
(Atroszko et al., 2018)	2	2	2	1	2	2	1	2	1	2	2	19/22
(Jasso-Medrano and Lopez-Rosales, 2018)	2	2	2	2	1	2	2	2	1	2	2	20/22
(Brailovskaia et al., 2018b)	2	2	1	1	2	0	1	2	1	1	2	15/22
(Punyanunt-Carter et al., 2018)	2	1	1	1	1	1	1	1	1	1	2	13/22
(Pontes et al., 2018)	2	1	2	1	2	1	2	2	1	1	2	17/22
(Brailovskaia et al., 2018a)	2	1	1	1	2	2	1	1	1	2	2	16/22
(Li et al., 2018a)	2	1	2	1	2	1	1	1	1	1	2	15/22
(Osatuyi and Turel, 2018)	2	2	2	1	2	0	2	2	1	2	2	18/22
(Abbasi and Dibble, 2019)	2	2	2	1	2	0	1	1	1	2	2	16/22
(Hawi and Samaha, 2019)	2	2	2	1	2	2	1	1	1	2	2	18/22
(Gong et al., 2019a)	2	2	2	1	2	1	2	2	2	2	2	20/22
(Lin et al., 2019)	2	2	2	1	2	1	2	2	2	2	2	20/22
(Yahya et al., 2019)	2	2	2	1	1	0	2	1	1	2	2	16/22

Reference												Total
(Lee, 2019)	2	1	2	1	2	1	1	1	1	1	2	15/22
(Islam et al., 2019)	2	2	2	2	2	1	2	2	2	2	2	21/22
(de Bérail et al., 2019)	2	2	2	2	2	2	2	2	2	2	2	22/22
(Barnes et al., 2019)	2	2	2	2	1	0	2	2	2	2	2	19/22
(Chen, 2019)	2	2	2	2	2	1	2	2	1	2	2	20/22
(Zhang et al., 2019)	2	2	2	2	2	1	2	2	1	2	2	20/22
(Foroughi et al., 2019)	2	2	2	2	2	1	1	1	1	2	2	18/22
(Leong et al., 2019)	2	2	2	2	2	2	2	2	1	2	2	21/22
(Aparicio-Martínez et al., 2020)	2	2	2	1	2	1	2	1	1	2	2	19/22
(Ponnusamy et al., 2020)	2	2	2	1	2	1	1	2	1	2	2	18/22
(Müller et al., 2020)	2	2	2	1	2	1	2	1	2	2	2	19/22
(Tarafdar et al., 2020)	2	2	2	2	2	1	2	2	2	2	2	21/22
(Nikbin et al., 2020)	2	2	2	2	2	1	2	1	2	2	2	20/22
(Cao et al., 2020)	2	2	2	2	2	2	2	2	1	2	2	21/22
(Bulut and Tuncay, 2020)	2	0	1	2	2	1	1	1	1	1	2	13/22
(Purohit et al., 2020)	1	1	2	1	2	2	1	1	1	1	2	15/20
(Brailovskaia et al., 2020)	1	1	2	2	2	2	1	1	0	1	2	15/20
(Boursier et al., 2020)	1	1	2	2	2	2	1	1	1	1	2	16/20
(Gong et al., 2020a)	2	2	2	1	2	2	2	2	1	2	2	20/22
(Bouffard et al., 2021)	2	2	2	1	2	2	2	1	1	1	2	18/22

(Naranjo-Zolotov et al., 2021)	1	2	1	1	2	2	2	1	1	2	2	17/22
(Qaisar et al., 2021)	2	2	2	1	2	2	2	1	2	2	2	20/22
(Abbasi and Dibble, 2021)	1	1	2	2	2	1	1	1	1	1	1	14/22
(Zhao, 2021)	1	2	1	1	2	2	1	1	1	2	2	16/22
(Maqableh et al., 2021)	2	2	1	2	2	2	2	1	1	2	2	19/22
(Monacis et al., 2021)	1	1	2	1	1	2	1	1	1	2	1	14/22
(Malak et al., 2022)	1	2	1	1	2	2	2	1	1	2	1	16/22
(Tian et al., 2022)	1	2	2	2	2	2	2	2	2	2	1	20/22
(Chidambaram et al., 2022)	2	2	2	1	2	1	2	2	1	2	1	18/22
(Al-Busaidi et al., 2022)	1	2	1	1	1	1	1	2	1	2	1	14/22
(Salehi et al., 2022)	2	1	2	1	2	2	1	1	1	2	2	17/22
(Soh et al., 2022)	2	2	1	1	1	1	2	2	1	2	2	17/22
(Xu et al., 2022)	1	2	2	1	2	2	2	2	2	2	2	20/22

Quality assessment qualitative studies											
Reference	Q1	Q2	Q3	Q4	Q5	Q6	Q7	A8	Q9	Q10	Total Score
(Xu and Tan, 2012)	2	1	2	1	1	1	0	2	2	2	14/20
(Balakrishnan and Shamim, 2013)	2	1	2	2	2	2	1	1	2	2	17/20
(Luke and Evelina, 2017)	2	1	2	0	1	1	2	1	2	1	13/20
(Kanat-Maymon et al., 2018)	1	1	2	0	1	2	2	1	2	1	13/20
(Dalvi-Esfahani et al., 2019)	2	2	1	2	1	2	2	2	2	1	17/20
(Purohit et al., 2020)	1	1	2	2	1	2	1	1	1	1	13/20
(Purohit and Holzer, 2021)	2	1	2	1	1	1	1	1	2	2	14/20

Appendix 3: Identified Influential Factors/Drivers of Social Media Addiction

#	Influential Factors/Predictors	Description	Reference
1	Habit	In general, habit is defined as "learned sequences of acts that have become automatic responses to specific cues, and are functional in obtaining certain goals or end-states" (Verplanken and Aarts, 1999)(P.104). In the IS context, habit refers to "the extent to which people tend to perform behaviours (use IS) automatically because of learning" (Limayem et al., 2007)(P. 709). In the context of social media, habit can be defined as learned sequences of acts that become automatic, reflexive, or impulsive responses to social media stimuli (James et al., 2017, Xu et al., 2022). In addition, IS habit is formed by the enjoyment experience of mobile SNS facilities (Yang et al., 2016). IS use habits can play an important role in continued IS use. So that after repeated uses, a strong habit is formed and continued usage decisions can become automatic, less goal-oriented, and reliant on mindful cognitions (Turel and Serenko, 2012). Therefore, IS habit in general (Turel and Serenko, 2012, Yang et al., 2016, Yahya et al., 2019) and social media habit (James et al., 2017, Xu and Tan, 2012, Polites et al., 2018, Xu et al., 2022) in particular can elevate high IS/social media engagement which can eventually transform the habit into addiction; because a strong IS habit reduces users' attention on future harmful consequences (Yang et al., 2016).	(Turel and Serenko, 2012) (Xu and Tan, 2012) (Yang et al., 2016) (Polites et al., 2018) (Yahya et al., 2019) (Xu et al., 2022)
2	Anxiety/Social anxiety (Negative emotion)	Anxiety, in general, refers to an undesirable condition of mind that involves feelings of stress, worry uneasiness, and fear (Wang et al., 2015). Social anxiety can be defined as excessive, unreasonable, and continuous fear in performance or social situations that it is either avoided or unfortunately and painfully endured (de Bérail et al., 2019). Social media platforms cause individuals who have social anxiety to feel comfortable to establish their online parasocial relationships to fulfil their need to belong (de Bérail et al., 2019). Consequently, anxiety can reinforce the tendency to stay constantly in contact with SNSs and subsequently lead to SNS obsessive-compulsive disorder which refers to addiction	(Koc and Gulyagci, 2013) (Wang et al., 2015) (James et al., 2017) (Atroszko et al., 2018) (Brailovskaia et al., 2018b) (de Bérail et al., 2019)

		(James et al., 2017). Therefore, anxiety as a personality risk factors and a symptom of mental disorder (psychological problem) positively contribute to social media addiction (Koc and Gulyagci, 2013, Wang et al., 2015, James et al., 2017, Atroszko et al., 2018, Brailovskaia et al., 2018b, de Bérail et al., 2019).	
3	Envy (negative emotions)	Envy can be defined as a painful or resentful feeling about another's advantages and a desire to possess the same advantages (Smith et al., 1999). Therefore, in the social media context, envy refers to a negative emotion resulting from social media use, when a user desires the same assets or life experiences of other users who belong to the same social network application and plays a direct and indirect role to social media addiction (James et al., 2017).	(James et al., 2017)
4	Insomnia	Insomnia is defined as unsatisfactory sleep or poor sleep quality that affects daytime functions. This problem has been identified as a severe predictor of Facebook addiction (Koc and Gulyagci, 2013).	(Koc and Gulyagci, 2013)
5	Deficient of social self-regulation	Social self-regulation is defined as individuals' ability to resist or refuse the pressures or automatic stimulus to use social media from social settings in both online (e.g. notifications of friend requests, chat messages or comments on one's status updates) and offline (e.g. meeting at a bar, during work meetings or at dinner with friends) environments (Wang et al., 2015, Osatuyi and Turel, 2018). Deficient of self-regulation to the use of social media in reply to situations that promote social media use leads to one's preoccupation with social media to the point of showing symptoms of addiction (Wang et al., 2015, Osatuyi and Turel, 2018).	(Wang et al., 2015) (Osatuyi and Turel, 2018)
6	Depression (as a Comorbid symptom (Psychopathological symptoms))	Depression, in general, refers to a mood or emotional state which along with feelings of low self-worth, guilt, or a reduced ability to enjoy life (Vaghefi and Lapointe, 2013). Accordingly, depressed people use IT/social media to relieve their negative feeling because IT artefacts have interactive and hedonic characteristics. These characteristics attract IT/social media users and after a while, they negatively manipulate users' self-regulation (Vaghefi and Lapointe, 2013, Brailovskaia et al., 2018b, Koc and Gulyagci, 2013). Consequently, over the long term, deficient self-regulation leads to excessive usage and	(Koc and Gulyagci, 2013) (Vaghefi and Lapointe, 2013) (Brailovskaia et al., 2018b) (Jasso-Medrano and Lopez-Rosales, 2018)

		subsequently addiction to social media use (Vaghefi and Lapointe, 2013) (Brailovskaia et al., 2018b, Jasso-Medrano and Lopez-Rosales, 2018) especially in university students because it significantly determines Facebook usage patterns (Koc and Gulyagci, 2013, Dalvi-Esfahani et al., 2019).	(Dalvi-Esfahani et al., 2019)
7	Low level of Agreeableness (Big Five Model (BFM): conscientiousness, openness to experience, neuroticism, extraversion and agreeableness) (personality traits)	One of the most important factors that may contribute to both substance and behavioral addiction is personality traits (Błachnio and Przepiorka, 2016, Hawi and Samaha, 2019, Leong et al., 2019). Big Five-factor Model as one of the most influential theories distinguishes people based on five main dimensions of their personalities: 1) Agreeableness (e.g., being sympathetic and warm vs challenging/callous), 2) Neuroticism (e.g., being sensitive, nervous and anxiety-prone vs resilient/confident), 3) Openness to experience (being inventive, curious, imaginative and intellectually oriented vs consistent and cautious), 4) Extroversion (e.g., being talkative, energetic and outgoing vs. solitary, reserved), and 5) Conscientiousness (e.g., being efficient, organized and prompt vs. extravagant, careless) (Wiggins, 1996). people who have a low level of the Big Five-factors Model of personality traits, they spend more time using social media and have higher score in social media addiction. Agreeableness refers to the tendency to be cooperative with others, therefore, social media users who have a low level of this personality are very susceptible to be addicted (Błachnio and Przepiorka, 2016, Hawi and Samaha, 2019, Leong et al., 2019). Even some studies assert this factor among the BFM factors has the strongest effect on addiction to social media use (Błachnio and Przepiorka, 2016, Leong et al., 2019)	(Błachnio and Przepiorka, 2016) (Hawi and Samaha, 2019) (Leong et al., 2019)
8	High Neuroticism (Big Five Model (BFM): conscientiousness, openness to experience, neuroticism, extraversion and	Neuroticism characters who are fearful, anxious, nervous, introverted with poor emotional stability are prone to be addicted to social media use (Leong et al., 2019). This is because they excessively use social media as a surrogate for interpersonal communication to reduce their negative moods (Leong et al., 2019, Tang et al., 2016). In addition, individuals with high neuroticism are more likely to i) be involved with social media addiction because they respond more strongly to stimuli provided through the content of social media platforms such as wall posts by friends about them, comments, or tweets or retweets (Ho et al., 2017),	(Hong et al., 2014) (Tang et al., 2016) (Ho et al., 2017) (Hwang, 2017) (Dalvi-Esfahani et al., 2019) (Leong et al., 2019)

			(Nikbin et al., 2020)
	agreeableness) (personality traits)	and ii) share photos and images with others and update their profiles so they spend too much time on Facebook (Hwang, 2017, Nikbin et al., 2020). Dalvi-Esfahani et al. (2019) argue that neuroticism as an influential factor to problematic of social media use was received great attention from the respondents participated in this study. So that neuroticism is positively associated with social media addiction in both the adolescent and adult persons (Hong et al., 2014)	
9	Low level of conscientiousness (Big Five Model (BFM): conscientiousness, openness to experience, neuroticism, extraversion and agreeableness) (personality traits)	Conscientiousness measures the extent to which an individual is neat, well organized, diligent, and achievement-oriented. Therefore, it has been proved that people with low level of conscientiousness are prone to be addicted to social media use (Dalvi-Esfahani et al., 2019). People with a low level of conscientiousness who do not tend to be organized or efficient are more likely to be addicted to social media use (Błachnio and Przepiorka, 2016, Müller et al., 2016, Hawi and Samaha, 2019, Nikbin et al., 2020).	(Błachnio and Przepiorka, 2016) (Müller et al., 2016) (Dalvi-Esfahani et al., 2019) (Hawi and Samaha, 2019) (Nikbin et al., 2020)
10	Low level of openness to experience (Big Five Model (BFM): conscientiousness, openness to experience, neuroticism, extraversion and agreeableness) (personality traits)	Openness to experience refers to creativity, imagination and people's willingness to try new ideas and opinion and consider alternative approaches. Therefore, individuals with low level of this character are more prone to be addicted (Hawi and Samaha, 2019, Nikbin et al., 2020). This because the low level of openness to experience exhibit a significant relationship with excessive use of social media and subsequently addiction to social media use and also it moderates the relationships between negative emotions and addiction to social media use (Błachnio and Przepiorka, 2016, James et al., 2017, Dalvi-Esfahani et al., 2019).	(Błachnio and Przepiorka, 2016) (James et al., 2017) (Dalvi-Esfahani et al., 2019) (Hawi and Samaha, 2019) (Nikbin et al., 2020)

11	High Extraversion (Big Five Model (BFM): conscientiousness, openness to experience, neuroticism, extraversion and agreeableness) (personality traits)	Extraversion represents how outgoing, energetic, and social a person is (Atroszko et al., 2018) and individuals' quantity and intensity of interpersonal interaction and communication (Nikbin et al., 2020). Individuals who have a high level of extravert tend to be more energetic and also show a high level of commitment to social groups and activities. (Atroszko et al., 2018, Nikbin et al., 2020). In the context of social media, since such platforms pave the way for easy communications, extraverts tend to interact with their online peers to i) make comments on the social media application that they engage, ii) update more their status, iii) share their information and opinions, iv) extend their social networks and increase the number of their friend, v) share more photos, longer videos, and vi) engage in political issues through Facebook (Hwang, 2017, Nikbin et al., 2020). Therefore, people with a high level of extraversion are at risk of maladaptive or addictive use of social media because of their intensive dependence on such platforms to express themselves (Ho et al., 2017, Hwang, 2017, Atroszko et al., 2018, Kanat-Maymon et al., 2018, Nikbin et al., 2020).	(Ho et al., 2017) (Hwang, 2017) (Atroszko et al., 2018) (Kanat-Maymon et al., 2018) (Nikbin et al., 2020)
12	Gender	Gender has a significant influence on social media addiction. This because the sample of males showed higher frequency than initially expected for using social media platforms (Leong et al., 2019, Aparicio-Martínez et al., 2020). Social media addiction in males forms by a combination of their social and biological characters; however, this addiction in females is related to their socio-psychological factors such as self-esteem or loneliness (Aparicio-Martínez et al., 2020). According to Wang and Wang (2013), males are more likely to become addicted than females because males tend to engage in task-oriented interactions in order to provide more social supports. Despite of the aforementioned studies, some other studies argue that females are more likely to be addicted to social media use than males because 1) they are more absorbed by social media service (e.g. text, voice, and video message) (Müller et al., 2016, Hawi and Samaha, 2019), and 2) they avoid offline social environments because of their higher levels of social appearance anxiety and social media-based communications help them to have feeling less anxiety and actively use social media platforms to self-present themselves as they prefer (Boursier et al., 2020).	(Wang and Wang, 2013) (Müller et al., 2016) (Hawi and Samaha, 2019) (Leong et al., 2019) (Aparicio-Martínez et al., 2020) (Boursier et al., 2020)

