UNIVERSITI PUTRA MALAYSIA

INFLUENCE OF TECHNOLOGY ADDICTION, PSYCHOSOCIAL RISK FACTORS, TECHNOSTRESS, AND SELF-CONTROL ON THE PSYCHOLOGICAL WELL-BEING OF UNIVERSITY STUDENTS IN PAKISTAN

RUQIA SAFDAR BAJWA

FEM 2022 25

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By

RUQIA SAFDAR BAJWA

Thesis Submitted to the School of Graduate Studies, Universiti Putra Malaysia, in Fulfilment of the Requirements for the Degree of Doctor of Philosophy

August 2022

DEDICATION

This research work is dedicated to my beloved parents,
loving husband,
and adorable kids; Muhammad and Maryam,
for their endless support, tolerance, and sacrifices throughout
this research journey.

Abstract of thesis presented to the Senate of Universiti Putra Malaysia in fulfilment of the requirement for the degree of Doctor of Philosophy

INFLUENCE OF TECHNOLOGY ADDICTION, PSYCHOSOCIAL RISK FACTORS, TECHNOSTRESS, AND SELF-CONTROL ON THE PSYCHOLOGICAL WELL-BEING OF UNIVERSITY STUDENTS IN PAKISTAN

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August 2022

Chairman : Professor Haslinda binti Abdullah, PhD
Faculty : Human Ecology

Technology now reaches deep into our psyches and lives. Excessive technology use impacts human development and social functioning, and constant interaction with technology compromises psychological well-being. Previous empirical findings on the relationship between technology-related behaviors and psychological well-being are diverse and not explored. Based on the theoretical assumptions of Ryff's theory of Psychological Well-being and the Person-Technology Fit Model, the current correlational study determines the relationship between technology addiction (problematic internet use, smartphone addiction), psychosocial risk factors (phubbing, fear of missing out, loneliness, social phobia/anxiety, and social comparison), technostress, self-control, and psychological well-being among university students in Pakistan. It also investigates the direct effects of technology addiction and psychosocial risk factors on psychological well-being, the mediating role of technostress in the relationship between technology addiction, psychosocial risk factors, and psychological well-being, and the moderating effect of self-control on the relationship between technostress and psychological well-being. The study uses a multistage cluster random sampling method to collect data from two public sector universities in south Punjab, Pakistan. It involves 866 university students. The study administers a Problematic Internet Use Questionnaire, Smartphone Addiction Scale, Phubbing Scale, Fear of Missing Out Scale, Three-Item Loneliness Scale, Mini-Social Phobia Inventory, Scale for Social Comparison Orientation, Technostress Questionnaire, Brief Self-Control Scale, and Ryff's Psychological Well-Being Scale among the respondents through a web link in the virtual classrooms.

The results showed that problematic internet use, smartphone addiction, fear of missing out, loneliness, and social comparison were significantly associated with psychological well-being. In contrast, phubbing and social phobia/anxiety were not mainly related to

psychological well-being. Structural equation modeling demonstrated that technostress partially mediated the relationship between problematic internet use, smartphone addiction, fear of missing out, loneliness, and psychological well-being. In contrast, technostress fully mediated the relationship between social phobia/anxiety and psychological well-being. Nonetheless, it failed to function as a significant mediator in the relationship between phubbing and psychological well-being. Besides, self-control significantly moderated the relationship between technostress and psychological well-being. The current study highlighted the virtual social world's dynamics that considerably affect university students' psychological well-being. The present study provides valuable insights regarding the impact of technology addiction and its related psychosocial factors on psychological well-being and how self-control mitigates technostress. This study substantially contributed to the existing knowledge based on solid theoretical reasoning and enough empirical support. Current findings show significant implications for the field of study, theory, methodology, and policymakers.

Abstrak tesis yang dikemukakan kepada Senat Universiti Putra Malaysia sebagai memenuhi keperluan untuk ijazah Doktor Falsafah

PENGARUH KETAGIHAN TEKNOLOGI, FAKTOR RISIKO PSIKOSOSIAL, TEKANAN TEKNO DAN KAWALAN DIRI TERHADAP KESEJAHTERAAN PSIKOLOGI DALAM KALANGAN PELAJAR UNIVERSITI DI PAKISTAN

Oleh

RUQIA SAFDAR BAJWA

Ogos 2022

Pengerusi : Profesor Haslinda binti Abdullah, PhD
Fakulti : Ekologi Manusia

Teknologi telah meresap ke dalam jiwa dan kehidupan kita. Penggunaan teknologi yang berlebihan memberi kesan kepada pembangunan manusia dan fungsi sosial. Sementara interaksi berterusan dengan domain digital menjejaskan kesejahteraan psikologi. Pelbagai penemuan empirikal terdahulu mempamerkan hubungan antara tingkah laku yang berkaitan dengan teknologi dan kesejahteraan psikologi. Mekanisme asas dalam hubungan ini tidak diketahui secara menyeluruh. Berdasarkan andaian teori Ryff tentang Kesejahteraan Psikologi dan Manusia serta Model Kesesuaian Teknologi, kajian korelasi ini cuba mengesan hubungan antara ketagihan teknologi (penggunaan internet yang bermasalah, ketagihan telefon pintar), faktor risiko psikososial (debaran, takut kehilangan, kesepian, fobia atau kebimbangan sosial, dan perbandingan sosial), tekanan tekno, kawalan diri, dan kesejahteraan psikologi dalam kalangan pelajar universiti di Pakistan. Ia juga mengkaji kesan langsung ketagihan teknologi dan faktor risiko psikososial terhadap kesejahteraan psikologi, peranan pengantaraan tekanan tekno dalam hubungan antara ketagihan teknologi, faktor risiko psikososial, kesejahteraan psikologi, kesan sederhana kawalan diri terhadap hubungan antara tekanan tekno dan kesejahteraan psikologi. Kajian ini menggunakan kaedah persampelan rawak kluster pelbagai peringkat untuk mengumpul data dari dua universiti sektor awam di selatan Punjab, Pakistan. Ia melibatkan 866 pelajar universiti. Kajian ini ditadbir menggunakan Soal Selidik Penggunaan Internet bermasalah, Skala Ketagihan Telefon Pintar, Skala Debaran, Skala Takut Kehilangan, Skala Kesepian Tiga Item, Inventori fobia Mini-Sosial, Skala untuk Orientasi Perbandingan Sosial, Soal Selidik Tekanan Tekno, Skala Kawalan Diri Ringkas, dan Skala Kesejahteraan Psikologi Ryff dalam kalangan responden. Kajian dilaksanakan melalui pautan web di bilik darjah maya. Hasil kajian menunjukkan bahawa penggunaan internet yang bermasalah, ketagihan telefon pintar, ketakutan kehilangan, kesepian, dan perbandingan sosial dikaitkan dengan kesejahteraan psikologi. Sebaliknya, debaran dan fobia atau kebimbangan sosial tidak dikaitkan dengan kesejahteraan psikologi. Pemodelan persamaan struktur menunjukkan bahawa tekanan tekno sebahagiannya