13	Arousal	Arousal can be described as a psychological and physiological state of being awake and responsive to stimuli. In the context of social, these stimuli come from social media platforms that facilitated various social needs. For example, individuals are stimulated via social media features and services in forming a close relationship with others or meeting people with common interests. Subsequently, the users may be attracted to the consistent use of social media to create pleasurable experiences resulting from arousal.	(Huang et al., 2014)
14	Maintain parasocial relationships	Parasocial relationships refer to a kind of psychological and one-sided relationship that one person extends his/her emotional energy, interest, and time and the other one or the persona is completely unaware of the other's existence. For example, these relationships occur between individuals and their favourite social media users such as actors, actresses, bloggers, and athletes (Baek et al., 2013). Parasocial relationships are very pleasant for social media users because such relationships can meet individuals' need to belong by compensating their lack of real-life relationships (de Bérail et al., 2019). People who have social anxiety or feeling of loneliness develop a more intensive parasocial relationship with their favourites (de Bérail et al., 2019). Consequently, those who highly rely on their parasocial relationships are more likely to be addicted to social media use. (Baek et al., 2013, de Bérail et al., 2019)	(Baek et al., 2013) (de Bérail et al., 2019)
15	Maintain Social relationships/Reciprocal relationships	A reciprocal or social relationship refers to one's relationships with his/her friends. In this relationship, users know each other (Baek et al., 2013). People use social media platforms to maintain their offline acquaintance relationships. Consequently, their online interpersonal relationships are integrated with their daily life, and that was the most prevalent reason for addiction (Tang et al., 2016). Therefore, interpersonal relationship in social media is one of the most prominent influential factors on social media addiction (Baek et al., 2013, Tang et al., 2016).	(Baek et al., 2013) (Tang et al., 2016)
16	Online social enhancement	Online social enhancement refers to "Value that a participant derives from gaining acceptance and approval of other members, and the enhancement of one's social status within the community on account of one's contribution to it" (Cheung et al., 2011)(P. 1338).	(Ryan et al., 2016) (James et al., 2017)

		Therefore, The need for online social enhancement stems from the need to provide a level of social interaction lacking in individuals' offline lives (Ryan et al., 2016). In this regards, individuals have high social engagement in social media platforms such as Facebook because i) they can post their pictures on Facebook and hope that others will have a reaction to the post by their "like" or "comment" to the picture (Ryan et al., 2016), ii) they can feel more comfortable communicating on Facebook than in offline situations (James et al., 2017). However, individuals with a preference for online social interaction and subsequently with high interactions can develop problematic use of Facebook such as addiction to Facebook (Ryan et al., 2016, James et al., 2017).	
17	Online social interaction/networking	Online social interaction means the interpersonal relationship between an individual and others through social media platforms (Wang and Wang, 2013) that has been preferred than traditional face-to-face social communications (Pontes et al., 2018). Some people are really interested to develop their social networking in terms of 1) find people with similar interest, 2) manage their social activities, 3) make new friends, 4) locate their old friends, 5) socialise with their friends, family, and teachers/lecturers/supervisors/boss/colleagues (Balakrishnan and Shamim, 2013). Consequently, highly interactive applications, such as online chatting applications have the potential to become addictive. This because high social interaction ties through online social networks instead of having face-to-face interaction indicate a high level of frequency and time investment and excessive usage (Balakrishnan and Shamim, 2013, Wang and Wang, 2013, Pontes et al., 2018).	(Balakrishnan and Shamim, 2013) (Wang and Wang, 2013) (Pontes et al., 2018)
18	Online social support	In general, Social support can be defined as social resources or social assets that are used by individuals when they need advice, approval, protection or assistance (Wang and Wang, 2013). Online Social support as a broad concept refers to different types of support that flow between people, such as instrumental, informational, and emotional assistance that they are different qualitatively (Tang et al., 2016). So, Online Social support represents a number of functional supports such as 1) informational support that involves information, guidance or advice for solving a problem, 2) emotional support that involves	(Wang and Wang, 2013) (Tang et al., 2016)

		caring, loving, and sympathy, 3) instrumental support that involves providing material aid or behavioral assistance, 4) affectionate support that involves expressions of love and affection, and 5) social companionship that involves spending time with others in leisure and recreational activities (Tang et al., 2016). So that in the online environment social support is highly related to social media addiction (Wang and Wang, 2013, Tang et al., 2016) because i) individuals may feel that they can be supported or meet their needs by counting on some online users , and ii) they quickly receive friends' supports, attention, advice, and approval via Facebook features such as ''like'' and messaging functions (Tang et al., 2016). Therefore, users are motivated to use Facebook for excessive amounts of time by giving and receiving online support.	
19	Recognition needs	Recognition need refers to individuals' need for receiving admiration, respect and support from others when they are using SNSs (Leung, 2013). This need has been identified as a significant influencer factor on Instagram addiction (Ponnusamy et al., 2020) and Facebook addiction (Foroughi et al., 2019) because individuals' recognition needs can be fulfilled by using this platform (Ponnusamy et al., 2020).	(Foroughi et al., 2019) (Ponnusamy et al., 2020)
20	Social needs	Social needs refer to individuals' needs to demonstrate their ideas, views, thoughts, and to express their feelings and experiences (Chan et al., 2012). This need has been identified as a significant influencer factor on Instagram addiction because individuals' social needs can be fulfilled by using this platform (Ponnusamy et al., 2020).	(Ponnusamy et al., 2020)
21	Entertainment needs	Entertainment refers to some needs that individuals intend to meet such as 1) check what others are doing or to update themselves of their friends' status, 2) to update others about her/himself, 3) just to pass some time, or 4) it is cool and fun to be engaged with social media (Balakrishnan and Shamim, 2013). Thus, social media is used as a method of entertainment when individuals who are unemployed, stay-at-home parents, or retired have excessive free time (Ryan et al., 2016). Consequently, they will overuse their favourite social media such as Facebook over time (Balakrishnan and Shamim, 2013). Therefore, entertainment emerges as one of the main motivators for engaging with social media	(Balakrishnan and Shamim, 2013) (Ryan et al., 2016) (Foroughi et al., 2019) (Zhao, 2021)

		application such as Facebook (Balakrishnan and Shamim, 2013, Ryan et al., 2016, Foroughi et al., 2019). In the same direction, Zhao (2021) indicate that entertainment use has a positive effect on college students' social media addiction. Thus, college students are more likely to become addicted as their tendency to social media for entertainment is increasing.	
22	Need to belong	Need to belong not only is positively associated with excessive use of social media but also the addiction to social media use. Need to belong is an intrinsic motivation inside people who are really interested to form and maintain interpersonal relationships. This need can be fulfilled partially via social media platforms. This because social media facilitates this path for its users to maintains their relationships with their family, friends, and others without any restriction in time and places. Moreover, social media gives an opportunity to its users to freely express their opinion and receive others' attention and approval. Consequently, individuals with a higher need to belong will spend more time on social media platforms and subsequently will develop addictive tendencies.	(Ho et al., 2017)
23	Satisfaction of the need for relatedness (Attachment anxiety)	The need for relatedness refers to individuals' innate psychological need to interact and connect with others. Persons with a high level of this need tend to have an excessive need for relatedness and consequently, they have a character by a strong focus on their relationships to attract others' attention. Social media applications by providing communication services have been designed to trigger users' satisfaction by meeting their need for relatedness. Relationship formation features of Facebook or Twitter, for example, allow users to directly communicate and bond to each other. However, users with a high level of need for relatedness may develop an unrealistic positive feeling by using such platforms and become maladaptive dependent on their favourite social media which can develop their addictive tendencies.	(Chen, 2019)
24	Satisfaction of the need for self-presentation (Attachment anxiety)	The need for self-presentation refers to people's innate psychological need to present their identity to control and shape others' views on their own selves (Chen, 2019). Individuals who have a high level of need for self-presentation try to attract others' attention and to receive approval, support, and validation from others (Chen, 2019). Social media	(Balakrishnan and Shamim, 2013) (Chen, 2019)

		platforms provide different features that boost users' motivations and satisfaction to engage with such platforms (Chen, 2019). So that The technology of social media meet this need and significantly motivate individuals to be engaged with social media platforms in order to 1) show off themselves, 2) become popular, 3) express themselves, 4) gossip, 5) flirt with the others, and 6) seek attention from their friends (Balakrishnan and Shamim, 2013). Consequently, people with a high level of need for self-presentation excessively use social media, and subsequently they are more likely to be addicted to such use (Balakrishnan and Shamim, 2013, Chen, 2019).	
25	Interpersonal attachment	Interpersonal attachment is defined as "the bond between group members, the interpersonal conception of group cohesion, and the attraction of the individuals to one another (personal attraction)" (Sassenberg, 2002)(P. 28). Forming and maintaining interpersonal relationships is one of the key purposes of using social media platforms. So that social media addiction is largely interpreted as social media addiction (Zhang et al., 2019). Social media platforms provide proper tools such as "like", comment functions and short-form video apps that all of them create a convenient space for social media users to share happy moments with their family, friends, online acquaintances, and to express their opinions and emotional support to others (Zhang et al., 2019).	(Zhang et al., 2019)
26	Emotional attachment	Individuals with emotional attachment feel that they connected to another person or object and prefer to preserve this connection. In the context of social media, emotional attachment refers to the emotionally laden bonds that reflect users' affective commitment and desire to stay connected with social media. So that individuals with emotional attachment to social media spend extra time and energy on such platforms. Moreover, they tend to protect their relationship with their online friends through social media because these platforms facilitate this way for them to keep in touch with one another without any restriction in time and place. Therefore, these persons spend extra time and energy to strengthen their relationship. Subsequently, emotional attachment is positively related to users' social media addiction.	(Cao et al., 2020)

27	Site/Functional attachment (Technical system)	Site attachment refers to i) the user's emotional bond to social media platforms which play an important role in keeping users connected to such platforms (Zhang et al., 2019) and ii) how well social media settings and features can support users' goal achievement (Cao et al., 2020). Social media platforms provide technical services and supports which enable users to share their information and knowledge and communicate with other users (Cao et al., 2020). For example, Short-form video applications with creative tools such as filters and visual effects trigger users' motivations for increasing their connection and attachment to social media use (Zhang et al., 2019). Consequently, attachment to such applications due to their attractive features and services encourage individuals spend much additional time to contact their online friends or to share their information. Consequently, individuals with a high level of functional attachment on social media may believe that this service is a unique place that can feed all their needs and goals (Cao et al., 2020). Thus, functional attachment is positively related to users' social media addiction (Zhang et al., 2019, Cao et al., 2020).	(Zhang et al., 2019) (Cao et al., 2020)
28	Insecure attachment	People who have an insecure attachment style have difficulty making emotional connections with others. This problem occurs in two ways, dismissive-avoidance attachment and anxious-preoccupation attachment styles. The amount of time spent on social media use may be influenced by attachment styles, which may also be used as a framework to understand why people use social networks. Since insecure attachment can make real-world social interactions anxious, online communications through social media platforms is being used as a strategy for avoiding and compensation. Therefore, individuals with high anxiety attachment and low avoidance attachment are more prone to be addicted to social media use.	(Salehi et al., 2022)
29	Narcissism	Narcissism is a type of character that refers to an overly positive feeling toward self-view, self-love, sense of entitlement, and uniqueness (Casale et al., 2016, Brailovskaia et al., 2018a). Narcissistic individuals seek to receive more attention and admiration and to become popular for increasing their self-esteem, mood, and well-being (Casale et al.,	(Casale et al., 2016) (Atroszko et al., 2018) (Brailovskaia et al., 2018a)

		2016, Brailovskaia et al., 2018a). Hence, narcissistic individuals excessively use social media to obtain more rewards in the form of "likes" and positive comments from their relatives, friends, and totally from their followers (Dalvi-Esfahani et al., 2019). Therefore, narcissism positively affects social media addiction and individuals with a higher score on narcissism scales are more likely to be addicted (Casale et al., 2016, Atroszko et al., 2018, Brailovskaia et al., 2018a, Dalvi-Esfahani et al., 2019). This because such individuals have high motives to post their selfies and engage with other activities to receive more interest and admiration from their followers (Dalvi-Esfahani et al., 2019).	(Dalvi-Esfahani et al., 2019)
30	Loneliness (as a Psychosocial factor)	Loneliness is defined as an unpleasant experience which is actually a state of mind that is caused by important deficiencies in persons' social relationships (Dalvi-Esfahani et al., 2019). Loneliness IS positively related to social media addiction (Dalvi-Esfahani et al., 2019, Aparicio-Martínez et al., 2020) such as Facebook addiction (Atroszko et al., 2018)	(Atroszko et al., 2018) (Dalvi-Esfahani et al., 2019) (Aparicio-Martínez et al., 2020)
31	Self-identity	Since individuals' identity is a combination of their personality based on their experiences, self-identity refers to self-definition including beliefs, values, goals, and whatever associated with self-representations and self-evaluations. Individuals who are seeking some stability to understand their own identity find social media as a prominent facilitator because social media 1) provides engaging platforms for identity exploration, 2) allows them to freely express themselves, 3) enables them to interact with their friends without any restriction in time and place, 4) enables them to join social groups to obtain their social identity, and 5) enables them to how to control others to perceive them. Hence, these characteristics of social media attract individuals to overspend time in social media. Consequently, individuals will be dependent on social media use. Individuals who feel online communities as a part of their self-identity show a higher level of gratification for participating in social media use. Therefore, over time, dependent users who are	(Ho et al., 2017)

		seeking to form their self-identity by using social media will develop their addictive tendencies.	
32	Low self-esteem (as a Psychosocial factor) (low level of positive orientation) (as a self-identity)	Self-esteem refers to the positive or negative evaluation that individuals have about themselves (Ho et al., 2017). In other words, it also refers to what extent individuals perceive their value and proficient which is heavily dependent on reflected appraisals, social comparisons, and self-attributions (Ho et al., 2017, Dalvi-Esfahani et al., 2019). People with high self-esteem have more prone to maintain their self-control overusing social media (Ho et al., 2017), and vice versa, people with low self-esteem are more likely to develop the addiction to social media use (Vaghefi and Lapointe, 2013, Hong et al., 2014, Błachnio et al., 2016, Baturay and Toker, 2017, Ho et al., 2017, Dalvi-Esfahani et al., 2019, Hawi and Samaha, 2019, Aparicio-Martínez et al., 2020). For example, adolescents with low self-esteem show a high level of engagement with instant messaging in order to receive more social support (Baturay and Toker, 2017). Moreover, Facebook, for example, by bridging to social capital has more affected users with low self-esteem because it meets such users' satisfaction of needs (Vaghefi and Lapointe, 2013, Błachnio et al., 2016, Hawi and Samaha, 2019). Online social relationships lead people with low self-esteem to receive strong gratification because they feel that they have been enabled to compensate their real-life's difficulties such as lack of popularity through online social interactions (Vaghefi and Lapointe, 2013, Błachnio et al., 2016, Hawi and Samaha, 2019).	(Vaghefi and Lapointe, 2013) (Hong et al., 2014) (Błachnio et al., 2016) (Baturay and Toker, 2017) (Ho et al., 2017) (Dalvi-Esfahani et al., 2019) (Hawi and Samaha, 2019) (Aparicio-Martínez et al., 2020)
33	Fear of Missing Out (FOMO) (negative emotions) (as a Psychosocial factor)	Fear of missing out (FOMO) is defined as "a pervasive apprehension that others might be having rewarding experiences from which one is absent" (Przybylski et al., 2013)(P. 1841). FOMO as a negative emotion can reinforce the tendency to stay in constant contact with social media platforms like SNSs (James et al., 2017). For example, individuals with this negative emotion are more desire to stay continually connected to social media to do not miss what others are doing (Pontes et al., 2018). Hence, some studies proved that FOMO has a direct relationship with addiction to social media use such as Facebook addiction (James et al., 2017, Pontes et al., 2018, Dalvi-Esfahani et al., 2019). Also, Al-Busaidi et al.	(James et al., 2017) (Pontes et al., 2018) (Dalvi-Esfahani et al., 2019) (Al-Busaidi et al., 2022)

		(2022) state that Extraverted students who get their energy from being around other people, will report high experience of FoMO. Consequently, students who reported increased levels of FoMO report high levels of social media addiction	
34	Low life satisfaction (as a Psychosocial factor) (negative emotions) (low level of positive orientation)	Life satisfaction, defined as "cognitive assessment of a person's subjective well-being" (Lemmens et al., 2015)(P. 3). Individuals with a low level of life satisfaction are more prone to experience higher levels of Internet and social media addiction (Błachnio and Przepiorka, 2016, Dalvi-Esfahani et al., 2019).	(Błachnio and Przepiorka, 2016) (Dalvi-Esfahani et al., 2019)
35	Low empathy concern (as a Psychosocial factor)	Empathy as a psychological state refers to the ability to understand or feel what another person is experiencing. It is a skill to comprehend other individuals' feelings, emotions, motives, and thoughts. Empathy concern associates with the desire to help others. Empathy enhances healthy communication and leads to effective conflict resolution in relationships. Studies indicate that empathy relates positively to effective social communication and negatively to antisocial and problematic behaviour (Melchers et al., 2015, Jiao et al., 2017). So that, some mental disorder like addiction are related to low empathy. Some studied argue that Internet addiction has a direct relationship with lack of empathy (Melchers et al., 2015, Jiao et al., 2017, Wang et al., 2014b). Accordingly Dalvi-Esfahani et al. (2019) identified the low empathy concern as an important determinant of social media addiction.	(Dalvi-Esfahani et al., 2019)
36	Impulsivity (as a Comorbid symptom (Psychopathological symptoms)) (Individual-related factors)	Individuals with Impulsive behaviour act quickly with no thought to the consequences (Dalvi-Esfahani et al., 2019). It means there is nothing on the mind of such persons beyond that exact moment (Dalvi-Esfahani et al., 2019). Individuals with a higher level of Impulsivity are more likely to unregulated levels of usage and addictive behaviours because they use technology to gratify their sensation-seeking desires (Vaghefi and Lapointe, 2013, Dalvi-Esfahani et al., 2019).	(Vaghefi and Lapointe, 2013) (Dalvi-Esfahani et al., 2019)
37	Attention deficit disorder (as a Comorbid symptom	Attention deficit disorder can be defined as neurological disorder that causes a range of behaviour problems such as inattention and difficulty of staying focused on a specific task.	(Dalvi-Esfahani et al., 2019)

	(Psychopathological symptoms)) (Contingent self-worth (CSW) in the domain of others' approval)	There is a direct and positive relationship between this problem and addiction to social media.	
38	Extent of usage/High intensity of usage	Frequent and intensive use of social networking sites is accompanied by psychosocial distress and also, this pattern of usage causes to form addictive online behaviour (Müller et al., 2016). Facebook active hours significantly predict Facebook addiction because those who use Facebook more actively, they are more prone to become a Facebook addict (Baturay and Toker, 2017, Kanat-Maymon et al., 2018). Therefore, higher Facebook intensity is positively related to Facebook addiction. Because the more one uses Facebook the more prone one is to develop the addiction. It can be happened due to low self-esteem, low life satisfaction and habituation to social media services (Błachnio et al., 2016, Kanat-Maymon et al., 2018). Furthermore, social media platforms such as Facebook and YouTube are used in the context of education, communication and socialization especially among students. Therefore students use social media to gather information, access learning materials, learn university culture, and connect with their peers (Moghavvemi et al., 2017). Therefore, social media makes them lose track of their time and spend lots of time on social media platforms. Consequently, excessive use of social media has been identified as a driver to social media addiction (Hong et al., 2014) (Błachnio et al., 2016, Müller et al., 2016, Baturay and Toker, 2017, Brailovskaia et al., 2018a, Jasso-Medrano and Lopez-Rosales, 2018, Osatuyi and Turel, 2018, Kanat-Maymon et al., 2018, Moghavvemi et al., 2017). Moreover, Luke and Evelina (2017) argue that Indonesian young females excessively use Line, WhatsApp, Twitter, YouTube, Facebook, and Yahoo Messenger in order. They use all these social media platforms to update and share personal information, share opinions, and communicate with their peers and friends.	(Hong et al., 2014) (Błachnio et al., 2016) (Müller et al., 2016) (Baturay and Toker, 2017) (Luke and Evelina, 2017) (Moghavvemi et al., 2017) (Brailovskaia et al., 2018a) (Jasso-Medrano and Lopez-Rosales, 2018) (Kanat-Maymon et al., 2018) (Osatuyi and Turel, 2018)

		So Indonesian young females are very keen to use social media apps in order to chat with their family and friends and also to find novel news and information. So that 93% of the sample studied spend 1 - 12 hours or half-day working and playing with social media platforms and 7% spend 13 - 24 hours for using social media. They are willing to spend the day only for excessive usages of OSNs. Therefore, the time spent daily on social media was found as a significant influencer factor to addiction to social media use.	
39	Age	Age is a factor that has been considered as an influential factor of Internet and social media addiction (as a subtype of Internet addiction such as Facebook addiction) because young people are part of the population that has been found as a population with the most problematic use of social media (Błachnio and Przepiorka, 2016, Atroszko et al., 2018, Salehi et al., 2022). University students, for example, are one of the vulnerable populations because internet consumption has been a part of their daily routine in order to the maintenance of their online social relationships, hobbies and reducing academic stress (Atroszko et al., 2018). Thus, young users are more prone to be addicted to the internet or Facebook use than adult users (Błachnio and Przepiorka, 2016, Atroszko et al., 2018). Salehi et al. (2022) state that in online activities, age is an significant driver or influential factor for social media addiction because 1) young generation has greater problematic involvement in online activities, 2) young adults' leisure and social lives are significantly influenced by social media platforms, 3) younger people are more likely than older ones to quickly adopt new technologies, and 4) The younger generation use social media platforms to foster their identity and culture without interference from parents or people in positions of authority. These statements may be just a stereotype because in general here are more young people than there are adults among Internet users. So, more study is needed to clarify this relationship (Błachnio and Przepiorka, 2016).	(Błachnio and Przepiorka, 2016) (Atroszko et al., 2018) (Salehi et al., 2022)
40	Social overload	"Overload occurs when input demands exceed information processing ability" (Choi and Lim, 2016)(P. 245). For the first time, this concept comes out from the social psychology	(Choi and Lim, 2016)

| | | discipline. So that, McCarthy and Saegert (1978) suggest that social overload refers to "high densities contribute to social and cognitive overload by increasing the number of other people with which an individual may have to deal and … that some experience of them is difficult for the individual to avoid" (McCarthy and Saegert, 1978)(P. 254). In the context of social media, this concept means that an individual is engaged in social exchange beyond his or her communicative and cooperative capability to caring others' existence, concerns and issues and occasionally provide entertainment for them (Choi and Lim, 2016). Therefore, social overload plays a significant role in forming social media addiction for some reasons:1) users cannot terminate their social media usage due to communicating with others, 2) the growth of networks encourages individuals to invest more time and energy within social media, 3) social media platforms are useful places to provide social supportive information, advice, and companionship, consequently, users must endeavour to serve high-quality information and relationships on their online networks, and 3) social norms can lead to social overload in those who have dedicated themselves to reduce the burden of reciprocity of other users (Choi and Lim, 2016). Thus, although social overload is a minor everyday issue caused by unwanted social demands, eventually becomes a serious problem defined as an addiction (Choi and Lim, 2016). | |
| 41 | Technology overload | Technology overload can be defined as an Information and Communication Technology (ICT) environment that pushes its users to perform to use multiple gadgets with multiple functions to accomplish multiple tasks more rapidly and for a longer period (Choi and Lim, 2016). Therefore, social overload plays a significant role in forming social media addiction for some reasons: 1) social media platforms encourage individuals to continuously use by providing interpersonal utility, information seeking, and entertainment, 2) use of social network sites becomes habitual because social media users believe that IT services are more useful, easier to use and more enjoyable, 3) once users are habituated, they pay little or no attention to their habitual usage patterns, thereby the resultant lack of attention develops | (Choi and Lim, 2016) |

		into an addiction, and 4) technology overload cause lack self-regulation in using pervasive technologies in users' daily lives (Choi and Lim, 2016).	
42	Perceived enjoyment	Enjoyment significantly affects mobile social media addiction behaviours (Yang et al., 2016). Perceived enjoyment is a substantial key that highly motivates individuals to use Information Systems (IS) (Yang et al., 2016). So that enjoyable experiences pave the way for forming "bad habit" which can develop a pathological dependency on a specific IT artefact (Turel and Serenko, 2012) such as short-form video (Tian et al., 2022). Consequently, when using a specific IT artefact is accompanied by an enjoyable experience, users are more prone to become addicted to such use due to forming a tendency to repeat the usage (Yang et al., 2016). Tian et al. (2022) state that the features of short-form videos (e.g. TikTak videos) stimulate an organism to generate positive emotions such as perceived enjoyment and consequently trigger addictive behaviours based on the positive reinforcement mechanisms. Perceived enjoyment is a positive emotional state that encourages TikTok users to use Tiktok frequently.	(Yang et al., 2016) (Tian et al., 2022)
43	Pleasure (Enjoyment)	Pleasure is one of the dimensions of enjoyment. "Pleasure is the extent to which a person feels happy, good, or satisfied while doing something." (Gao et al., 2017)(P. 348). Enjoyment stimulates SNSs' users to have high engagement with their favourite SNSs because individuals use SNSs to enjoy through interaction with their peers, friends, and families. Therefore, when individuals perceive the enjoyment of SNSs use, they tend to spend more time and energy into such use (Turel and Serenko, 2012). Consequently, users lose track of time, they are deeply immersed in the use of SNSs and subsequently they get into pleasure psychological state. In this state, they have less desire to leave the use of SNSs, and become more dependent or addicted to SNSs use (Gao et al., 2017).	(Gao et al., 2017)
44	Escapism (Enjoyment)	Escapism is one of the dimensions of enjoyment. "Escapism comes from & engaging in activities that are absorbing to the point of offering an escape from unpleasant realities, problems, and pressures." (Gao et al., 2017)(P.348). Enjoyment stimulates SNSs' users to	(Gao et al., 2017)

		have high engagement with their favourite SNSs because individuals use SNSs to enjoy through interaction with their peers, friends, and families (Turel and Serenko, 2012). Therefore, when individuals perceive the enjoyment of SNSs use, they tend to spend more time and energy into such use (Turel and Serenko, 2012). Consequently, users lose track of time, they are deeply immersed in the use of SNSs and subsequently they get into escapism psychological state. In this state, they have less desire to leave the use of SNSs, and become more dependent or addicted to SNSs use (Gao et al., 2017).	
45	Gratification sought	Gratifications sought (GS) can be considered as a specific motivation for using social media. U&G theory informed this study that SNS gratifications sought of social support is a significant motivator for actively engage in utilizing the SNSs. SNSs users tend to maintain their relationship because these platforms help them to bond with old friends and bridge with new friends. Consequently, they spend more time and energy on their favourite platforms. Therefore, SNS gratification sought is positively associated with SNS addiction.	(Lin et al., 2019)
46	Subjective happiness	Happiness is positively associated with Facebook addiction. In the short term, it seems that using Facebook promotes wellbeing due to increasing happiness and life satisfaction. However, in the long term, such use has a negative relationship with mental health. When users gain more positive experiences and happiness, the more they want to use Facebook to maintain and to increase the level of their happiness. However, excessive use has a negative outcome because the level of users' happiness completely depends on such use. Consequently, such use significantly increases the likelihood of their Facebook addiction.	(Brailovskaia et al., 2018b)
47	Low sense of self-efficacy	Self-efficacy refers to individuals' belief in their capacity to execute necessary behaviours to produce specific attainments. So, individuals' confidence in the ability to control their own motivation, behaviour, and social environment is a reflection of their self-efficacy. Consequently, individuals with low self-efficacy do not believe in their own abilities to control their stress or social anxiety. Therefore, low self-efficacy has been identified as an important factor in addiction.	(Atroszko et al., 2018)

48	Psychological Benefits	Psychological benefits, for example, being happy, feeling connected to others, and overcoming loneliness, among others have been identified as a significant motivator for using social media and consequently causes addiction to social media use. This because some social media users think that this technology 1) boosts their self-esteem, 2) improves their social status, 3) helps them to overcome their loneliness, 4) gives them sort of satisfaction, 5) makes them happy when they use for example Facebook, 6) leads them to feel more comfortable communicating with people in online platforms, and 7) allows me to create an identity.	(Balakrishnan and Shamim, 2013)
49	Social benefits	Social benefit refers to social support and social interaction ties. In the context of social media, online social networks enable individuals to maintain their active friendships, develop their new friendships with other members and obtain additional social support. Hence, on the one hand, people gain social benefits from their SNS communities and on the other hand, such benefits significantly facilitate their addictive behaviour.	(Gong et al., 2019a)
50	Hedonic benefits	Hedonic benefits refer to the positive emotions developed by using mobile SNS (Gong et al., 2019a). This factor is a significant reason for individuals' continuous social media usage and their high engagement with such use (Gong et al., 2019a). According to Turel and Serenko (2012), enjoyment acts play an important role in the formation of IT addiction. This because social media users gain enjoyable experience from using SNSs and consequently they tend to spend further time and energy for continually using SNSs.	(Gong et al., 2019a)
51	Skill Enhancement	Some individuals, especially students think that social media applications such as Facebook help them enhance their skills. Therefore, they use such platforms to 1) improve their interaction skill, and 2) seek useful information. As a result, skill enhancement emerged as of the significant motives for the overuse or addictive use of social media.	(Balakrishnan and Shamim, 2013)
52	Number of friends	The number of social media friends plays a significant role in addiction to social media use (Luke and Evelina, 2017, Hawi and Samaha, 2019). For example, near 70% of young Indonesian females have more than 100 friends on their favourite social media platforms (Luke and Evelina, 2017) They participate actively in online communication because online	(Luke and Evelina, 2017) (Hawi and Samaha, 2019)

		platforms enable them to keep their privacy talk and also help them to find their old friends. Hence the significant number of friends or followers is another dominant factor that causes social media addiction (Luke and Evelina, 2017, Hawi and Samaha, 2019).	
53	Number of SNS groups joined	Around 50% of young Indonesian females are a member of 11 – 20 social media groups and 40% of them are a member of 1 -10 groups. They like to belong to groups of social media in order to develop their relationship with other members. Hence, increasing the number of groups that they join is another dominant factor to become a social media addict.	(Luke and Evelina, 2017)
54	Number of medias for accessing SNSs	The availability of a significant number of social media is a significant influential factor in social media addiction. Because diverse and numerous social media platforms are accessible via smartphone and they are used frequently. Indonesian young females excessively use Line, WhatsApp, Twitter, YouTube, Facebook, and Yahoo Messenger in order. They use all these social media platforms to update and share personal information, share opinions, and communicate with their peers and friends. So Indonesian young females are very keen to use social media apps in order to chat with their family and friends and also to find novel news and information.	(Luke and Evelina, 2017)
55	Cognitive absorption	This concept was introduced by Agarwal and Karahanna (2000). Cognitive absorption refers to the state of deep engagement and immersive experience of social media users for doing collaborative activities (Agarwal and Karahanna, 2000). This because social media platforms are accessible, available, and easy to use (Barnes et al., 2019). Therefore, the level of cognitive absorption experienced by social media users leads to the deep attention of users to this media. Consequently, high levels of cognitive absorption cause an inability to self-regulation especially harmful or damaging behaviours such as social media addiction (Barnes et al., 2019).	(Barnes et al., 2019)
56	Lower optimism (low level of positive orientation)	Optimism as a dimension of positive orientation (i.e. self-esteem, optimism, and satisfaction with life) plays an important role in the quality of life. The term "positive orientation" is identified as a positive perception of oneself, a positive evaluation of one's life, and	(Błachnio and Przepiorka, 2016)

		expecting positive things in the future. Therefore, people who have a low level of optimism in their life are more likely to be addicted to social media use.	
57	Chronic Daily stress	Chronic daily stress or stressful life events is positively related to social media addiction such as Facebook (Brailovskaia et al., 2018b) and WeChat addiction (Li et al., 2018a). German students use Facebook to engage in different positive activities such as online games, social interaction, self-promotion, exchange, and transfer information in order to escape from their daily experienced (academic) stress (Brailovskaia et al., 2018b). It seems that using Facebook helps individuals to promote their life satisfaction and happiness. However, in the long term, if excessive use of Facebook becomes the only source of joy and relief for an individual, the risk to develop Facebook addiction is increased (Brailovskaia et al., 2018b). Li et al. (2018a) state when Chinese students face with life stressors, they experience negative feelings; so then, they use WeChat to anesthetize and relieve their negative emotions. Therefore, stressful life events not only is negatively related to individuals' life satisfaction but also cause addiction to social media such as WeChat addiction (Li et al., 2018a).	(Brailovskaia et al., 2018b) (Li et al., 2018a)
58	Psychiatric distress	Psychiatric distress is mental or psychological distress resulted by a disorder (e.g. depression and anxiety) in the regulation of emotions (Aldao et al., 2010). Psychiatric distress is related to a range of and experiences of an individual's internal life that all of them commonly lead the person to be troubling, confusing, or out of the ordinary (Pontes et al., 2018). Therefore, this factor has been identified as an influential factor on SNSs addiction (Pontes et al., 2018).	(Pontes et al., 2018)
59	Maladaptive cognitions	"Maladaptive cognitions refer to cognitive biases that individuals form toward themselves and the world after they start using the Internet" (Pontes et al., 2018)(P. 241). People with maladaptive cognition are usually cynical and distrustful. So they prefer online connections and interactions in comparison to the offline one. Thus, this factor significantly impacts on SNS addiction.	(Pontes et al., 2018)