menjadi perantara hubungan penggunaan internet yang bermasalah, ketagihan telefon pintar, ketakutan kehilangan, dan kesepian dengan kesejahteraan psikologi. Sebaliknya, tekanan tekno menjadi perantara sepenuhnya hubungan antara fobia sosial atau kebimbangan dan kesejahteraan psikologi. Walau bagaimanapun, ia gagal berfungsi sebagai pengantara penting dalam hubungan antara debaran dan kesejahteraan psikologi. Selain itu, kawalan diri dengan ketara menyederhanakan hubungan antara tekanan tekno dan kesejahteraan psikologi. Kajian semasa menekankan dinamika dunia sosial maya yang sangat mempengaruhi kesejahteraan psikologi pelajar universiti. Kajian ini memberikan pandangan yang berharga mengenai kesan ketagihan teknologi dan faktor psikososial yang berkaitan terhadap kesejahteraan psikologi dan bagaimana kawalan diri melindungi kesejahteraan psikologi. Kajian ini secara signifikan menyumbang kepada pengetahuan sedia ada berdasarkan pemikiran teori yang kukuh dan sokongan empirikal yang mencukupi. Penemuan semasa menunjukkan implikasi yang ketara dalam bidang kajian, teori, metodologi, dan penggubal dasar.

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First, I would like to show my sincere gratitude and appreciation to my first supervisor and committee chairperson, Professor Haslinda Binti Abdullah, for her continuous guidance, patience, support, encouragement, and valuable suggestions throughout the process of my doctoral program. I am so grateful for the freedom you provided me in this process while also walking alongside me to ensure my success. Your guidance helped me remain focused and realistic about my goals. I thank my committee members and co-supervisors, Professor Dr. Asnarulkhadi Abu Samah and Dr. Wan Munira Wan Jaafar, for their continuous input and valuable suggestions during my research plan. And their careful review of my draft and insightful comments contributed vastly to the development of this dissertation. I feel fortunate to have met and had a chance to work with three amazing academics who have inspired my love of research. I want to echo my special thanks to my parents for making me who I am today, a courageous and devoted person due to their upbringing and unconditional support. I would also love to thank my siblings, who have been my constant support system during my Ph.D. journey, from listening to my worries to taking care of my kids in my absence. I extend special gratitude to my sisters Kalsoom Safdar and Zanab Bajwa for their continuous backing and encouragement; both are always by my side in every phase of life. I would also like to thank my husband for always trusting and supporting me no matter what (even when it takes me across oceans)! Without your patience, encouragement, love, compassion, and care, this thesis would not have become a reality. I am also grateful to a few dear friends who always stood by my side in every thick and thin of my professional and academic journey.

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This thesis was submitted to the Senate of Universiti Putra Malaysia and has been accepted as fulfillment of the requirement for the award of degree of Doctor of Philosophy. The members of the Supervisory Committee were as follows:

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This is to confirm that:

- the research conducted and the writing of this thesis was under our supervision;
- supervision responsibilities as stated in the Universiti Putra Malaysia (Graduate Studies) Rules 2003 (Revision 2012-2013) are adhered to.

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α	Alpha
AVE	Average Variance Extracted
BSCS	Brief Self-Control Scale
BZU	Bahauddin Zakariya University
CA	Cronbach's Alpha
CR	Composite Reliability
FoMO	Fear of Missing Out
ICTs	Information and Communication Technologies
INCOM	Iowa-Netherlands Comparison Orientation Measure
IUB	Islamia University Bahawalpur
MS	Mini-SPIN
Mini SPIN	Mini Social Phobia Inventory
PIU	Problematic Internet Use
PLS	Partial Least Squares
PSU	Problematic Smartphone U
PWB	Psychological Well-Being
RPWB	Ryff's Psychological Well-Being
SA	Smartphone Addiction
SAD	Social Anxiety Disorder
SAS	Smartphone Addiction Scale
SCO	Social Comparison Orientation
SCS	Self-Control Scale
Self-C	Self-Control

SEM	Structural Equation Modelling
SPIN	Social Phobia Inventory
SWB	Subjective Well-being
SP	Social Phobia
TS	Technostress
UPM	University Putra Malaysia
VIF	Variance Inflation Factor
YDI	Youth Development Index

CHAPTER 1

INTRODUCTION

1.1 Introduction

This chapter enlightens the major components that directed this study, including the current study's background, a problem statement, research questions, objectives, hypotheses, and significance. Based on the theoretical background, the conceptual framework of the current study is presented**.** Operational and conceptual definitions of variables are presented, along with the study's limitations and layout of the rest of the chapters.

1.2 Background of the Study

In the South Asian region, Pakistan holds the youngest generation after Afghanistan. Sixty-four percent of Pakistan's total population is below the age of 29, whereas 30% lies between the ages of 15 to 29 years (Rahman, 2014). Pakistan will continue to be the youth's country for at least 30 years. Youth is the key pillar of any society, so it is important to enable them to unleash their true potential and become constructive for society (Najam & Yusuf, 2013).

The epochs of technological innovation are a major source of social transformations. Owing to the dynamic technological change, today's Information and Communication Technology (ICT) has the potential to contribute to human well-being (Miller et al., 1998). ICT usage is prevalent among contemporary youth, and it is imperative to understand the technological, social, and psychological impacts of ICT usage on psychological well-being (PWB) (Coleman et al., 2015). Psychological well-being explains an individual's healthy emotional state and better functioning in life. It is also considered a combination of functioning effectively and feeling good in life (Huppert, 2009). Researchers have elaborated that merely the absence of distress does not mean that person is high in psychological well-being. It is about doing well all the way and feeling happy, satisfied with life, well-supported, and capable that defines a man with a high level of PWB (Saunders et al., 2007).

A person cannot experience ultimate well-being even after fulfilling all worldly desires. The advocates of psychological well-being explain it in terms of fully functioning in life, having self-realization, flourishing, and meaning in life (Ryan & Deci, 2001; Ryff & Singer, 1998, 2000). Ryff & Keyes (1995) differentiated psychological well-being from subjective well-being. Psychological well-being is considered a multidimensional construct covering six distinctive human potential aspects: autonomy, self-acceptance, purpose in life, personal growth, positive relationships, and environmental mastery. Existing literature emphasizes promoting

psychological well-being among youth (Santos et al., 2018; Van Ryzin et al., 2009) because enhanced psychological well-being is associated with lesser social problems. Researchers highlighted that psychological well-being is essential for youth at the given moment and provides a firm basis for their future well-being and a better society (Rees & Bradshaw, 2018). Youthhood is a vulnerable and transitory period of development that is heavily affected by external and internal factors (Santrock, 2004). It impacts future attitudes, behaviors, and health outcomes (Basson, 2008; Sawyer et al., 2012).

In this modern era of technology, swift transformations in the social world substantially impact youth positively and negatively (Roberts & Foehr, 2008). Social psychologists have been highly interested in finding social and environmental factors affecting psychological well-being since long ago (Graham, 2011; Kraut et al., 1998; McAuley & Rose, 2010; Rook, 1984; Ryan & Deci, 2000; Taylor & Brown, 1988).

Substantial research has identified numerous positive, social, and environmental factors that positively and negatively affect psychological well-being (Heekin & Polivka, 2015; Huppert, 2009; Morales-Rodriguez et al., 2020; Woolverton et al., 1989). For instance, positive affect (Steptoe et al., 2008), passion (Vallerand, 2012), Positive technology use (Amichai-Hamburger, 2009; Gaggioli et al., 2017), self-efficacy, religiosity, and social support (Fatima et al., 2018) enhance psychological well-being among adolescents and youth. But Kraut et al. (1998), Caplan et al. (2009), Caplan (2002), and Huang (2010) identified several factors related to modern social technology that reduce the psychological well-being of young people. The most influential factor is technology addiction, i.e., Problematic Internet Use (PIU) and Smartphone Addiction (SA) (Gerhart, 2017). Griffiths (1996) defined technological addiction operationally as a behavioral addiction that is not chemical by nature and involves human interaction with machines. Many people are addicted to the internet and smartphones, which indicates serious issues in their users (Beranuy et al., 2009; Karakartal, 2022). According to Kraut and Burke (2015) internet causes negative consequences in normal lives, and it causes a break in the person's psychological well-being. Likewise, researchers have focused on smartphone addiction's negative effects on psychological well-being (Tangmunkongvorakul et al., 2019).

Many psychosocial risk factors for PWB in modern society are co-presented when individuals heavily indulge in ICT. A current study identified phubbing, Fear of Missing Out (FoMO), loneliness, social phobia, and social comparison as the most prominent technology-related psychosocial factors affecting psychological well-being (Chotpitayasunondh & Douglas, 2016; Elhai et al., 2016; Enez Darcin et al., 2016; He et al., 2020; Koyuncu et al., 2014; Schmuck et al., 2019; Vaidya et al., 2016; Weinstein et al., 2015).

Haigh (2015) identified the negative consequences of phubbing on intimate relationships and well-being. Another important risk factor associated with technology use is the fear of missing out, reflecting the importance of social relations, in-group

identification, and acceptance (Lai et al., 2016; Przybylski et al., 2013). Hence, it triggers a strong desire to stay connected (Kang et al., 2019; Riordan et al., 2015), and this obsession can negatively impact well-being (O'Connell, 2020; Scott & Woods, 2018). Furthermore, any individual's desire for social connectedness is greatly important; otherwise, the individual feels lonely (Helliwell et al., 2012; Pittman & Reich, 2016). Loneliness is increasing in the young population, hence connected with many risks for health and personal well-being and potentially adverse effects on healthy functioning in society. Similarly, a psychosocial problem like social phobia also affects psychological well-being (Enez-Darcin et al., 2016). A person with social phobia fears being ostracized, and virtual platforms provide a comfort zone (Tsumura & Murata, 2015). According to researchers, impaired social fear can severely affect an individual's everyday life, need to belong, social relationships, subjective well-being, and quality of life (Diener & Ryan, 2009). Another important occurrence in the virtual social world is the constant opportunity for social comparisons (Warrender, 2020). Although a minimal social comparison is good for individuals, excessive social comparison is detrimental to self-esteem and mental health (Jang et al., 2016). Researchers are concerned about online social comparisons and their negative impact on the community's subjective well-being (Verduyn et al., 2020). A study has explored the social comparison processes on social media. It concluded that social comparison produces negative emotions that decrease self-esteem, social support, and psychological well-being (Lee, 2020).

Technostress is another important factor that brings serious psychological health concerns for young adults (Thomee et al., 2011). Brillhart (2004) stated that technostress is caused by technology-focused and related tasks such as anxiety about job tasks, meetings, business plans, etc. Champion (1988) informed that social factors also induce technostress.

Self-control plays a pivotal role in managing and mitigating stress as it is the ability and moral muscle to handle personal emotions, feelings, and behaviors in challenging situations. Self-control is beneficial for individual, social and societal well-being. Self-control is connected to positive psychological consequences, and many studies have confirmed the positive role of self-control in enhancing well-being. People with a good sense of self-control report less stress than people with poor self-control (Nielsen & Bauer, 2019). A study described that people with a high level of self-control report higher levels of subjective well-being and cope better with stress (Massar et al., 2020). Self-control is also very important for a flourishing society.

This study aims to present evidence for the psychological well-being of Pakistani youth in a technologically dominated world. Hence, this study aims to determine the effect of technology addiction (PIU and SA) and psychosocial factors related to technology use (phubbing, fear of missing out, loneliness, social phobia/anxiety, and social comparison) on the PWB of university students in Pakistan. This study also seeks to identify technostress as a potential mediator between technology addiction, psychosocial risk factors, and PWB as well as this study aims to assess self-control as a potential moderator on the relationship between technostress and PWB.

1.3 Statement of the Problem

Youth is a critical period during development when values, goals, directions, and the most important purpose in life are established. So, guaranteeing psychological well-being among youth is an essential socio-psychological obligation (Berman et al., 2006; Bonanno, 2019; Savage, 2011). Assessing the PWB of youth is the first step in protecting their psychological health and providing an environment that helps them flourish in their development and transition into useful adults.

First, the measurement of psychological well-being is inconsistent in the literature. Most literature studies PWB through depression, anxiety, self-esteem, happiness, and life satisfaction measures (Cheung et al., 2018). Thus, current research includes a multidimensional, theoretically grounded measure of psychological well-being proposed by Ryff and Singer (1995) to have an inclusive insight into psychological well-being.