60	Internet addiction	Facebook addiction is positively associated with Internet addiction (Błachnio et al., 2017). Facebook addiction and Internet addiction are the same phenomena, so that Facebook addiction can be defined as a subtype of Internet addiction (Schou Andreassen and Pallesen, 2014). This study states that although Internet addiction and SNSs addiction have different causes, the majority of their influential factors such as personality traits are the same (Błachnio et al., 2017).	(Błachnio et al., 2017)
61	Attitude	Attitude can be defined as "people's positive or negative assessment of engaging in a behaviour" (Ho et al., 2017)(P. 633). Whenever people present a positive attitude toward a behaviour, there is a high likelihood that their intention would be increased to do that behaviour. Therefore, social media users who hold a favourable attitude toward social media may use this technology more than they expect to. Social media abilities and facilities provoke individuals' positive attitudes toward social media and consequently, this situation weakens individuals' self-regulatory functions, which is associated with the development of addiction (Ho et al., 2017).	(Ho et al., 2017)
62	Subjective norms	Subjective norms refer to "the perceived prevalence of a behaviour and individuals' perceptions of the general social expectations to perform (or not to perform) the behaviour" (Ho et al., 2017)(P. 633). Therefore, subjective norms may induce pressure in terms of both social/external and personal/intrinsic pressure. So that a person does her/his activities based on the belief of an important person or group of people who will approve and support a particular behaviour; or based on his/her own belief due to intrinsic motivations such as using SNSs for self-presentation and mood-modification purposes (Ho et al., 2017). This study revealed that subjective norms are associated with social media addiction among adolescents because of the aforementioned pressures.	(Ho et al., 2017)
63	Social media purposive value	Social network sites purposive value refers to when individuals use social media platforms for functional outcomes such as information seeking, information generation, learning, and making decisions. This study discovered that this factor is associated with addiction to social media use.	(James et al., 2017)

64	Distraction within SNS	In the field of psychological stress, distraction refers to coping behaviour when an individual tries to respond to stress-creating situations by diverting his/her attention from that stressful situation (Cooper et al., 2001). This mechanism takes the person away from those stressful situations into a pleasant and enjoyable situation. Consequently, distracted users use SNS to deal with stressors. However, using SNS applications causes a stressful situation as well (Tarafdar et al., 2020). But because SNS applications are feature-rich, users are able to use the same or different platforms to do something different that is not stressful (Tarafdar et al., 2020). SNSs provide a bunch of different features and functions to carry out many activities such as posting and sharing information in the form of text, picture and video, reacting to other posts, private or group communication by using the chat functions, browsing peoples' profiles, and searching for old and new friends (Shao, 2009, Boroon et al., 2018a). Hence, SNSs provide opportunities for diversion from a stressor. So that, when an individual feels stressed by using a feature of an SNS, she/he can divert her/his attention from that stress by switching to a different type of use on the same SNS (Tarafdar et al., 2020). Such a scenario indicates a continuous deep use that makes it difficult for distracted individuals to get out of the feature-rich environment of the SNS applications. Therefore, the distraction caused by using SNSs induces compulsive and excessive use of SNSs such as SNSs addiction (Tarafdar et al., 2020).	(Tarafdar et al., 2020)
65	self-promotion	Self-promotion refers to the degree to which using an SNS affords a user to gain acceptance and approval from other SNS users to enhance her/his social status (Mäntymäki and Islam, 2016). Individuals with a high intention for self-promotion such as high exhibitionism characters have a fragile trait that required to be constantly reaffirmed form others (Islam et al., 2019). SNSs pave a way for their users to show off themselves and receive admiration from other people (Islam et al., 2019). Therefore, users with a high level of exhibitionism engage in excessive self-promotion through SNSs to gain maximum attention and admiration (Islam et al., 2019). This situation causes a high level of dependency on SNS	(Islam et al., 2019)

		services and consequently, these users may involve with behavioural and psychological problems such as addiction (Islam et al., 2019).	
66	psychopathy	Psychopathy as a dimension of the Dark Triad refers to a lack of empathy, callousness, and erratic behaviours. Furthermore, Psychopathy is consistently linked to poor self-control and impulsivity. Therefore, this factor has a significant impact on SNSs addiction.	(Lee, 2019)
67	Social monitoring	The need for social monitoring resulted from a fear of missing out (FOMO) on information about others when social media apps such as Facebook are not being used. For this purpose, Individuals feel a strong need to monitor the activity of their friends by repetitively checking the news feed for new information. Consequently, these persons are often distracted by repetitively checking their Facebook, and subsequently this activity interferes with their work or study. Moreover, they may feel withdrawal symptoms when no updated news has been posted to Facebook during their last checking. Therefore, some of these individuals potentially became problematic Facebook users such as Facebook addict.	(Ryan et al., 2016)
68	Procrastination	Procrastination refers to the tendency to delay, postpone, or avoid decision making, completing mundane or difficult tasks (Tuckman, 1991). When one follows this behaviour pattern, indeed, she/he wants to reduce the level of stress or fear of beginning a new task (Ryan et al., 2016, Müller et al., 2020). Although in the short term, procrastination causes tempting satisfaction related to SNSs use such as Facebook, in the long term, it is significantly related to the problematic use of the Internet in general and SNSs in particular (Ryan et al., 2016, Müller et al., 2020). Thus, this pathway is likely to be associated with excessive use of Facebook. Furthermore, this situation causes low conscientiousness and then addictive tendencies to SNS use addiction (Ryan et al., 2016, Müller et al., 2020).	(Ryan et al., 2016) (Müller et al., 2020)
69	Social media related infidelity behaviour	In comparison with face-to-face communication, individuals interacting through social media platforms generally have a tendency to self-disclose deeper topics more quickly and they are more comfortable to share their deepest intimate desires. Consequently, they routinely use social media to communicate with romantic/sexual alternatives such as online sex, hot chatting, viewing pornography, emotional involvement, emotional disclosure, and	(Abbasi and Dibble, 2019) (Abbasi and Dibble, 2021)

		cybersex, whether or not they are already in a committed relationship. Such behaviours cause social media infidelity. Therefore, the behaviours on social media that lead to cheating in a committed, dyadic romantic relationship is known as social media infidelity. individuals who are involving with social media infidelity unconsciously spend too much time on their social media platforms. Consequently, they are more prone to be addicted to social media use.	
70	Mental illness	Social media applications are popular among people who live with mental illness/disorder. Engaging with social media led Individuals with serious mental illness to increase their social and civic participation such as voting (Brusilovskiy et al., 2016), self-esteem, life satisfaction, and to decrease their feeling of loneliness (Seabrook et al., 2016). Because using social media helps Individuals who have a mental illness to self-manage their mental health, via access motivational information, interacting with those who have similar experiences, receiving peer support, maintaining their friendship, and self-express (Abbasi and Dibble, 2019, Abbasi and Dibble, 2021). However, all these services lead them to spent additional time and energy into their favourite social media and consequently become addicted to such use (Abbasi and Dibble, 2019, Abbasi and Dibble, 2021).	(Abbasi and Dibble, 2019) (Abbasi and Dibble, 2021)
71	Posting updates	Daily frequency of checking and posting on social media sites is positively impact on social media addiction.	(Hawi and Samaha, 2019)
72	Independent self-construal	Markus and Kitayama (1991) coined the term "self-construal" which refers to how individuals perceive themselves and how they see themselves in relation to others. However the term "interdependent self-construal" means how individuals evaluate themselves not in the context of others, but they evaluate themselves in comparison with others (Hawi and Samaha, 2019). This factor positively impacts on social media addiction.	(Hawi and Samaha, 2019)
73	Social Features (Structural Features of Technology)	IT can be addictive due to its features and the opportunities it provides to individuals through its features. Therefore, IT artefact can cause addictive IT behaviours. Therefore, IT artefact can cause addictive IT behaviours. Social media platforms, for example, can provide communication tools such as voice calls, conference calls, forums, blogs that all are	(Vaghefi and Lapointe, 2013)

		important for improving social communication and interaction. In addition, social media platforms are diverse, accessible, and usable for different types of users. Thus, on average, users are more likely to become addicted to social media use. This because structural features of social media play a prominent role to develop the addictive behaviour. For example, social features refer to the capabilities of social media platforms that create a sense of belonging and social recognition within the users' community and encourage them to communicate, interact and exchange simply with one another.	
74	Manipulation & Control Features (Structural Features of Technology)	IT can be addictive due to its features and the opportunities it provides to individuals through its features. Therefore, IT artefact can cause addictive IT behaviours. Therefore, IT artefact can cause addictive IT behaviours. Social media platforms, for example, can provide communication tools such as voice calls, conference calls, forums, blogs that all are important for improving social communication and interaction. In addition, social media platforms are diverse, accessible, and usable for different types of users. Thus, on average, users are more likely to become addicted to social media use. This because structural features of social media play a prominent role to develop the addictive behaviour. "Manipulation and control features provide the basis from which users control the properties of a system and create a feeling of dominance over a system." (Vaghefi and Lapointe, 2013)(P. 7).	(Vaghefi and Lapointe, 2013)
75	Presentation Features (Structural Features of Technology)	IT can be addictive due to its features and the opportunities it provides to individuals through its features. Therefore, IT artefact can cause addictive IT behaviours. Therefore, IT artefact can cause addictive IT behaviours. Social media platforms, for example, can provide communication tools such as voice calls, conference calls, forums, blogs that all are important for improving social communication and interaction. In addition, social media platforms are diverse, accessible, and usable for different types of users. Thus, on average, users are more likely to become addicted to social media use. This because structural features of social media play a prominent role to develop the addictive behaviour. "Reward and punishment features are the gains (or losses) that motivate users to use a system more	(Vaghefi and Lapointe, 2013)

		frequently and prompt them to learn a system in order to maximize the benefit they obtain from its features.	
76	Reward & Punishment Features (Structural Features of Technology)	IT can be addictive due to its features and the opportunities it provides to individuals through its features. Therefore, IT artefact can cause addictive IT behaviours. Therefore, IT artefact can cause addictive IT behaviours. Social media platforms, for example, can provide communication tools such as voice calls, conference calls, forums, blogs that all are important for improving social communication and interaction. In addition, social media platforms are diverse, accessible, and usable for different types of users. Thus, on average, users are more likely to become addicted to social media use. This because structural features of social media play a prominent role to develop the addictive behaviour (Vaghefi and Lapointe, 2013)(P. 7)	(Vaghefi and Lapointe, 2013)
77	Social appearance anxiety	Social standing Anxiety can be defined as the obsession with one's own physical appearance and the fear of circumstances in which one's own appearance (face, body form, height, and weight) might be unfavourably assessed by others. Social media provides this platform for its users, particularly teenagers, who are dissatisfied with their own body image, to be able to deliberately regulate how they show themselves through the use of photos, selfies, videos, and other visual information. As a result, individuals who are socially anxious about their appearance could utilise social media more frequently and problematically, which leads them to be addicted to social media use.	(Boursier et al., 2020)
78	Users' inner feelings or states (flow)	Gong et al. (2020a) argue that technological utilities of social media application such as enjoyment, sociability, and information value positively affect users' inner feelings or states (flow). Consequently, Users frequently repeat their usage in order to increase the subjective utility to obtain more experience, value and more flow states, which promotes the development of addiction to social media use.	(Gong et al., 2020a)
79	Low quality romantic relationships	Romantic partners with no longer content with their ongoing relationship are more prone to social media addiction; because they replace their face to face communication with resort to online social networks for seeking psychological and emotional comfort. Since social	(Bouffard et al., 2021)

		media platforms pens up the opportunity to follow online partners, relationship commitment is reduced. Consequently, low commitment leads to negative relationship outcomes that stimulate social media addiction.	
80	Immersion	Immersion is positively associated with addiction to social media use. Immersion refers to the degree of flow that an individual experience when using an information technology. The flow is a mental state in which individuals experience full involvement and enjoyment when they are performing some activities. Sensitive and engaging content on social media platforms such as videos, political opinions, and news tempts social media users to frequency check their social media platforms. Consequently, levels of user immersion on social media will be increased. So that, Immersion can cause social media addiction.	(Naranjo-Zolotov et al., 2021)
81	Communication overload	Utilizing information technology more than is necessary can potentially result in overload and have negative effects. in a constantly connected world specially with the expanding social media services, an imbalance state is being developed between communication needs and human cognitive capacity. Users who excessively communicate through social media platform may become distracted from their regular work and feel obligated to reply on social media. Moreover, these users will lose their control regarding social media use. Consequently, individuals who have lost control of their social media usage and are actively participating and engaging in social media ultimately are led to overload and social media addiction.	(Qaisar et al., 2021)
82	Information overload	When Individuals receive excessive information, information overload occurs because the need to process information exceeds the processing capabilities of users and consequently they need spent more time on social media to be able to process such a kind of information about their friends, family, personal lives, news, events, expertise and rumours. As social media network expands, a lot of information can be generated quickly. Information overload causes social media addiction because it enhances the social lives of users.	(Qaisar et al., 2021)
83	Continuance intention	Continuance intention refers to an individual's intention to continually use or reuse a system. Studies on Facebook addiction indicate that this negative phenomenon is caused by	(Maqableh et al., 2021)

		the excessive use of Facebook. There are approximately 350 million Facebook users between the ages of 16 and 25 who suffer from Facebook addiction syndrome (Leong et al., 2019). Facebook users' initial decision is to reuse this website due to being psychologically reliant on its use. Maqableh et al. (2021) argue that some factors such as emotional value, informational value, and hedonic value positively influences the intention to continue using Facebook, which has a significant role in Facebook addiction.	
84	Selfitis behaviour	Selfitis behaviour refers to the appropriate arena or vehicle for engaging in strategic self-presentation. This behaviour is reinforced by social media because social media gives an opportunity to its users to enhance their profiles and maintain or fills the gap in social connections and interactions by presenting an online ideal or fake self. Manipulation of online self-presentation, characterised by self-and/or others-oriented behaviours, meets self-reinforcement needs and leads to apparent addictive use of social media platforms.	(Monacis et al., 2021)
85	Parental neglect	The behaviour of parents in controlling what their children do is crucial in forming the behaviour of the children. Adolescent students will get infatuated toward social media use because of certain family problems, unsupportive parents, neglected parents, abusive and authoritative parents. These students replace the use of social media with their family and consequently, they devote a significant amount of time to visiting their social media platforms. Repeated use of social networking sites over time leads to "addictive behaviour," which is of particular concern to academics and parents. Therefore, parental neglect is positively and significantly related to social media addiction	(Chidambaram et al., 2022)
86	Social capital bonding	Social capital bonding is characteristic of close communities where individuals are dependent on exchange with their community, and committed to help, support and trust one another. In another words, social capital bonding takes place on a community where its members develop strong bonds based on trust and solidarity. As social capital bonding allows social media users to form close connections, it leads to social media attachment and causes social media users feel a commitment to their online connections. For example, social media users may feel obligated to reciprocate the support received because failing to meet	(Soh et al., 2022)

		norms and expectations may result in sanctions such as exclusion from others and loss of future support. This feeling likely reduces social media users' self-control over social media usage, and leading to social media addiction.	

Appendix 4: Invitation to Assess the Content Validity of the Online Survey

Request for verifying the validity of an online survey

Dear …………….

I would be very grateful if you could take 30 minutes to provide your opinions in our survey (the file is attached).

I am conducting a research project to meet the requirements for Doctoral of Philosophy. My study aims to investigate addiction to social media use: influential factors and mitigation strategies. Your responses would be very helpful to stablish understandable, valuable and deliverable research questionaries.

Thank you in advance for taking part in the survey. I wish you all the best for your future endeavours.