Regarding psychological well-being, there are heightened concerns regarding technology addiction's positive and negative impacts (Ostic et al., 2021). The psychological well-being of youth is affected by innovations in technology, i.e., the internet, smartphones, and an abundance of technology-related psychosocial factors in numerous ways (Park & Lee, 2012). Studies have shown that iDisorder (Rosen, 2010) technology addiction (Scott et al., 2017), problematic internet use, and smartphone addiction result in behavioral, cognitive, and affective consequences (Burke & Kraut, 2016; Casale et al., 2015; Guo et al., 2014; Heo et al., 2015; Hu et al., 2014; Mills, 2014; Odaci & Cikrikci, 2014; Satici & Uysal, 2015; Tangmunkongvorakul et al., 2019) among youth. Researchers have also identified the influence of environment, social context, and social influence (Wills et al., 2007) on the PWB. The virtual/digital world is a new social environment for youth that shapes their behaviors and psychological well-being (Valkenburg & Piotrowski, 2017). Researchers have identified that many technology-related psychosocial risk factors are associated with psychological well-being, such as phubbing, FoMO, loneliness, social phobia or social anxiety, and social comparison (Bhagchandani, 2017; Lee, 2020; Savitri, 2019; Sushma et al., 2016; Tekkam et al., 2020). However, no study has explored the associations between all these technology-related variables in one study. Hence, one of the main aims of the current study was to examine the relationship between technology addiction, psychosocial factors, and psychological well-being among youth.

Several studies have extensively reported significant associations between technostress and psychological well-being at work (Dragano & Lunau, 2020; Fuglseth & Sorebo, 2014; Jaiswal et al., 2022; Le Roux & Botha, 2021; Pfaffinger et al., 2020). Few studies have explored the relationship between technostress and PWB among students (Choi & Lim, 2016; Schettino et al., 2022; Torales et al., 2022), while individuals with technology addiction are prone to technostress (Bell, 2016; Brooks et al., 2016; Lee et al., 2014). To the best of the researcher's knowledge, no empirical study has explored the relationship between technologies-related psychosocial factors and technostress

among youth and employed technostress as a mediator in the relationship between technologies-related psychosocial factors and psychological well-being. Therefore, the current study attempted to understand the pathways between technology addictions, technology-related psychosocial factors, and PWB via technostress.

The literature described that people with a high level of self-control report higher levels of well-being and cope better with stressful life events (Massar et al., 2020). Besides, previous literature has examined the differences in psychological well-being due to self-control (Jackson et al., 2020; Rivkin et al., 2015). A study found self-control as a moderator in the relationship between stress and mental distress (Schnell & Krampe, 2020). Low self-control is a prominent cause of technology addiction and compulsive and addictive behaviors, but it can also serve as a protective psychological resource (Baumeister et al., 2007). Technostress literature has tried to find ways to mitigate technostress through different organizational resources (Brivio et al., 2018; Salo et al., 2017). It is pertinent to find ways to alleviate the negative effects of technostress on psychological well-being through psychological resources (Whelan et al., 2022). Regardless of various studies, the differences in self-control in PWB have made it stand out as a moderator in this study. Nonetheless, to the researcher's knowledge, no study has explored the moderating role of self-control on the relationship between technostress and PWB.

Literature review shows that most studies on psychological well-being have been conducted in developed countries (Kubzansky et al., 2018; Luo & Hancock, 2020; Matud et al., 2019; Trudel-Fitzgerald et al., 2019; Wang et al., 2019). Owing to the double-fold effects of modern practices, the values and the growth trajectory of technology, the future generation is open to a completely different context. However, little empirical evidence on psychological well-being exists in the context of Pakistani youth. Progressively Pakistani society is changing to a digital society and becoming reliant on the technology and cyber realm for communication purposes and viable social development. This age of technology ruling has opened new horizons for young people for communication, news, entertainment, and information advancement.

Nevertheless, very little effort has been devoted to studying the risks and accountabilities of being and remaining in a virtual world and the pros and cons of using the technology. An extensive review of the literature divulges the substantial need for research on PWB among youth living in the technology-dependent world (Clark et al., 2018). Some recent researchers (Rasmussen et al., 2020) declared the need for further research to improve psychological well-being among youth because there is a huge scarcity of literature about youth's psychological well-being in Pakistan (Khan et al., 2020). Therefore, the current study endeavored to furnish a deeper understanding of the impact of technology addictions (PIU and SA), psychosocial factors related to technology use (phubbing, fear of missing out, loneliness, social phobia/anxiety, and social comparison), technostress and self-control on PWB.

While considering the problems mentioned above, the following research questions were formulated.

1.4 Research Questions

After going through the above-stated research problem and the structured relationship between the study variables, the following research questions have been formulated:

RQ1: Is there a relationship between technology addiction (PIU and SA), psychosocial risk factors (phubbing, fear of missing out, loneliness, social phobia/anxiety, and social comparison), technostress, and PWB among university students in Pakistan?

RQ2: Does technostress mediate the relationship between technology addiction (problematic internet use and smartphone addiction), psychosocial risk factors (phubbing, fear of missing out, loneliness, social phobia/anxiety, and social comparison), and PWB among University Students in Pakistan?

RQ3: Does self-control play a moderating role in the relationship between technostress and PWB among university students in Pakistan?

1.5 Objectives of the Study

The following section describes the main and specific objectives of the study in light of the research question.

1.5.1 Main Objective

The main objective of this study was to examine the effects of technology addiction, technology-related psychosocial risk factors, technostress, and self-control on the psychological well-being of university students in Pakistan.

1.5.2 Specific Objectives

The specific objectives of the study are as follows:

1. To examine the effect of technology addiction (problematic internet use and smartphone addiction), technology-related psychosocial factors (phubbing, fear of missing out, loneliness, social phobia/ anxiety, and social comparison), and technostress on PWB among university students in Pakistan.

2. To examine the mediating role of technostress in the relationship between technology addiction (problematic Internet use and smartphone addiction), technology-related psychosocial risk factors (phubbing, fear of missing out, loneliness, social phobia/anxiety, social comparison), and PWB among university students in Pakistan.
3. To assess the moderating role of self-control on the relationship between technostress and PWB among university students in Pakistan.

1.6 Research Hypotheses

The following alternative hypotheses were postulated based on the afore-mentioned objectives:

H_{1a}: Problematic internet use has a significant negative effect on PWB among university students in Pakistan

H_{1b}: Smartphone addiction has a significant negative effect on PWB among university students in Pakistan

H_{1c}: Phubbing has a significant negative effect on PWB among university students in Pakistan

H_{1d}: Fear of missing out has a significant negative effect on PWB among university students in Pakistan

H_{1e}: Loneliness has a significant negative effect on PWB among university students in Pakistan

H_{1f}: Social phobia has a significant negative effect on PWB among university students in Pakistan

H_{1g}: Social comparison has a significant negative effect on PWB among university students in Pakistan

H_{1h}: Technostress has a significant negative effect on PWB among university students in Pakistan

H_{2a}: Technostress has a significant mediating role in the negative relationship between problematic internet use and PWB among university students in Pakistan

H_{2b}: Technostress has a significant mediating role in the negative relationship between smartphone addiction and PWB among university students in Pakistan

H_{2c}: Technostress has a significant mediating role in the negative relationship between phubbing and PWB among university students in Pakistan

H_{2d}: Technostress has a significant mediating role in the negative relationship between fear of missing out and PWB among university students in Pakistan

H_{2e}: Technostress has a significant mediating role in the negative relationship between loneliness and PWB among university students in Pakistan

H_{2f}: Technostress has a significant mediating role in the negative relationship between social phobia/anxiety and PWB among university students in Pakistan

H_{2g}: Technostress has a significant mediating role in the negative relationship between social comparison and PWB among university students in Pakistan

H_3: Self-control has a significant moderating role in the relationship between technostress and PWB among university students in Pakistan

1.7 Significance of the Study

This research acknowledged existing literature and its contribution, which has examined technology addictions (problematic internet and smartphone use), psychosocial factors, technostress, self-control, and PWB. This study plays a significant role by exploring the state of art literature in many ways; an effort was extended to explore psychological well-being from a eudemonic perspective that has not been adequately considered. At the same time, most literature exclusively focused on subjective well-being concerning technology-related behaviors. This study aimed to explore whether PIU, smartphone addiction, phubbing, FoMO, loneliness, social phobia/anxiety, and social comparison predict psychological well-being. Similar to predicting subjective well-being and other types of well-being, there were not enough studies on PWB with other technology-related behaviors, technostress, and self-control. Above all, the study revealed statistics about Pakistani youth, which were very few in the available literature.

The research findings contribute to the existing literature regarding new knowledge; they explored the mediating role of technostress between problematic internet use, smartphone addiction, psychosocial factors, and PWB. Most of the literature focused on the moderators between the relationships of these variables. The current study further assessed the moderating role of self-control on the relationship between technostress and psychological well-being. Further, the current study revealed information about Pakistani youth, particularly university students, local internet and smartphone use practices, technology-related behaviors, outcomes, and the current state of PWB.

Regarding theoretical expansion, the present study extends Ryff's PWB model (Ryff & Singer, 2008) by integrating other important variables, such as technology addiction and different psychosocial variables. Understanding modern-day psychosocial risk factors of PWB among youth would lead to enhanced knowledge and better outcomes.

The study would help educationists, parents, and policymakers educate about the healthy use of the internet and smartphone, monitor its purpose, control excessive

access to communication technology, and improve the PWB of the youth to make a better society. In short, a well-balanced use and awareness about the negative consequences should be conveyed to the youth through different mediums to enhance PWB.

For all these reasons, the current study was carried out to explore technology addiction (PIU and SA), psychosocial factors (phubbing, FoMO, loneliness, social phobia/anxiety, and social comparison), technostress, self-control, and PWB. To assess the relationship between these technology-related variables and PWB and a mediated moderation model of technology-related variables and PWB.

1.8 Theoretical Background

This study examined the effects of technology addiction, technology-related psychosocial factors, technostress, and self-control on the PWB of Pakistani youth studying at universities. To explain the relationship between study variables, Ryff's theory of psychological well-being and the person-technology fit model was employed.

1.8.1 Theory of Psychological Well-being

The current study was based on the theoretical model of psychological well-being (Ryff & Keyes, 1995). Generally, psychological well-being theories focus on considering the dynamic of PWB (i.e., its causes and the consequences) or its structure. The current study describes techno-psychosocial causes of psychological well-being that negatively affect it. The psychological well-being model includes six dimensions of human wellness guided by the theories: environmental mastery, autonomy, personal growth, purpose in life, self-acceptance, and positive relations (Ryff & Keyes, 1995). According to Ryff (1989), Psychological well-being is influenced by previous experience, daily life events/ experiences, and the underlying personality. Short-term adverse experiences may make the man resilient, but long-term stressors affect PWB negatively (Gladstone et al., 2004; Khoshaba & Maddi, 1999; Solomon et al., 2007). There is enough evidence that constant exposure to stress for longer periods will negatively influence the PWB (Eden et al., 2020; Joseph et al., 2012; Larsen, 2009) that will lead the individual to serious illness (Chandola et al., 2008). This assumption of the PWB theory that constant exposure to stress affects PWB is not explored extensively in the literature. So, the researchers tested this model in the current study where technology-related addictive and psychosocial risk factors bring technostress that affects the PWB and self-control, a very important individual difference and resilience factor that moderated the relationship between technostress and PWB. In the current study, the psychological well-being of university students was examined as the dependent variable and measured through Ryff's scale of PWB.

1.8.2 Person-Technology Fit Model

The current study is also based on the theoretical lens of the Person-Technology Fit Model (P-T fit model (Ayyagari et al., 2011). This model is an extension and application of the person-environment fit theory (P-E fit theory) (Edwards & Cooper, 1988). P-E fit theory is widely used in stress literature and emphasizes the congruence between the person and his environment that impacts psychological functioning. This concept carries roots in Kurt Lewin's field theory and Parsons' work in the vocational field (Beasley et al., 2012). P-E fit theory elaborates on the sources and outcomes of stress very well (Ayyagari et al., 2011; Edwards et al., 1998).

The theory stresses a proportionate and balanced relation between the person and environment, called "fit." Person environment fit happens in two ways: the first type of fit is about the demands (D) of the person's environment and abilities (A). Whereas the second type of fit occurs between the needs (N) of the person and supplies (S) in the environment related to the individual's personal needs (Ayyagari et al., 2011; Edwards et al., 1998). A fit between the person and environment arises when there is no conflict in personal and environmental factors. Personal factors are abilities and personalities like locus of control, hardiness, and coping styles, use patterns, and environmental factors are other people, activities, and daily hassles, stressful life events, and role conflict (DeLongis et al., 1982; Edwards et al., 1998; Edwards & Shipp, 2007). This fit improves an individual's life, increases satisfaction with external environmental factors, and enhances well-being when this fit comes into play.

On the other hand, a person-environment misfit results in drastic consequences and brings strain and damages well-being (Edwards & Shipp, 2007). In the current study context, a misfit comes between the demands of the environment (use of ICTs and virtual social demands) and the abilities (personal capacities, states). Due to this misfit, individual experiences technostress that leads to strain response (low psychological well-being. And technology use and related psychosocial factors do not benefit psychological well-being (i.e., N-S misfit) (Wang et al., 2020).