Kind regards,

Layla

Appendix 5: Online Survey Questionnaires

INFORMATION SHEET AND CONSENT FORM FOR ONLINE SURVEYS

ETH205332 – Investigating Addiction to Social Media Use: Influential Factors and Mitigation Strategies

<table>
<tr><td colspan="1" align="center">

"Participant Information and Survey"

School of Information Systems and Modelling

Faculty of Engineering and Information Technology

University of Technology Sydney, Ultimo NSW 2007

Phone: (02) 9514 2000

Project Title: Investigating Addiction to Social Media Use: Influential Factors and Mitigation Strategy

Researcher: Layla Boroon

Supervisor: Doctor Eila Erfani

</td></tr>
</table>

Section 1: Please answer the following questions

1. What is your gender?

□ Female

□ Male

2. How old are you? --------- (please specify your actual age)

3. What is your nationality/nationalities? --------------------------

4. Education (Highest qualification)

□ High school

□ Bachelor

□ Master (Course work)

□ Master by research

□ Doctorate

5. Experience of Instagram use

□ From 6 months to 1 year

□ More than 1 year to 2 years

□ More than 2 years to 3 years

□ More than 3 years to 4 years

□ More than 4 years

6. On average, how much time per day do you spend on your Instagram (for non-work-related purposes)?

□ 30 minutes or less

□ 31-60 minutes

□ 1-2 hours

□ 2-4 hours

□ 4-6 hours

□ 6-8 hours

□ More than 8 hours

Section 2: Please answer the following questions based on your habit of Instagram use. *Questions in this section are based on (Xu and Tan, 2012).*

	Strongly Disagree	Disagree	Neither Agree nor Disagree	Agree	Strongly Agree
7. Using Instagram has become automatic to me.					
8. Using this Instagram application is not very natural habit to me.					
9. When I want to interact with friends and relatives, using Instagram is an obvious choice for me.					

Section 3: Please answer the following questions based on your attitude toward using Instagram. *Questions in this section are based on* (Ho et al., 2017).

	Strongly Disagree	Disagree	Neither Agree nor Disagree	Agree	Strongly Agree
10. It is good to check my Instagram regularly.					
11. It is not valuable to check my Instagram regularly.					
12. It is enjoyable to check my Instagram regularly.					

Section 4: Please answer the following questions based on your personal norm toward using Instagram. *Questions in this section are based on (Ho et al., 2017).*

	Strongly Disagree	Disagree	Neither Agree nor Disagree	Agree	Strongly Agree
13. I believe it's perfectly fine to share news or communicate with friends by using Instagram regularly.					

	Strongly Disagree	Disagree	Neither Agree nor Disagree	Agree	Strongly Agree
14. I think the right way for me to share news or communicate with friends is by using Instagram.					
15. I am in reluctant to use of Instagram to share news or communicate with friends.					
16. Personally, I think it's tricky to use Instagram to share news or communicate with friends.					

Section 5: Please answer the following questions based on your social norm toward using Instagram. *Questions in this section are based on (Ho et al., 2017).*

	Strongly Disagree	Disagree	Neither Agree nor Disagree	Agree	Strongly Agree
17. People who influence my behaviour think that I should use Instagram to share news with them.					
18. People who are important to me think that I should use Instagram to share news with them					
19. People who care about me think that I should use Instagram to share news with them.					
20. People in my social circle think that I should use Instagram to share news with them.					

Section 6: Please answer the following questions based on your relatedness or dependency toward using Instagram. *Questions in this section are based on* (*Carter, 2013*)

	Strongly Disagree	Disagree	Neither Agree nor Disagree	Agree	Strongly Agree
21. Thinking about myself in relation to my favourite social media, I am connected with my Instagram.					
22. Thinking about myself in relation to my favourite social					

media, I am in coordination with my Instagram.					
23. Thinking about myself in relation to my favourite social media, I am close with my Instagram.					
24. Thinking about myself in relation to my favourite social media, I am linked with my Instagram.					
25. Thinking about myself in relation to my Instagram, I feel pumped up.					
26. Thinking about myself in relation to my favourite social media, I feel confident.					
27. Thinking about myself in relation to my Instagram, I feel enthusiastic.					
28. Thinking about myself in relation to my Instagram, I feel down.					
29. Thinking about myself in relation to my favourite social media, I am needing my Instagram.					
30. Thinking about myself in relation to my favourite social media, I am counting on my Instagram.					
31. Thinking about myself in relation to my favourite social media, I am not reliant on my Instagram.					
32. Thinking about myself in relation to my favourite social media, I am independent from my Instagram.					

Section 7: Please answer the following questions based on your tendency for using Instagram. *Questions in this section are based on Andreassen et al. (2012)*.

	Very rarely	Rarely	Some-times	Often	Very often

33. Spent a lot of time thinking about my Instagram platform or planned use of my Instagram?					
34. Thought about how you could free more time to spend on Instagram?					
35. Thought a lot about what has happened on my Instagram recently?					
36. Spent more time on Instagram than initially intended?					
37. Felt an urge to use Instagram more and more?					
38. Felt that you had to use Instagram more and more in order to get the same pleasure from it?					
39. Used Instagram in order to forget about personal problems?					
40. Used Instagram to reduce feelings of guilt, anxiety, helplessness, and depression?					
41. Used Instagram in order to reduce restlessness?					
42. Experienced that others have told you to reduce your use of Instagram but not listened to them?					
43. Tried to cut down on the use of Instagram without success?					
44. Decided to use Instagram less frequently, but not managed to do so?					
45. Become restless or troubled if you have been prohibited from using Instagram?					
46. Become irritable if you have been prohibited from using Instagram?					
47. Felt bad if you, for different reasons, could not log on to Instagram for some time?					
48. Used Instagram so much that it has had a negative impact on your job/studies?					

49. Given less priority to hobbies, leisure activities, and exercise because of Instagram?					
50. Ignored your partner, family members, or friends because of Instagram?					

Section 8: Please answer the following questions based on your self-regulation to prevent using Instagram. *Questions in this section are based on (Khan et al., 2021).*

Questions: Reflecting on your experience with using Instagram to what extent "…………………." can stop you from excessive use of Instagram?	Never	Seldom	Sometimes	Frequently	Always
51. "leaving your phone in another room"					
52. "charging your phone in a different room"					
53. "spending two days in an area with no service and limited Wi-Fi"					
54. "leave my phone in the car and go to the library"					
55. "leaving your phone in the locker room while at work"					
56. "putting your phone to charge 15 ft. away from yourself"					
57. "Studying around others"					
58. "putting your phone in your purse instead of your pants pocket to make it harder for yourself to grab"					
59. "putting your phone in a drawer"					
60. "going to the library and using a computer"					
61. "putting your phone screen down and on mute"					
62. "leaving your phone on mute at all times"					
63. "putting your phone on airplane mode"					
64. "turning off your mobile data and Wi-Fi"					

65. "putting your phone on "do not disturb"					
66. "turning off notification sound"					
67. "using an Internet blocker when trying to write papers"					
68. "No using Instagram when you are at dinner"					
69. "planning to stop using Instagram after 11 pm"					
70. "checking your Instagram only when you have a rest period between classes"					
71. "Setting limit of the time. For example, I will set up time that I will concentrate on doing homework for 1–2 hr, then check social media later after I finished my tasks"					
72. "only using Instagram during relaxing periods of the day when you are not engaging in others"					
73. "taking 10 min breaks after every 1 hr of studying to use Instagram"					
74. "reminding yourself that work is more important than Instagram"					
75. "thinking about passing the course"					
76. "trying to focus on other important things like your university and getting your work done"					
77. "Reminding yourself of the overall goals that you need to accomplish"					
78. "telling yourself that there is an important test coming up"					
79. "reminding yourself that your "to-do list" is more important"					
80. "keep working					
81. "self-control, simply forcing yourself to not check Instagram until you are done with the task at hand"					
82. "using self-control and not look at your phone"					

83. "finishing important tasks before checking your phone"	291				
84. "If you are working on something more important than alerts from Instagram, you will simply ignore any phone completely"					

Appendix 6: Invitation to Participate in the Online Survey Research

School of Information Systems and Modelling

Faculty of Engineering and Information Technology

University of Technology Sydney, Ultimo NSW 2007

Phone: (02) 9514 1098

Project Title: Investigating Addiction to Social Media Use: Influential Factors and Mitigation Strategy

Researcher: Layla Boroon

Supervisor: Doctor Eila Erfani

You are invited to participate in a study of investigating addiction to social media use: influential factors and mitigation strategies. This study is being conducted by Ms. Layla Boroon as part of her PhD study at the University of Technology Sydney under the supervision of Dr. Eila Erfani (contact number: 02 9514 1098, email Eila.Erfani@uts.edu.au) from the School of Information Systems and Modelling.

The study is open to anyone who is

•   A student at University of Technology Sydney or another Australian university,

•   An experienced Instagram user for at least 6 months,

•   Aged between 18 and 40 years old and

•   Fluent in English

If you are interested in participating, please follow one of the links below to get started:

Mobile version link: https://utsau.au1.qualtrics.com/jfe/form/SV_exnzXtboWIQSrRz

If you have any questions about the study please contact Ms. Layla Boroon at Layla.Boroon@uts.edu.au

Appendix 7: Online Survey Consent Form

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INFORMATION SHEET AND CONSENT FORM FOR ONLINE SURVEYS

ETH205332 – Investigating Addiction to Social Media Use: Influential Factors and Mitigation Strategies

What is the research study about?

The purpose of this online survey is to investigate the impact of influential factors to social media addiction and mitigation strategies for combating social media addiction. Studying social media addiction is very important because this negative phenomenon has detrimental impacts on the users' performance both academic and job performance, mental and physical health of users.

Who is conducting this research?

My name is Layla Boroon and I am a PhD student at UTS. My principal supervisor is Dr. Eila Erfani Deputy Head of Teaching and Learning of School of Information Systems and Modelling, Faculty of Engineering and Information Technology (FEIT).

Inclusion/Exclusion Criteria

Since it is not possible to study all social media platforms in the same study, this study focuses on Instagram as one of the most popular social media platforms. Therefore, an eligible participant in this research are:

- A student at University of Technology Sydney or another Australian university,
- An experienced Instagram user for at least 6 months,
- Aged between 18 and 40 years old and
- Fluent in English

Do I have to take part in this research study?

Participation in this study is voluntary. It is completely up to you whether or not you decide to take part.

If you decide not to participate, it will not affect your relationship with the researchers or the University of Technology Sydney. If you wish to withdraw from the study once it has started, you can do so at any time without having to give a reason.

If you withdraw from the study, I will thank you for your time so far and will not contact you about this research again.

If I say yes, what will it involve?

If you decide to participate, I will invite you to participate in an online survey (It will not take you more than 30 minutes), please answer all questions (otherwise, your questionnaire will be invalid and will be excluded).

Are there any risks/inconvenience?

We don't expect this online survey to cause any kind of inconvenience, however if you experience feelings of discomfort as a result of participation in this study you are free to stop answering questions at any stage of the survey.

What are potential benefits of this study?

The findings from this study will be important for ascertaining what influential factors of Instagram addiction are and how to combat this negative phenomenon. The findings will be of benefit for individuals, policymakers, social media developers and will inform them about the mitigation strategies to combat social media addiction.

What will happen to information about me?

Access to the online survey is via Computer version
link: https://utsau.au1.qualtrics.com/jfe/form/SV_8qrDiMvMGvrJRdj. Submission of the online survey is an indication of your consent. By clicking the Computer version
link: https://utsau.au1.qualtrics.com/jfe/form/SV_8qrDiMvMGvrJRdj you consent to the research team collecting and using personal information (i.e., gender, age, nationality and education) about you for the research project. All this information will be treated confidentially. The collected and annotated forum data will only be stored in password protected computers and the UTS repository system. All collected data will not be shared with anyone other than the named investigators. These named investigators agree to never transfer research data via email, USB drive, or another insecure medium. Your information will only be used for the purpose of this research project. In any publication, information will be provided in such a way that you cannot be identified.

What if I have concerns or a complaint?

If you have concerns about the research that you think I or my supervisors can help you with, please feel free to contact us on

- Layla Boroon (Layla.boroon@uts.edu.au)
- Dr Eila Erfani (Eila.Erfani@uts.edu.au): contact number: (2) 95141098

NOTE:

This study has been approved by the University of Technology Sydney Human Research Ethics Committee [UTS HREC]. If you have any concerns or complaints about any aspect of the conduct of this research, please contact the Ethics Secretariat on ph.: +61 2 9514 2478 or email: Research.Ethics@uts.edu.au], and quote the UTS HREC reference number (ETH205332). Any matter raised will be treated confidentially, investigated and you will be informed of the outcome.

Online survey information sheet – version1, 9/09/2020

Appendix 8: Interview Questionnaire

INFORMATION SHEET AND CONSENT FORM FOR FOCUS GROUP RESEARCH

ETH205332 – Investigating Addiction to Social Media Use: Influential Factors and Mitigation Strategies

<table>
<tr><td colspan="1">

"Participant Information and Semi-Structured Interview"

School of Information Systems and Modelling

Faculty of Engineering and Information Technology

University of Technology Sydney, Ultimo NSW 2007

Phone: (02) 9514 2000

Project Title: Investigating Addiction to Social Media Use: Influential Factors and Mitigation Strategy

Researcher: Layla Boroon

Supervisor: Doctor Eila Erfani

Please answer the following questions

</td></tr>
<tr><td>

Section 1: Please answer the following questions

1. What is your gender?

☐ Female

☐ Male

2. How old are you? --------- (please specify your actual age)

3. What is your nationality/nationalities? ---------------------------

4. Education (Highest qualification)

☐ High school

☐ Bachelor

☐ Master (Course work)

☐ Master by research

☐ Doctorate

5. Experience of Instagram use

☐ From 6 months to 1 year

☐ More than 1 year to 2 years

☐ More than 2 years to 3 years

☐ More than 3 years to 4 years

☐ More than 4 years

6. On average, how much time per day do you spend on your Instagram (for non-work-related purposes)?

☐ 30 minutes or less

☐ 31-60 minutes

</td></tr>
</table>

□ 1-2 hours
□ 2-4 hours
□ 5-6 hours
□ 6-8 hours
□ More than 8 hours
Section 2: Please answer the following questions
7. Do you feel that self-talk can stop you from excessive use Instagram? If yes, how?
8. Do you feel that build or choose a safe context with no direct access to Instagram can stop you from excessive use Instagram? If yes, how?
9. Do you feel that build or choose a safe context but with a potential access to Instagram can stop you from excessive use Instagram? If yes, how?
10. Do you feel that delimit a specific time of use can stop you from excessive use Instagram? If yes, how?
11. Do you feel that modify a feature on your device such your mobile phone can stop you from excessive use Instagram? If yes, how?
If you would like to be informed about the findings of this research please provide your email address below: ………………………………@………………………………………………………… Thank you for your time and participation.

Appendix 9: Invitation to Participate in the Interview Research

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Dear ……

I am writing to invite you to participate in a interview session on mitigation strategy to deal with social media addiction/excessive use. This research is being conducted as a part of my Ph.D. project in information systems under the supervision of Dr. Eila Erfani (my principal supervisor) and A/Prof Valerie Gay (my co-supervisor) in Faculty of Engineering and Information Technology at the University of Technology Sydney.

The interviews are conducted to focus on documenting participants' ideas about using the proposed mitigation strategy (self-regulation). This will involve a semi-structured conversation about if self-regulation can combat social media addiction, and then discuss on users' opinion, experiences, experimental knowledge and behaviours to discover how the users execute the self-regulation mechanism. The main outcome of this interview will be a a conceptual framework of the self-regulation strategy in the format of a prototype.

The interview session will be held maximum in 60 minutes individual or group discussion in both face to face and zoom meeting based on your preference. If you are interested in face to face meeting, it will be held over some light refreshments.

If you are interested, please email Layla.boroon-1@student.uts.edu.au with your name, contact number and your preferred date and time to book your place now. If you are not able to come to UTS campus, please advise me your preferred place and send the location.

Thanks in advance for your consideration

Kind regards,
Layla

Appendix 10: Interview Consent Form

UTS | UNIVERSITY OF TECHNOLOGY SYDNEY

INFORMATION SHEET AND CONSENT FORM FOR FOCUS GROUP RESEARCH

ETH205332 – Investigating Addiction to Social Media Use: Influential Factors and Mitigation Strategies

What is the research study about?

The purpose of these focus groups is to examine the impact of applying mitigation strategies on combatting the social media addiction. Studying social media addiction is very important because this negative phenomenon has detrimental impacts on the users' performance both academic and job, mental and physical health of users, and users' wellbeing. You have been invited to participate because your response to the questions will positively affect the findings of this project and help us to provide more reliable information.

Who is conducting this research?

My name is Layla Boroon and I am a PhD student at UTS. My principle supervisor is Dr. Eila Erfani Deputy Head of Teaching and Learning of School of Information Systems and Modelling, Faculty of Engineering and Information Technology (FEIT).

Inclusion/Exclusion Criteria

Since it is not possible to study all social media platforms in the same study, this study focuses on Instagram as one of the most popular social media platforms after Facebook. Therefore, an eligible participant in this research are:

- A student at University of Technology Sydney or another Australian university,
- An Instagram user,
- An experienced Instagram user for at least 6 months,
- Aged between 18 and 40 years old and
- Fluent in English

Do I have to take part in this research study?

Participation in this study is voluntary. It is completely up to you whether or not you decide to take part.