Grounded on the P-E fit model, Ayyagari et al. (2011) developed a person technology fit model (shown in Figure 1.1) that identified specific technology characteristics as antecedents of stressors due to ICTs that result in the strain.

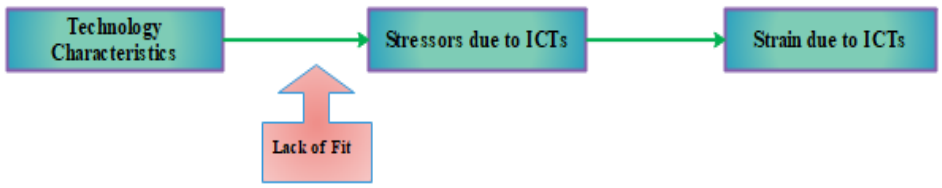

Figure 1.1 : Person-Technology Fit Model
(Source : Ayyagari et al. 2011)

The P-T fit model is amongst the first models that provided valuable insight into technology characteristics that trigger stressors like technostress. Technology characteristics are referred to the features or attributes of the ICTs. In the next step of the model come stressors that represent conditions or factors that generate stress. The 3rd and last part of the model is called "strain," which refers to the physiological, psychological, and behavioral outcomes related to stress observed in the individuals (Ayyagari et al., 2011; Cooper et al., 2001; Tarafdar et al., 2011). The P-T fit model was adapted by Qi (2019), who used this model to examine the effects of smartphone characteristics on the technostress and students' academic performance. Most of the literature has used the P-E fit model in ergonomics and organizational setup while focusing on the behavioral outcomes of stressors. Very little work has tested the psychological strain responses as an outcome of ICT characteristics and stressors. The current study focuses on the impact of technology characteristics (technology addiction and related psychosocial factors), technostress, and self-control on the PWB.

Figure 1.3 exhibits the linkage between the variables and theories examined in the current study.

1.9 Conceptual and Theoretical Framework

Based on the theoretical implications of Ryff's Model of PWB and the Person-technology fit model, the conceptual framework of this study has been developed. The conceptual framework outlines the direction of the relationship among the variables of this study.

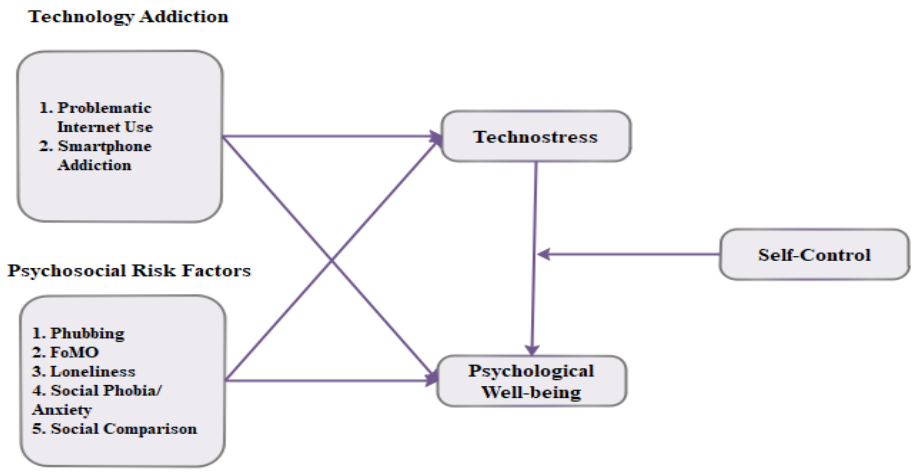

Figure 1.2 : Conceptual Framework of the Study based on the Relationship between Technology Addiction (Problematic Internet Use and Smartphone Addiction), Psychosocial Factors (Phubbing, FoMO, Loneliness, Social Phobia/anxiety, Social comparison), Technostress, Self-control, and Psychological Well-being among Youth in Pakistan

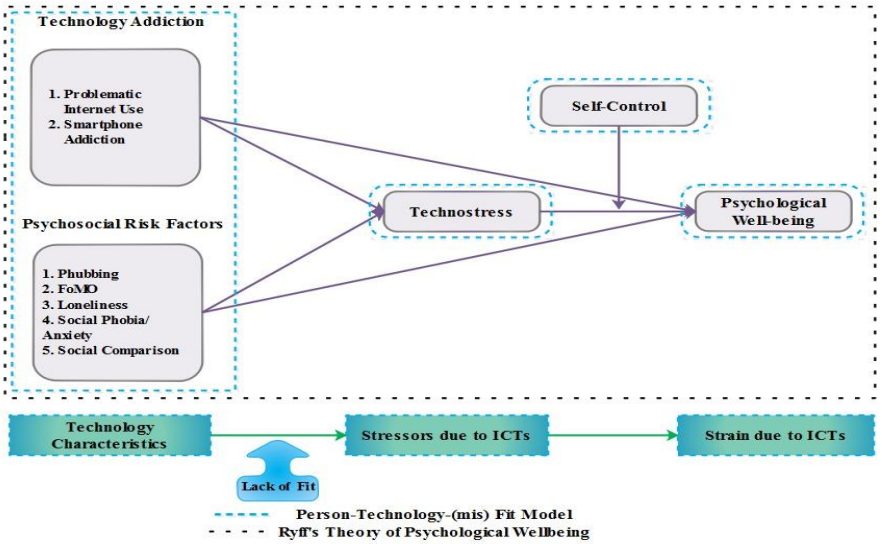

Figure 1.3 : Theoretical Framework of the Study Based on Theories and Models (Ryff's Theory of Psychological Well-Being and Person-Technology- Fit Model

1.10 Definition of Terms

This section details psychological well-being, technology addiction, problematic internet use, smartphone addiction, psychosocial risk factors, phubbing, FoMO, loneliness, social phobia/ anxiety, social comparison, technostress, self-control, and youth.

1.10.1 Psychological Well-being

The following is an explanation of psychological well-being based on current literature:

Conceptual Definition

Psychological well-being is the best mental and physical health (Diener, 1984). Psychological well-being is a state that represents an individual's healthy emotions and overall better functioning in life. It is also considered a combination of functioning effectively and feeling good in life (Huppert, 2009).

Psychological well-being was conceptualized just as postulated by Ryff. Who believed that being effective in six core areas (autonomy, a feeling of purpose and meaning in life, positive relationships with others, personal mastery, and personal growth and development) reflects the optimal level of PWB (Ryff, 1989; Ryff & Singer, 2008).