If you decide not to participate, it will not affect your relationship with the researchers or the University of Technology Sydney. If you wish to withdraw from the study once it has started, you can do so at any time without having to give a reason.

If you withdraw from the study, I will thank you for your time so far and will not contact you about this research again.

If I say yes, what will it involve?

If you decide to participate, I will invite you to focus groups (participate in a 1-hour semi-structured interview) to learn about your personal thoughts, opinions and experiences on how our proposed mitigation strategies would combat social media addiction.

The main outcome of this focus group/workshop will be a validated prototype of mitigation strategies to combat social media addiction.

Are there any risks/inconvenience?

We don't expect these focus groups to cause any kind of inconvenience, however if you experience feelings of discomfort as a result of participation in this study you are free to stop answering questions at any stage of the focus groups.

What are potential benefits of this study?

The findings from this study will be important for ascertaining the mitigation strategies that can combat social media addiction. The findings will be of benefit for individuals, policymakers, social media developers and will inform them about the mitigation strategies to combat social media addiction.

What will happen to information about me?

It is completely voluntary and confidential. You may choose not to participate, not to answer certain questions or stop the interview at any time. Your responses will be treated confidentially.

Q1. Are you still interested in participating in focus groups?

Yes

No

Thank you for your time and consideration. I will send you a study package that will include a formal consent form. I would ask you to please read and sign the consent form and return it to me. Once you have returned the signed consent form, we can conduct the interview.

The audio and transcripts will only be stored on password protected computers. All collected data will not be shared with anyone other than the named investigators. These named investigators agree to never transfer research data via email, USB drive, or another insecure medium. Your information will only be used for the purpose of this research project. In any publication, information will be provided in such a way that you cannot be identified.

What address should I use to send you the consent form? I can send it to you by email and you can fax it back to me. Or I can send it to me by postal mail with a return postage-paid envelope. Which method would you prefer? CONFIRM.

_____ _____
_____
_____

What if I have concerns or a complaint?

If you have concerns about the research that you think I or my supervisors can help you with, please feel free to contact us on

- Layla Boroon (Layla.boroon@uts.edu.au)
- Dr Eila Erfani (Eila.Erfani@uts.edu.au): contact number: (2) 95141098

NOTE:

This study has been approved by the University of Technology Sydney Human Research Ethics Committee [UTS HREC]. If you have any concerns or complaints about any aspect of the conduct of this research, please contact the Ethics Secretariat on ph.: +61 2 9514 2478 or email: Research.Ethics@uts.edu.au], and quote the UTS HREC reference number (ETH205332). Any matter raised will be treated confidentially, investigated and you will be informed of the outcome.

Interview information sheet – version1, 9/09/2020

Appendix 11: Normality Test Outcome

	N	Minimum	Maximum	Sum	Mean	Std. Deviation	Skewness		Kurtosis	
	Statistic	Statistic	Statistic	Statistic	Statistic	Statistic	Statistic	Std. Error	Statistic	Std. Error
Habit1	332	1	5	1209	3.64	1.177	-.964	.134	.113	.267
Habit2	332	1	5	1220	3.67	1.064	-.728	.134	.015	.267
Habit3	332	1	5	981	2.95	1.227	-.022	.134	-1.042	.267
Attitude1	332	1	5	1006	3.03	1.071	-.238	.134	-.714	.267
Attitude2	332	1	5	923	2.78	1.030	.134	.134	-.776	.267
Attitude3	332	1	5	1199	3.61	.928	-.980	.134	.882	.267
P_Norm1	332	1	5	1263	3.80	.880	-1.080	.134	1.448	.267
P_Norm2	332	1	5	991	2.98	.957	-.136	.134	-.514	.267
P_Norm3	332	1	5	1059	3.19	1.030	-.320	.134	-.691	.267
P_Norm4	332	1	5	1188	3.58	1.064	-.486	.134	-.529	.267
S_Norm1	332	1	5	902	2.72	.948	.100	.134	-.624	.267
S_Norm2	332	1	5	886	2.67	1.028	.111	.134	-.776	.267
S_Norm3	332	1	5	873	2.63	1.013	.144	.134	-.734	.267
S_Norm4	332	1	5	995	3.00	1.081	-.297	.134	-.837	.267
Relatedness1	332	1	5	1123	3.38	.993	-.565	.134	-.294	.267
Relatedness2	332	1	5	1087	3.27	.949	-.572	.134	-.192	.267
Relatedness3	332	1	5	1059	3.19	.985	-.426	.134	-.578	.267
Relatedness4	332	1	5	1070	3.22	.989	-.516	.134	-.499	.267
Emotion_E1	332	1	5	987	2.97	.934	-.035	.134	-.510	.267

Emotion_E2	332	1	5	1046	3.15	.953	**-.369**	.134	**-.675**	.267
Emotion_E3	332	1	5	1018	3.07	.907	**-.205**	.134	**-.613**	.267
Emotion_E4	332	1	5	961	2.89	.925	**.027**	.134	**-.680**	.267
Dependency1	332	1	5	994	2.99	1.046	**-.131**	.134	**-.896**	.267
Dependency2	332	1	5	911	2.74	1.048	**.179**	.134	**-.826**	.267
Dependency3	332	1	5	923	2.78	1.095	**.056**	.134	**-.909**	.267
Dependency4	332	1	5	898	2.70	1.141	**.156**	.134	**-1.050**	.267
Addiction_Salience1	332	1	5	780	2.35	1.071	**.500**	.134	**-.418**	.267
Addiction_Salience2	332	1	5	660	1.99	1.088	**.887**	.134	**-.101**	.267
Addiction_Salience3	332	1	5	776	2.34	1.116	**.407**	.134	**-.724**	.267
Addiction_Tolerance1	332	1	5	1005	3.03	1.264	**-.132**	.134	**-.949**	.267
Addiction_Tolerance2	332	1	5	834	2.51	1.162	**.284**	.134	**-.822**	.267
Addiction_Tolerance3	332	1	5	752	2.27	1.143	**.687**	.134	**-.287**	.267
Addiction_Mood_Modification1	332	1	5	852	2.57	1.219	**.223**	.134	**-.933**	.267
Addiction_Mood_Modification2	332	1	5	807	2.43	1.218	**.288**	.134	**-1.052**	.267
Addiction_Mood_Modification3	332	1	5	884	2.66	1.192	**.084**	.134	**-.952**	.267
Addiction_Relapse1	332	1	5	708	2.13	1.171	**.761**	.134	**-.389**	.267
Addiction_Relapse2	332	1	5	763	2.30	1.142	**.523**	.134	**-.604**	.267
Addiction_Relapse3	332	1	5	769	2.32	1.150	**.462**	.134	**-.775**	.267
Addiction_Withdrawal1	332	1	5	631	1.90	1.034	**.960**	.134	**.191**	.267
Addiction_Withdrawal2	332	1	5	623	1.88	1.077	**1.197**	.134	**.779**	.267
Addiction_Withdrawal3	332	1	5	675	2.03	1.086	**.702**	.134	**-.507**	.267
Addiction_Conflict1	332	1	5	710	2.14	1.189	**.740**	.134	**-.380**	.267

Addiction_Conflict2	332	1	5	716	2.16	1.221	**.748**	.134	**-.451**	.267
Addiction_Conflict3	332	1	5	625	1.88	1.052	**.988**	.134	**.082**	.267
Self_Regulation1	332	1	5	1084	3.27	1.182	**-.239**	.134	**-.654**	.267
Self_Regulation2	332	1	5	1098	3.31	1.172	**-.345**	.134	**-.572**	.267
Self_Regulation3	332	1	5	1018	3.07	1.488	**.008**	.134	**-1.374**	.267
Self_Regulation4	332	1	5	836	2.52	1.447	**.449**	.134	**-1.140**	.267
Self_Regulation5	332	1	5	974	2.93	1.500	**.038**	.134	**-1.412**	.267
Self_Regulation6	332	1	5	971	2.92	1.208	**.042**	.134	**-.642**	.267
Self_Regulation7	332	1	5	1038	3.13	1.156	**-.143**	.134	**-.554**	.267
Self_Regulation8	332	1	5	895	2.70	1.306	**.250**	.134	**-.921**	.267
Self_Regulation9	332	1	5	849	2.56	1.277	**.375**	.134	**-.789**	.267
Self_Regulation10	332	1	5	992	2.99	1.315	**-.026**	.134	**-1.005**	.267
Self_Regulation11	332	1	5	1072	3.23	1.237	**-.192**	.134	**-.798**	.267
Self_Regulation12	332	1	5	1066	3.21	1.359	**-.169**	.134	**-1.140**	.267
Self_Regulation13	332	1	5	941	2.83	1.342	**.094**	.134	**-1.133**	.267
Self_Regulation14	332	1	5	964	2.90	1.322	**.092**	.134	**-1.036**	.267
Self_Regulation15	332	1	5	977	2.94	1.319	**.011**	.134	**-1.036**	.267
Self_Regulation16	332	1	5	1093	3.29	1.329	**-.285**	.134	**-1.000**	.267
Self_Regulation17	332	1	5	841	2.53	1.382	**.431**	.134	**-1.028**	.267
Self_Regulation18	332	1	5	1170	3.52	1.396	**-.529**	.134	**-.961**	.267
Self_Regulation19	332	1	5	953	2.87	1.368	**.100**	.134	**-1.156**	.267
Self_Regulation20	332	1	5	1029	3.10	1.209	**-.120**	.134	**-.720**	.267
Self_Regulation21	332	1	5	952	2.87	1.227	**-.002**	.134	**-.883**	.267

Self_Regulation22	332	1	5	1057	3.18	1.153	**-.197**	.134	**-.555**	.267
Self_Regulation23	332	1	5	927	2.79	1.292	**.173**	.134	**-.938**	.267
Self_Regulation24	332	1	5	1122	3.38	1.301	**-.342**	.134	**-.860**	.267
Self_Regulation25	332	1	5	1135	3.42	1.283	**-.388**	.134	**-.802**	.267
Self_Regulation26	332	1	5	1174	3.54	1.190	**-.514**	.134	**-.425**	.267
Self_Regulation27	332	1	5	1167	3.52	1.200	**-.515**	.134	**-.445**	.267
Self_Regulation28	332	1	5	1150	3.46	1.227	**-.518**	.134	**-.550**	.267
Self_Regulation29	332	1	5	1117	3.36	1.215	**-.382**	.134	**-.610**	.267
Self_Regulation30	332	1	5	1132	3.41	1.166	**-.326**	.134	**-.557**	.267
Self_Regulation31	332	1	5	1111	3.35	1.223	**-.428**	.134	**-.616**	.267
Self_Regulation32	332	1	5	1085	3.27	1.191	**-.239**	.134	**-.621**	.267
Self_Regulation33	332	1	5	1125	3.39	1.125	**-.373**	.134	**-.366**	.267
Self_Regulation34	332	1	5	1123	3.38	1.266	**-.363**	.134	**-.803**	.267

Appendix 12: Overall Structural Model with Factor Loadings (SMARTPLS 3)
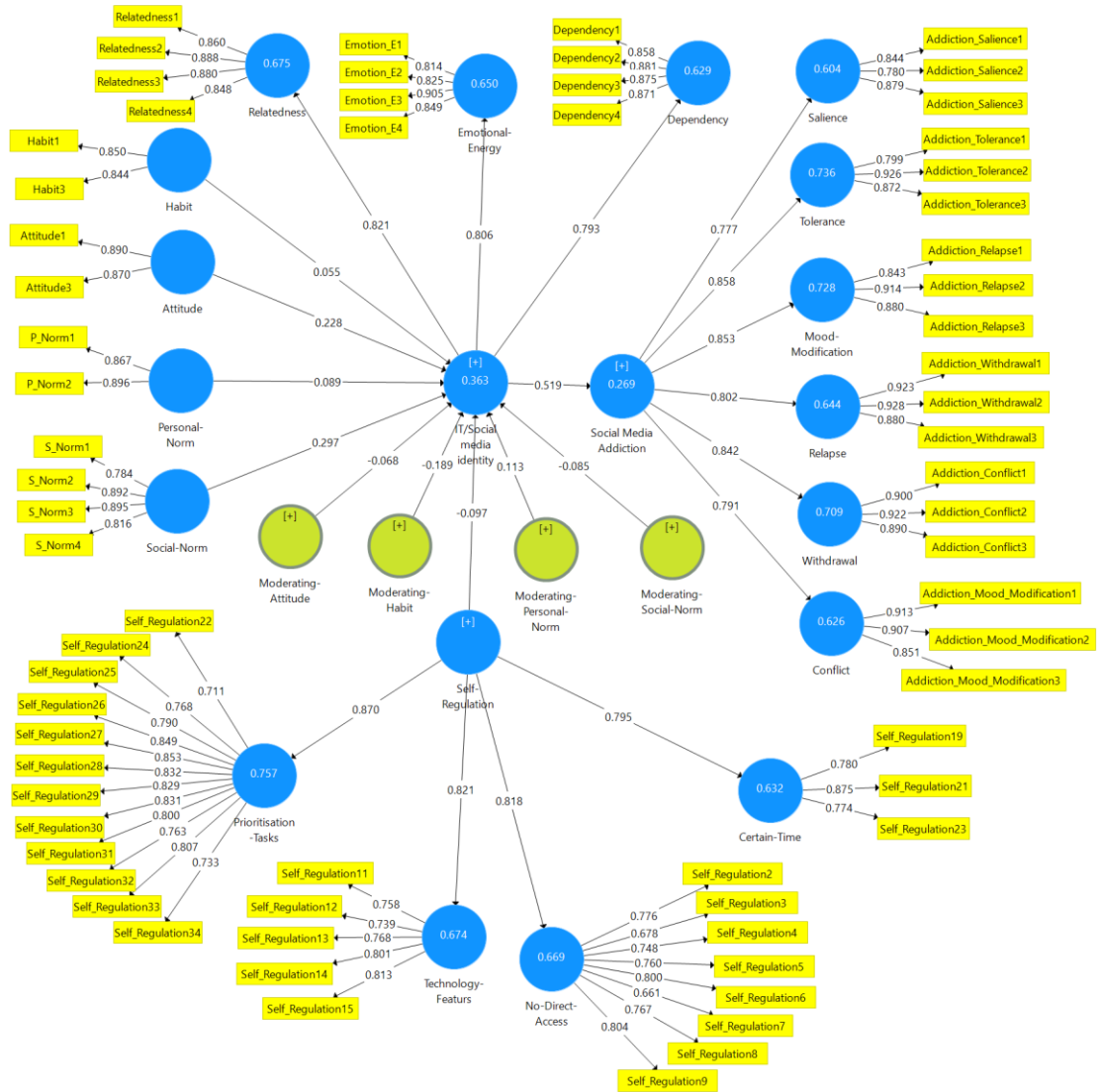
Appendix 14: Structural Model Analysis (Hypotheses Test)

Path	Path Coefficient	Standard Deviation (STDEV)	T Statistics	P Values	Confidence Interval Bias Corrected	
					5 % (Lower level)	95% (Higher Level)
Attitude -> IT/Social media identity	**0.228**	**0.055**	**4.127**	**0**	**0.133**	**0.315**
Habit -> IT/Social media identity	**0.055**	**0.055**	**1**	**0.159**	**-0.034**	**0.148**
IT/Social media identity -> Dependency	0.793	0.026	30.311	0	0.746	0.832
IT/Social media identity -> Emotional-Energy	0.806	0.027	29.93	0	0.751	0.843
IT/Social media identity -> Relatedness	0.821	0.025	32.681	0	0.774	0.857
IT/Social media identity -> Social Media Addiction	**0.519**	**0.042**	**12.282**	**0**	**0.444**	**0.585**
Moderating-Attitude -> IT/Social media identity	-0.068	0.114	0.595	0.276	-0.247	0.112
Moderating-Habit -> IT/Social media identity	-0.189	0.181	1.04	0.149	-0.334	0.098
Moderating-Personal-Norm -> IT/Social media identity	0.113	0.112	1.008	0.157	0.015	0.399
Moderating-Social-Norm -> IT/Social media identity	-0.085	0.176	0.48	0.316	-0.303	0.245
Personal-Norm -> IT/Social media identity	**0.089**	**0.064**	**1.392**	**0.082**	**-0.003**	**0.211**
Self-Regulation -> Certain-Time	0.795	0.025	32.182	0	0.749	0.83
Self-Regulation -> IT/Social media identity	**-0.097**	**0.053**	**1.852**	**0.032**	**-0.184**	**-0.015**
Self-Regulation -> No-Direct-Access	0.818	0.026	31.48	0	0.763	0.852
Self-Regulation -> Prioritisation-Tasks	0.87	0.017	49.913	0	0.833	0.892
Self-Regulation -> Technology-Features	0.821	0.023	34.981	0	0.775	0.853
Social Media Addiction -> Conflict	0.791	0.022	35.176	0	0.751	0.824
Social Media Addiction -> Mood-Modification	0.853	0.017	50.254	0	0.822	0.877
Social Media Addiction -> Relapse	0.802	0.022	36.079	0	0.761	0.835
Social Media Addiction -> Salience	0.777	0.028	28.004	0	0.729	0.823
Social Media Addiction -> Tolerance	0.858	0.015	55.866	0	0.831	0.88

Social Media Addiction -> Withdrawal	0.842	0.017	49.079	0	0.811	0.867
Social-Norm -> IT/Social media identity	**0.297**	**0.058**	**5.16**	**0**	**0.192**	**0.382**
Self-Regulation -> IT/Social media identity -> Social Media Addiction	**-0.051**	**0.028**	**1.83**	**0.034**	**-0.097**	**-0.009**
Moderating-Social-Norm -> IT/Social media identity -> Social Media Addiction -> Withdrawal	-0.037	0.077	0.479	0.316	-0.134	0.105
Moderating-Social-Norm -> IT/Social media identity -> Dependency	-0.067	0.14	0.479	0.316	-0.24	0.193
Moderating-Social-Norm -> IT/Social media identity -> Social Media Addiction -> Mood-Modification	-0.037	0.078	0.479	0.316	-0.135	0.105
IT/Social media identity -> Social Media Addiction -> Relapse	0.416	0.038	11	0	0.352	0.477
Moderating-Habit -> IT/Social media identity -> Social Media Addiction	**-0.098**	**0.093**	**1.046**	**0.148**	**-0.179**	**0.045**
Attitude -> IT/Social media identity -> Relatedness	0.188	0.046	4.111	0	0.107	0.257
Moderating-Attitude -> IT/Social media identity -> Social Media Addiction -> Conflict	-0.028	0.047	0.596	0.276	-0.104	0.046
Self-Regulation -> IT/Social media identity -> Social Media Addiction -> Withdrawal	-0.043	0.023	1.829	0.034	-0.083	-0.008
Personal-Norm -> IT/Social media identity -> Social Media Addiction -> Tolerance	0.039	0.029	1.374	0.085	-0.001	0.092
Attitude -> IT/Social media identity -> Social Media Addiction -> Mood-Modification	0.101	0.026	3.89	0	0.06	0.145
Moderating-Habit -> IT/Social media identity -> Relatedness	-0.155	0.149	1.041	0.149	-0.28	0.084
Attitude -> IT/Social media identity -> Social Media Addiction -> Salience	0.092	0.024	3.809	0	0.053	0.131
Moderating-Attitude -> IT/Social media identity -> Relatedness	-0.056	0.093	0.596	0.276	-0.201	0.092
Social-Norm -> IT/Social media identity -> Dependency	0.235	0.047	5.025	0	0.148	0.305
Moderating-Social-Norm -> IT/Social media identity -> Social Media Addiction	**-0.044**	**0.091**	**1.617**	**0.02**	**-0.159**	**-0.123**
IT/Social media identity -> Social Media Addiction -> Withdrawal	0.437	0.038	11.578	0	0.375	0.499
Social-Norm -> IT/Social media identity -> Emotional-Energy	0.239	0.047	5.043	0	0.152	0.307
Moderating-Habit -> IT/Social media identity -> Social Media Addiction -> Withdrawal	-0.082	0.079	1.045	0.148	-0.145	0.035
Habit -> IT/Social media identity -> Social Media Addiction -> Relapse	0.023	0.023	0.997	0.16	-0.014	0.062
Social-Norm -> IT/Social media identity -> Social Media Addiction -> Salience	0.12	0.029	4.176	0	0.075	0.168
Moderating-Personal-Norm -> IT/Social media identity -> Social Media Addiction -> Withdrawal	0.049	0.049	1.008	0.157	0.01	0.162
Attitude -> IT/Social media identity -> Social Media Addiction -> Withdrawal	0.1	0.026	3.892	0	0.058	0.14
Personal-Norm -> IT/Social media identity -> Social Media Addiction -> Mood-Modification	0.039	0.028	1.375	0.085	-0.001	0.092
Attitude -> IT/Social media identity -> Social Media Addiction -> Relapse	0.095	0.024	3.902	0	0.056	0.135
Habit -> IT/Social media identity -> Social Media Addiction -> Tolerance	0.024	0.025	0.994	0.16	-0.015	0.066
Self-Regulation -> IT/Social media identity -> Dependency	-0.077	0.042	1.841	0.033	-0.148	-0.013

Moderating-Social-Norm -> IT/Social media identity -> Emotional-Energy	-0.068	0.142	0.48	0.316	-0.244	0.193
Moderating-Personal-Norm -> IT/Social media identity -> Social Media Addiction	**0.059**	**0.058**	**1.008**	**0.157**	**0.011**	**0.197**
Attitude -> IT/Social media identity -> Social Media Addiction -> Tolerance	0.102	0.026	3.916	0	0.059	0.144
Personal-Norm -> IT/Social media identity -> Emotional-Energy	0.071	0.052	1.384	0.083	0	0.174
Self-Regulation -> IT/Social media identity -> Emotional-Energy	-0.079	0.042	1.855	0.032	-0.148	-0.013
Moderating-Attitude -> IT/Social media identity -> Social Media Addiction -> Mood-Modification	-0.03	0.05	0.596	0.276	-0.112	0.049
Moderating-Social-Norm -> IT/Social media identity -> Social Media Addiction -> Conflict	-0.035	0.072	0.479	0.316	-0.124	0.099
Habit -> IT/Social media identity -> Emotional-Energy	0.044	0.044	0.998	0.159	-0.029	0.118
Moderating-Attitude -> IT/Social media identity -> Social Media Addiction -> Withdrawal	-0.03	0.05	0.595	0.276	-0.111	0.048
Moderating-Social-Norm -> IT/Social media identity -> Relatedness	-0.069	0.145	0.48	0.316	-0.248	0.198
Moderating-Habit -> IT/Social media identity -> Emotional-Energy	-0.152	0.146	1.038	0.15	-0.276	0.082
Moderating-Attitude -> IT/Social media identity -> Social Media Addiction -> Salience	-0.027	0.046	0.595	0.276	-0.103	0.044
Moderating-Habit -> IT/Social media identity -> Social Media Addiction -> Conflict	-0.077	0.074	1.042	0.149	-0.143	0.029
Moderating-Social-Norm -> IT/Social media identity -> Social Media Addiction -> Relapse	-0.035	0.073	0.479	0.316	-0.128	0.1
Social-Norm -> IT/Social media identity -> Relatedness	0.244	0.048	5.051	0	0.154	0.313
Moderating-Social-Norm -> IT/Social media identity -> Social Media Addiction -> Salience	-0.034	0.071	0.478	0.316	-0.123	0.097
Moderating-Attitude -> IT/Social media identity -> Dependency	-0.054	0.09	0.595	0.276	-0.197	0.09
Attitude -> IT/Social media identity -> Social Media Addiction -> Conflict	0.094	0.024	3.868	0	0.055	0.134
Personal-Norm -> IT/Social media identity -> Social Media Addiction -> Salience	0.036	0.026	1.363	0.087	-0.001	0.085
Self-Regulation -> IT/Social media identity -> Relatedness	-0.08	0.044	1.834	0.033	-0.152	-0.012
Personal-Norm -> IT/Social media identity -> Dependency	0.07	0.05	1.396	0.082	-0.002	0.168
Moderating-Habit -> IT/Social media identity -> Social Media Addiction -> Mood-Modification	-0.083	0.08	1.044	0.148	-0.177	0.029
Moderating-Personal-Norm -> IT/Social media identity -> Social Media Addiction -> Relapse	0.047	0.047	1.007	0.157	0.009	0.154
Personal-Norm -> IT/Social media identity -> Social Media Addiction -> Conflict	0.036	0.027	1.37	0.086	-0.001	0.086
Habit -> IT/Social media identity -> Dependency	0.044	0.044	1.002	0.158	-0.028	0.116
Attitude -> IT/Social media identity -> Emotional-Energy	0.184	0.046	4.007	0	0.106	0.254
Moderating-Habit -> IT/Social media identity -> Social Media Addiction -> Relapse	-0.078	0.075	1.045	0.148	-0.141	0.028
Habit -> IT/Social media identity -> Relatedness	0.045	0.045	0.996	0.16	-0.028	0.124
Habit -> IT/Social media identity -> Social Media Addiction -> Withdrawal	0.024	0.024	0.996	0.16	-0.015	0.064

Habit -> IT/Social media identity -> Social Media Addiction	**0.029**	**0.029**	**0.996**	**0.16**	**-0.018**	**0.076**
IT/Social media identity -> Social Media Addiction -> Mood-Modification	0.442	0.038	11.544	0	0.379	0.504
Habit -> IT/Social media identity -> Social Media Addiction -> Conflict	0.023	0.023	0.995	0.16	-0.014	0.061
Moderating-Habit -> IT/Social media identity -> Social Media Addiction -> Salience	-0.076	0.073	1.045	0.148	-0.166	0.026
Social-Norm -> IT/Social media identity -> Social Media Addiction	**0.154**	**0.035**	**4.383**	**0**	**0.094**	**0.21**
Moderating-Personal-Norm -> IT/Social media identity -> Emotional-Energy	0.091	0.091	1.006	0.157	0.011	0.306
Social-Norm -> IT/Social media identity -> Social Media Addiction -> Tolerance	0.132	0.031	4.325	0	0.081	0.181
Moderating-Habit -> IT/Social media identity -> Dependency	-0.15	0.143	1.043	0.149	-0.275	0.075
Moderating-Social-Norm -> IT/Social media identity -> Social Media Addiction -> Tolerance	-0.038	0.078	0.479	0.316	-0.135	0.105
Self-Regulation -> IT/Social media identity -> Social Media Addiction -> Conflict	-0.04	0.022	1.823	0.034	-0.078	-0.007
Moderating-Personal-Norm -> IT/Social media identity -> Social Media Addiction -> Mood-Modification	0.05	0.05	1.009	0.157	0.009	0.165
Moderating-Attitude -> IT/Social media identity -> Social Media Addiction	**-0.035**	**0.059**	**1.66**	**0.04**	**-0.131**	**-0.057**
Self-Regulation -> IT/Social media identity -> Social Media Addiction -> Mood-Modification	-0.043	0.024	1.825	0.034	-0.085	-0.008
Self-Regulation -> IT/Social media identity -> Social Media Addiction -> Salience	-0.039	0.021	1.83	0.034	-0.075	-0.007
Attitude -> IT/Social media identity -> Social Media Addiction	**0.118**	**0.03**	**3.929**	**0**	**0.069**	**0.167**
Moderating-Attitude -> IT/Social media identity -> Emotional-Energy	-0.055	0.092	0.593	0.277	-0.2	0.093
Moderating-Personal-Norm -> IT/Social media identity -> Relatedness	0.093	0.092	1.009	0.157	0.011	0.324
Moderating-Personal-Norm -> IT/Social media identity -> Social Media Addiction -> Tolerance	0.05	0.05	1.008	0.157	0.008	0.17
Social-Norm -> IT/Social media identity -> Social Media Addiction -> Conflict	0.122	0.028	4.282	0	0.075	0.168
IT/Social media identity -> Social Media Addiction -> Salience	0.403	0.041	9.862	0	0.337	0.47
IT/Social media identity -> Social Media Addiction -> Conflict	0.41	0.038	10.921	0	0.346	0.471
Habit -> IT/Social media identity -> Social Media Addiction -> Mood-Modification	0.024	0.025	0.992	0.161	-0.015	0.065
Moderating-Attitude -> IT/Social media identity -> Social Media Addiction -> Relapse	-0.028	0.047	0.596	0.276	-0.105	0.045
Social-Norm -> IT/Social media identity -> Social Media Addiction -> Withdrawal	0.13	0.03	4.344	0	0.079	0.178
Self-Regulation -> IT/Social media identity -> Social Media Addiction -> Tolerance	-0.043	0.024	1.83	0.034	-0.083	-0.008
Personal-Norm -> IT/Social media identity -> Social Media Addiction -> Withdrawal	0.039	0.028	1.374	0.085	-0.001	0.093
Attitude -> IT/Social media identity -> Dependency	0.181	0.044	4.073	0	0.107	0.253
Self-Regulation -> IT/Social media identity -> Social Media Addiction -> Relapse	-0.041	0.022	1.832	0.034	-0.079	-0.007
Social-Norm -> IT/Social media identity -> Social Media Addiction -> Mood-Modification	0.131	0.03	4.353	0	0.08	0.178

Moderating-Personal-Norm -> IT/Social media identity -> Dependency	0.09	0.089	1.009	0.157	0.011	0.295
Personal-Norm -> IT/Social media identity -> Social Media Addiction -> Relapse	0.037	0.027	1.367	0.086	0	0.09
Habit -> IT/Social media identity -> Social Media Addiction -> Salience	0.022	0.022	0.994	0.16	-0.013	0.06
Moderating-Attitude -> IT/Social media identity -> Social Media Addiction -> Tolerance	-0.03	0.051	0.596	0.276	-0.113	0.049
Social-Norm -> IT/Social media identity -> Social Media Addiction -> Relapse	0.123	0.029	4.308	0	0.075	0.168
Moderating-Habit -> IT/Social media identity -> Social Media Addiction -> Tolerance	-0.084	0.08	1.045	0.148	-0.152	0.034
Personal-Norm -> IT/Social media identity -> Social Media Addiction	**0.046**	**0.033**	**1.377**	**0.084**	**-0.001**	**0.108**
Personal-Norm -> IT/Social media identity -> Relatedness	0.073	0.053	1.384	0.083	-0.003	0.174
Moderating-Personal-Norm -> IT/Social media identity -> Social Media Addiction -> Salience	0.046	0.045	1.004	0.158	0.008	0.157
IT/Social media identity -> Social Media Addiction -> Tolerance	0.445	0.039	11.517	0	0.38	0.504
Moderating-Personal-Norm -> IT/Social media identity -> Social Media Addiction -> Conflict	0.046	0.046	1.008	0.157	0.008	0.155

Appendix 15: Identified Codes, Categories, Sub-theme and Themes from Data Analysis

Codes	Categories/	Sub-theme	Theme	Main Theme
Monitoring daily professional responsibilities	Monitoring the list of daily tasks/responsibilities	Monitoring the deadline for the main tasks or responsibilities	Self-monitoring	Self-regulation
Monitoring work times/hours				
Monitoring daily program				
Monitoring daily tasks				
Monitoring the time allocated to tasks of personal life	Monitoring the allocated time to the main responsibilities			
Monitoring the time allocated to tasks of professional life				
Monitoring assessments due dates	Monitoring assessment' or projects' due dates			
Monitoring project deadlines				
Monitoring allocated time for using Instagram	Monitoring the allocated time for using Instagram	Monitoring Instagram usage time		
Monitoring time spent on Instagram	Monitoring the time spent on Instagram			
Monitoring Instagram daily usage				
Monitoring the comparison between the time spent by yourself on Instagram and your peers' in the same period of time	Monitoring the comparison between the time spent by an individual on Instagram and her/his peers'			
Considering family time	Monitoring the allocated time to family or friends	Monitoring the allocated time to family or friends		
Considering presence of family members				
Considering friends time				
Paying attention to the time spent on Instagram, or wasting that one	Being a punctual person or a procrastinator one		Self-judgment	

		Being a successful person or an ordinary one		
Punctual person or a time loser				
Punctual person or a procrastinator one				
Excessive use of Instagram or natural usage				
Being a balanced person or an extreme one				
Being a successful student, or a failure one	Being a successful person or an ordinary one			
Passing exams successfully or failing				
Achievement or lack of achievement				
Being an expert person or an ordinary one				
Taking care of responsibilities or losing their completion	Being a responsible person or an irresponsible one			
Being a committed worker or a non-committal one				
Taking care of family or neglecting them	Becoming a careful family member or a careless one	Becoming a careful person or a careless one		
Being a good role model for children	Becoming a careful mother or a careless one			
Responsible mother or irresponsible one				
Caring the quality of job performance or neglecting that one	Caring the quality of performance or neglecting that one	Caring the quality of performance or neglecting that one		
Avoiding to being blamed for low quality of performance				
Caring the quality of communication or neglecting that one	Caring the quality of communication or neglecting that one			
Having respectful communication behavior or indifferent				
Having high quality and interesting social interaction or a poor one				
Having intimate social interactions or an annoying one				
Putting away the phone	Putting the phone somewhere else		Self-reaction	