Operational Definition

In the current study, psychological well-being refers to the overall optimal functioning and best mental and physical health state and absence of mental health problems. It was measured by the psychological well-being scale developed by Ryff and Singer (2008). Furthermore, this scale contains six dimensions: autonomy, a feeling of purpose and meaning in life, positive relationships with others, personal mastery, and personal growth and development (Ryff, 1989, 2014; Ryff et al., 2013). PWB is an 18-item self-rating scale, and a higher score represents a higher PWB level.

1.10.2 Technology Addiction

Following is enlightenment on the term technology addiction.

Conceptual Definition

Technology addiction is a disorder of impulsivity that encompasses obsessive use of mobile phones/gadgets, the internet, video games, etc. Warning signs of technology addiction include excessive use, withdrawal symptoms, and Negative repercussions (Alavi et al., 2012). According to World Health Organization (WHO), behavioral or technology addiction is evaluated or appraised as internet addiction or mobile/smartphone/gadget addiction (Organization, 2015) as reported in (Jamir et al., 2019).

Operational Definition

Based on numerous definitions hitherto used for technology addiction, for the current study, the term technology addiction is used to combine referring to the terms smartphone addiction and problematic internet use.

i Problematic Internet Use

The following is an explanation of problematic internet use based on current literature.

Conceptual Definition

A specific conceptual framework to describe problematic internet use in the youth defines PIU as "a risky kind of internet use that is impulsive and excessive in nature and leads to adverse consequences in the life, more specifically emotional, physical, social and functional impairment" (Jelenchick et al., 2014). According to Demetrovics et al. (2008), PIU is a dangerous and problematic internet use among young adults and adolescents.

Operational Definition

PIU is an addictive behavior resulting from excessive internet use in this study. It was operationalized by the scores on nine questions versions of the Problematic Internet Use Questionnaire (Koronczai et al., 2011), and scores indicated the levels of problematic use. Mainly, PIUQ is a self-reporting Likert-type screening scale. The minimum score is 9, the maximum score is 45, the cut-off score is 22, and a 22 or higher score indicates a risk for problematic internet use.

ii Smartphone Addiction

The following is an explanation of smartphone addiction based on current literature.

Conceptual Definition

Smartphone addiction is a technological addiction (Griffiths, 1996), specifically defined as a non-chemical addiction based on human and machine interaction. Smartphone addiction shares several aspects of a substance-related disorder, including the symptoms of compulsive behavior, withdrawal, functional impairment, and tolerance (Lin et al., 2014).

Operational Definition

Smartphone addiction is defined as an addictive behavior resulting from excessive smartphone use. Operationally, smartphone addiction was defined by the scores on the smartphone addiction scale (Kwon et al., 2013). It is a 10-item self-reported tool for screening and assessing problematic smartphone use. A higher score expresses the maximum existence of "smartphone addiction" last year.

1.10.3 Psychosocial Risk Factors

The following is a description of psychosocial risk factors based on the literature.

Conceptual Definition

According to the literature, a psychosocial risk factor is any measure that relates psychological events to the social environment (Hemingway & Marmot, 1999). Based on previous literature, psychosocial factors of high relevance to technology addiction have been studied as a cause and effect of technology addiction.

Operational Definition

In this study, the psychosocial factors of technology addiction are phubbing, fear of missing out, loneliness, social phobia, and social comparison. These psychosocial factors are often contemporaneous with technology addiction and are considered psychosocial factors because they encompass both the social interactions of the individual with people around as well as the feelings and thoughts of the individual about those interactions (Kraut et al., 1998).

i Phubbing

The following is an explanation of phubbing based on current literature:

Conceptual Definition

Phubbing is the combination of phone and snubbing, considered a disturbance in this technologically advanced age. It is described as a state when the individual looks at the mobile during a face-to-face conversation with other people, escaping interpersonal communication and dealing with the mobile phone (Karadag et al., 2015).

Operational Definition

Phubbing is a social disconnection from people around you in favor of technology. In this study, Phubbing refers to the respondents' scores on the communication disturbance subscale containing five questions (Blanca & Bendayan, 2018) from the scale of Phubbing developed by Karadag et al. (2015). The higher the score, the higher the expected phubbing behavior.

ii Fear of Missing Out (FoMO)

The following is an explanation of the Fear of Missing out (FoMO) based on current literature.

Conceptual Definition

Fear of Missing Out (FoMO) is an apprehension that others may enjoy more rewarding experiences without the individual. FoMO is regarded as a strong desire to stay continually updated and connected with others to know about their activities (Przybylski et al., 2013).

Operational Definition

The current study defines FoMO as a constant urge to stay connected via social media sites to stay continually updated. It was operationalized by the scores on the ten items

of "The Fear of Missing Out scale" (FoMO) (Przybylski et al., 2013), which were considered to indicate the presence of FoMO. The increased score indicates the increase in the FoMO of the respondents accordingly. The respondents were asked to answer questions about technology use.

iii Loneliness

The following is an explanation of loneliness based on current literature.

Conceptual Definition

Loneliness is an emotional response to isolation and deprivation of social relations. It is also a subjective feeling that encompasses limited social skills to maintain social relations. It is considered a state of mind or psychological mechanism that seeks connections in terms of quality and quantity (Hughes et al., 2004). Generally, loneliness has two salient characteristics: first, a negative emotional state occurs when individuals feel apart from social interactions and emotional intimacy (Hazer & Boyle, 2010). Second, individuals can feel lonely without social isolation (Valtorta & Hanratty, 2012). Loneliness is also a modern 'epidemic' with many psychological, physical, and social effects (Alberti, 2019).

Operational Definition

Prolonged use of ICTs deteriorates social skills and leads to more time alone, isolation from others, and introversion. Loneliness is considered an important stressor and distraction (Mann & Holdsworth, 2003). In this study, loneliness is considered a feeling that emerged from technology use, as excessive technology usage may hinder individuals from establishing and retaining real-life social relationships (Taser et al., 2022). It was operationalized by using R-UCLA "3 Item Loneliness Scale" this version was formed (Hughes et al., 2004) to cater to the needs of assessment and screening of loneliness. Scores on the "3 Item Loneliness Scale" marked loneliness among the study participants. Respondents were considered not lonely based on their scores ranging from 3-5 and very lonely based on the scores approaching higher scores (Mehrbrodt et al., 2017).

iv Social Phobia/Anxiety

The following is an explanation of social anxiety based on current literature.