Putting the phone in a locker		No direct access to Instagram		
Putting the phone in a drawer				
Putting the phone in a bag				
Putting the phone in another place				
Putting the phone in another room				
Removing the phone from sight				
Giving the phone to someone else during work time	Giving the control of the phone to someone else			
Setting password by someone else				
Moving to somewhere else without internet service	Turning off the internet service	Cutting off the internet access		
Turning off Wi-Fi				
Turning off the mobile data				
Activating airplane mode				
Turning off the phone	Turning off the electronic device			
Turning off tablet				
Deleting Instagram app	Stopping access to Instagram	Stopping access to Instagram		
Deactivating Instagram account				
Setting time limits	Setting a certain time to stop Instagram	Setting a certain time to stop Instagram		
Setting Instagram timer to be stopped				
Blocking the screen by calling "time out" feature				
Activating the "Do Not Disturb" mode				
Silencing the phone	Blocking audio disturbance	Blocking audio disturbance		
Muting notifications				

Working out rather than using Instagram Doing physical activity rather than using Instagram	Replacing Instagram use with physical activities	Replacing Instagram use with physical activities		
Competing with peers for not using Instagram excessively Going to an encouraging environment to study or work Joining to group-study for preventing interruptions	Applying external motivations to stop Instagram use	Applying external motivations to stop Instagram use		

Appendix 16: Meaning unit, Condensed meaning unit, Code and Category

Meaning unit	Condensed meaning unit	Code	Category
I always make sure to first take care of my responsibilities. My main responsibilities in both my personal and professional life have the highest priority in my daily life. Once I finish my main works if I find any free time then start searching my Instagram. If I notice that, I am wasting my time and has no advantage for me, I put away my phone and never check my Instagram in rest of the day.	Checking main responsibilities and free time	Monitoring daily responsibilities	Self-monitoring
	Understanding of non-receipt of advantages and time wasting	Achievement or lack of achievement Paying attention to time, not wasting it	Self-judgment
	Putting away phone	Putting away phone	Self-reaction
I always check my exams calendar, then I delete the social media apps during the exam season. This is because it is really important for me to get high distinction marks. I always talk to myself if I ignore my Instagram and focus on my assessment to successfully pass them I will have a deep happiness rather than Intermittent entertainment without losing my priorities.	Checking the exams calendar	Checking assessments dates	Self-monitoring
	Having Intermittent entertainments or focusing on academic training	Being a successful student, not a failure one	Self-judgment
	Deleting the social media apps during the exam season.	Deleting Instagram	Self-reaction
I tell myself about my priorities, which are a combination of work, and family life. then I tell myself that it is not the right time for checking my Instagram and YouTube if. I tell myself, "Put this away!"	Thinking about the importance of main responsibilities	Taking care of responsibilities or losing their completion	Self-judgment
	Thinking about the importance of family	Taking caring of family or ignoring them	Self-judgment
	Putting away phone	Putting away phone	Self-reaction
I like to check my Instagram, and other social media platforms in my	Checking time spent on Instagram	Time limitation	Self-monitoring

me-time, the time I use to rest and relax. However, I have been always careful not to overuse social media.	Checking for not excessive usage	Excessive use of Instagram or natural usage	Self-judgment
When I have exams, I know that is more important to me to pass my exams, and then I can come back on Instagram, when exams are done.	Thinking about the importance of exams	Passing exams successfully or failing them	Self-judgment
I always record the timetable of my professional duties through my e-calendar. The calendar notifications remind me that I have important things to do, which pushes me to stop surfing Instagram.	Monitoring the calendar of professional duties	Monitoring work time	Self-monitoring
I tend to get distracted so easily, so if I need go check my phone for one thing, I forget about what I had to check and I go scrolling through Instagram. I think like turning my phone off or getting my phone out of the room that I'm in are the only things that really helps me to stop my Instagram usage.	Turning off the mobile phone	Turning off the phone	Self-reaction
	Getting the phone out of the room	Putting the phone in another place	Self-reaction
I set a limit on my Instagram reels; whenever I exceed the limit, it sends me notifications and I stop. Those reels are really addictive.	Setting time limitation and notification	Setting Time limits	Self-reaction
	Receiving notification in excessive usage	Not to excessive use	Self-judgment
When I use my mobile phone to check my Instagram, I notice that my daughter is following me and she use her mobile phone as well. I want to be a good role model for her; it is always a strong reminder for me and makes me to put my phone away immediately. I turn off my Wi-Fi.	Observing your children's behaviour while you are busy with your Instagram	Observing the effect of parents' behavioural patterns on children	Self-monitoring
	Being a good role model for children or misleading them	Being a good role model for children	Self-judgment
	Turning off Wi-Fi	Turning off Wi-Fi	Self-reaction
I also set a password for that, and the password I don't know because actually my husband set it! If I	Setting password by someone else	Blocking phone	Self-reaction

know the password, it's very tempting to use the password to bypass the system.			
I would like to compete with my peers in terms of the length of time that we spend on Instagram. we always monitor our usage and compare it with each other. The winner is the one who spent less time on Instagram .Some of my peers who spend less time on social media motivate me to stop my Instagram use.	Recording usages time	Checking usage time	<mark>Self-monitoring</mark>
	Competing with peers in terms of usage time	Competition in low use	<mark>Self-judgment</mark>
When I am with my family, I remind myself that it is family time; we need to eat and talk to each other, so we leave our phone out and then just talk to each other until at least we finish our food.	Checking family and eating time	Family time	<mark>Self-monitoring</mark>
	Reminding the importance of family and eating time	The importance of family time The importance of eating time	<mark>Self-judgment</mark>
I consider all my main responsibilities, my family and friends times, and I always talk to myself that if I spend my time on Instagram the quality of my work and communication will be dropped. Therefore, I put away my phone somewhere else and I do not check my Instagram while I am doing my job or I am with my friends or family.	Considering main responsibilities, family and friend times	Monitoring work time, family time, and friends time	<mark>Self-monitoring</mark>
	Giving importance to the quality of work and communication	Paying attention to the quality of job performance and communication or ignoring	<mark>Self-judgment</mark>
	Putting away phone somewhere else	No direct access	<mark>Self-reaction</mark>
It depends on how much work I have. If there is no deadline, if you're a free bird, like you have a month to complete a chapter, then I'm more on social media. But if there are some goals, like you have to complete marking, you have to do teaching, plus you have to	Monitoring deadline to complete teaching and learning tasks	Monitoring deadline	<mark>Self-monitoring</mark>
	Keeping phone away in another room	No direct access	<mark>Self-reaction</mark>

submit some abstracts, then I tell myself, like I keep my phone away from me, maybe in the bedroom.			
I have allocated a certain time to check my Instagram just to be a nice person by replying to my families and relatives' posts. I always focus on my main responsibilities and remind myself that this time is not an appropriate time to check my Instagram. So, I put away my phone.	Allocating certain time to check Instagram	Monitoring allocated time	<mark>Self-monitoring</mark>
	Reminding the priority of main responsibilities	Maintaining of quality of main tasks	<mark>Self-judgment</mark>
	Putting phone away	Stopping Instagram use	<mark>Self-reaction</mark>
I always check my daily plans, if I notice I have more important things to do, my work, family, or exercise, I never check my Instagram.	Checking daily plan	Checking daily plan	<mark>Self-monitoring</mark>
	Considering priority of work and family	Considering work quality and family time	<mark>Self-judgment</mark>
I spend more time on Instagram when I feel depressed and constantly visit celebrities' pages. When I realize that I have spent too much time on Instagram, I tell myself, you should stop using Instagram right now if you want to be successful person similar to these celebrities! Then I stop checking my Instagram by muting all my notifications.	Checking Instagram daily report	Monitoring daily usage	<mark>Self-monitoring</mark>
	Comparing yourself with successful and expert people	Being an expert person or an ordinary one	<mark>Self-judgment</mark>
	Muting Instagram notifications	Muting notifications	<mark>Self-reaction</mark>
	Setting Instagram daily time limit	Setting daily time limit	
I am using a feature called time-out, which can block my screen and turns of all notification on a specific time.	Calling "time out" feature to block the screen	Blocking the screen by calling "time out" feature	<mark>Self-reaction</mark>
I always consider my professional responsibilities, so when I am at work I prefer to focus on my job that's why I just use one of my two mobiles which has not been installed social media platforms on	Turning off Wi-Fi	Limiting Internet access	<mark>Self-reaction</mark>
	Focusing on professional responsibilities on work place	Being a committed worker or an underemployed one	<mark>Self-judgment</mark>

it. My second mobile connect to the internet just with my home Wi-Fi.			
When I am with my family, I always tell myself that your husband and your children are around and you should respect them and stop Instagram use. So, before my husband complains and asks me to stop using Instagram, I stop checking my social media! or, when I have something to do and I know that it is important, I stop using Instagram.	Considering presence of family members	Monitoring presence of family members	Self-monitoring
	Avoiding to being blamed by other family members	Avoiding to being blamed	Self-judgment
I allocate specific time to stop my social media platforms by calling "time out" feature, once that time is over then I stop my Instagram use. Once I spend a lot of time in Instagram, I feel guilty about being too engaged in Instagram and forgetting my children, then I stop using social media.	Allocation specific time	Monitoring allocated time	Self-monitoring
	Feeling guilty for forgetting important responsibilities	Responsible mother or irresponsible one	Self-judgment
	Calling "time out" feature to block the screen	Blocking the screen	Self-reaction
When I excessively use Instagram, I feel guilty about it that I am wasting my time. I think to myself that I am an irresponsible and procrastinator person instead of on a punctual and responsible, while I should have devoted my time to my duties, I wasted it on Instagram	Feeling guilty for wasting time	Punctual or time loser	Self-judgment
I always list my daily tasks and I tick one by one the task done. To prevent excessive use of Instagram, I keep thinking that I have other responsibilities and I need to keep my body healthy. So, I do exercise or walk in the nature rather than spending my time on Instagram. I would like to keep a balance in my	Writing daily tasks	Checking daily tasks	Self-monitoring
	Keeping daily life balance	Being a balanced person or an extreme one	Self-judgment
	Doing exercise or walk in the nature	Physical activity rather than using Instagram	Self-reaction

daily life, I don't want to be an extremist.			
My preference is focusing on my life priorities such as my projects, research and work. I always consider the deadlines marked in my calendar. That is why, I just check my Instagram several minutes before bed time.	Recording the deadlines of all tasks, project and studies	Monitoring deadlines	<mark>Self-monitoring</mark>
	Considering the importance of deadlines	Punctual or procrastinator	<mark>Self-judgment</mark>
I always remind myself to regulate my Instagram usage. I always compare my own usage to someone else whose is one of my family members or a close friend that her/his usage is less than mine. This comparison motivates me to control the time I spend on Instagram.	Checking your time spent in Instagram and your peers' time	Monitoring the time spent by several users on Instagram in the same period of time	<mark>Self-monitoring</mark>
	Comparing the duration of using Instagram among some users	Winer or loser	<mark>Self-judgment</mark>
I usually put my phone in another room, to cut any access.	Putting phone in another room	No direct access	<mark>Self-reaction</mark>
When I have very important tasks, which must be done I a short time, I block my access by deleting Instagram to not having it on my phone for 6 months.	Deleting Instagram for a short period of time	Deleting Instagram	<mark>Self-reaction</mark>
I put my phone away, like in a locker when I am at work; I only use it when I go for lunch or break. When I am at home, I do not put it next to me.	Putting phone away	Putting phone in a locker	<mark>Self-reaction</mark>
I will either put my phone somewhere I can't see it, or I put it on "do not disturb" so I don't get notifications that distract me. I have used an app before. It has a timer. I set my phone timer for like an hour of study and then you get a 20-min break.	Placing the mobile where it cannot be seen	Removing the phone from sight	<mark>Self-reaction</mark>
	Muting notifications	Muting notifications	<mark>Self-reaction</mark>
	Setting phone timer for working times	Setting Instagram timer to be stopped	<mark>Self-reaction</mark>

When I am with people, I remind myself that it not a respectful behaviour to continuously check my phone, that's why I put away my phone.	Giving importance to the quality of communication	Considering the quality of communication	<mark>Self-monitoring</mark>
	Respecting others in communication time	Having respectful communication behaviour or indifferent	<mark>Self-judgment</mark>
When I want to focus on my assessment tasks, I prefer to put my phone on airplane mode, so like disconnecting my phone from the internet and helps me to stop using Instagram.	Active air plane mode	Activating airplane mode	<mark>Self-reaction</mark>
When I am at university I always put my phone on silent and also in my bag.	Putting the phone on silent mode	Silencing the phone	<mark>Self-reaction</mark>
	Putting the phone in a bag	Putting the phone in a bag	<mark>Self-reaction</mark>
I need internet access because of my research. When I have internet access, I have access to social media and it would be very difficult for me to control my Instagram usage. What works for me is putting my phone in another room, or just give it to my husband.	Putting away the phone	Giving the phone to someone else during work time	<mark>Self-reaction</mark>
If I decide to limit myself, based on the time required to do my important tasks or responsibilities, I do it by setting time limits through my iPhone screen time settings. I tell myself that I should not spend more than two hours on Instagram.	Setting time limits through iPhone screen time settings	Setting time limits	<mark>Self-reaction</mark>
When I want to focus on assignments and exams, I put it completely on silent and away from myself, so that's I don't hear the "dinging" of the notifications or have it within my reach so I can easily get on it.	Putting the phone on silent mode	Silencing the phone	<mark>Self-reaction</mark>
	Putting the phone in another room	Putting away the phone	<mark>Self-reaction</mark>

I always put my phone on 'do not disturb' mode after ten o'clock, and I get no notification, so I don't check my phone	Setting a certain time to block the phone	Monitoring a certain time	<mark>Self-monitoring</mark>
	Activating the "Do Not Disturb" mode at a certain time	Activating the "Do Not Disturb" mode	<mark>Self-reaction</mark>
Sometimes my husband and I decide to go camping where does not have any receptions, only to get detached from our phones.	Going to somewhere without Internet service	Moving to places having no internet access	<mark>Self-reaction</mark>
When I'm working, I could easily be distracted, so I put my phone in a drawer or another room.	Putting the phone in a drawer	No direct access to the phone	<mark>Self-reaction</mark>
When I want to control my Instagram usage, I prefer to being in an environment with other people, students, or my co-workers. It works for me as a mitigation strategy. for example, when I come to Uni, or library, I feel peer pressure or, that means once everybody is working, so I should work.	Joining other active groups to being more undertaking/engaged	Having Peer pressure	<mark>Self-reaction</mark>
	Going quiet areas to being more undertaking/engaged	Going to an encouraging environment to study or work	<mark>Self-reaction</mark>
I always like to join group sessions for focusing on my study. Because I think when someone is doing group work or group study, why not I be a part of it.	Joining other active groups to being more undertaking/engaged	Joining to group-study for preventing interruptions	<mark>Self-reaction</mark>
When I am in a library or my office and do not focusing on my task, I feel bad because I think that everyone knows that I am not working. This situation positively affects me to stop exploring my Instagram.	Giving importance to the judgment of others	Being a committed worker or a non-committal one	<mark>Self-judgment</mark>
I always care the time that I am with my friends. When I am communicating with my friends, I don't like the phone to interfere with my interactions with others.	Observing social interaction behavior	Quality of social behaviour	<mark>Self-monitoring</mark>
	Giving attention to the quality of social interactions	Having high quality and interesting social	<mark>Self-judgment</mark>

So, like, I am having lunch with my colleagues and I wouldn't be using the phone much, or dinner, or going out with friends. Because I am practicing that. When I am having dinner with someone and they constantly checking their phone, I would come back to the self-talk. I'll be like, I don't want to be that person who constantly checking their phone in their family times or when they are with their friends, because I am feeling annoyed		interaction or a poor one	
When I see that my parents and siblings are always on their phones, I realize that I shouldn't be on the phone as the same as them because it is very annoying behaviour not to pay attention to your family members during family time. I don't want to be on my phone while having lunch with my family.	Giving attention to the quality of intimate interactions of family members	Having intimate social interactions or an annoying one	<mark style="background-color:cyan">Self-judgment</mark>
I am using the Instagram timer, which is a feature on Instagram; you can set it to notify you if your daily usage exceeds a certain limit. If you go beyond the limit, you get a notification, stating that you have exceeded your limit.	Activating the Instagram timer	Setting time limits	<mark style="background-color:cyan">Self-judgment</mark>
I have a habit of writing down my goals on a piece of paper and sticking that paper on the wall of my research room. It always helps me to recall my goals. It could be a notification stating my purpose. I have experienced that when I am reminded of my goals, it has been more effective than other strategies	Writing goals and sticking them in a more visible place	Reminding of goals	<mark style="background-color:yellow">Self-monitoring</mark>

used for controlling my excessive usage of Instagram			
My phone clock has a feature that can be set for sleeping time. I am using this feature when I want to focus on my study. If I set it to 8 hours, and also set the starting time, the 8 Hours is considered my sleeping period and my phone automatically turns off at the starting time and turns back after 8 hours.	Using technology feature to turn off a phone	Setting time limits	Self-reaction