Conceptual Definition

According to DSM-V, Social phobia or social anxiety is an intense fear of social situations. People with social phobia/anxiety feel nervous and uncomfortable in social situations and prefer avoiding such situations (Connor et al., 2001).

Operational Definition

Social phobia or social anxiety is an intense fear of social situations. In this study, answers to social phobia or anxiety questions were asked in the context of the virtual social world. Scores on the Mini Social Phobia inventory (Mini-SPIN) were used to measure "Social Phobia/Anxiety," which principally measures the generalized and all types of social anxiety disorder with three items. The Mini-SPIN was developed to determine the risk and level of social anxiety disorder in non-clinical groups. Respondents with scores of 6 and higher scores reported on the Mini-social phobia inventory are considered to have possible difficulties in social situations expressing social anxiety problems (Connor et al., 2001).

v Social Comparison

The following is an explanation of social comparison based on current literature:

Conceptual Definition

People possess an innate drive to compare themselves, their opinions, and their abilities with others. Everyone is involved in some social comparison at any stage of life, at least sporadically, whether this comparison is about the feelings, abilities, opinions, appearances, or success in the life of others. Social comparison is an individual difference in comparing one's abilities and opinions to others (Gibbons & Buunk, 1999).

Operational Definition

Social comparison is the practice of comparing oneself to others unconsciously in all domains of life. In the current study, questions related to social comparison were answered about social comparison happening in the virtual social world. The Social Comparison Orientation (SCO) of the participants was operationalized by using The Iowa-Netherlands Comparison Orientation Measure (INCOM) (Gibbons & Buunk, 1999). The scale is based on 11 items and 5 points Likert scale. The total score ranges between 11 and 55, indicating a higher tendency to socialize with others.

1.10.4 Technostress

The following is an explanation of technostress based on current literature.

Conceptual Definition

Bord (1984) originated and described the concept of technostress; he explained it as a "modern disease" of adjustment and adaptation caused when the individual cannot cope with new and modern technologies healthily. The definition of technostress refers to personal stress generated by internet-mediated activities (Brod, 1984). According to

Chiapetta (2017), technostress is a syndrome that occurs when the person, subjected to information overload and continuous contact with most digital devices and technologically focused tasks, develops a state of stress (Brillhart, 2004). Technostress is directly associated with the negative and adverse psychosocial effects of using information and communication technologies (Gonzalez-Lopez et al., 2021).

Operational Definition

This study defines technostress as a syndrome or stress resulting from technology use and related psychosocial factors. It was operationalized by the scores on the three dimensions (technostress creators) of the technostress questionnaire (Hsiao, 2017; Westermann, 2017), which were used to measure the technostress among students. It has 12 items, and responses are given on a 5-point Likert scale. The respondents answer the questions in light of their technology use, where the higher scores indicate a higher level of technostress.

1.10.5 Self-control

The following is an explanation of self-control based on current literature.

Conceptual Definition

As defined by Tangney et al. (2004), self-control is "the ability to override or change one's inner responses, as well as to interrupt undesired behavioral tendencies and refrain from acting on them" (p. 274). Self-control is the ability to self-discipline; with self-control, thoughts, emotions, and behaviors are regulated whenever the individual faces temptations or impulses. As a feature of inhibitory control, self-control, executive function, and the cognitive process are necessary to regulate behavior to achieve particular goals in everyday life (Tangney et al., 2004).

Operational Definition

In this study, self-control is defined as an ability to override or change one's inner responses. The scores operationalized on Tangney's Self-Control Scale (SCS) referred to the individual differences in self-control (Tangney et al., 2004) measured by 13 questions. The minimum obtained score is 13, and the maximum score is 65; the sum score indicates the respondents' self-control level. A higher score indicates a high level of self-control and self-discipline among respondents.

1.10.6 Youth

The following is an explanation of youth based on current literature.

Conceptual Definition

The United Nations defines 'youth' as a stage of life ranging from 15 to 26 years of age. All the United Nations statistics are grounded on the given definition (Binde, 2005).

Operational Definition

In this study, youth will be referred to undergraduate and graduate students studying at public and private universities of 2 major cities of south Punjab province in Pakistan between the ages of 18 and 26.

1.11 Scope of the Study

In this study, the independent variables of technology addiction (PIU and SA) and psychosocial factors (phubbing, fear of missing out, loneliness, social phobia/anxiety, and social comparison), whereas PWB is the dependent variable. Technostress is mediating variable between independent and dependent variables, while self-control is moderating variable between technostress and psychological well-being. The study measured psychological well-being in eudemonic terms. The study measured different aspects of technology use among university students in Pakistan.

1.12 Limitations of the Study

While conducting the current study, certain limitations occurred. Technology is a vast, complex domain; the current study only covered some technology factors and demographics. The youth should have been approached from all walks of life, but the youth population is limited to the university students of 2 cities from one province of Pakistan. Pakistan is a developing country where students heavily use technology. Universities were chosen from the South Punjab province because existing literature has insufficient information about the youth of this region.

Another important limitation is the assessment; the research was conducted online through self-reported assessments of the study variables. It is worth mentioning that the study was based on a survey method, and the assessment was based on self-reporting. Hence the findings are considered restricted to the students' perception that might have answered the research questions in socially desirable ways and based on their current circumstances rather than revealing their inner responses. COVID-19 affected the data collection technique, while the study was supposed to collect data physically. Owing to

the closure of universities, data was collected from online classes that might have built pressure on the students for social desirability.

1.13 Organization of the Thesis

This study has been organized into five distinct chapters. Chapter one is about the general research background and outlines the statement of the concerned problem, describes research questions, study objectives, and hypotheses. The first chapter further provides the significance of the current study, its theoretical and research framework, and operational and conceptual definitions of the study variables.

Next is chapter two provides a detailed review of the relevant literature about the key study variables. This part of the manuscript elaborates on the existing literature and the relationships between study variables. Chapter three discusses the methodology adopted for this study, including its design, sample size and procedure, study instruments, and a detailed review of their psychometric properties. This chapter also describes the pilot testing results, the data collection technique, and preliminary data analysis. Next, chapter four is mainly devoted to presenting the results obtained from data analysis and discussing the study's key findings. This chapter provides the descriptive profile of the respondents' background and their internet and smartphone use patterns and preferences. It further elaborates on the relationships between exogenous and endogenous variables and structural equation models.

The final chapter, "chapter five," presents findings, hypotheses, conclusions and suggestions, and recommendations for future research. This chapter also discusses the limitations and implications of the current research.

1.14 Chapter Summary

This chapter introduces the topic that defines Ryff's psychological well-being, independent variables, and mediating and moderating variables. The chapter briefly reviewed the study variables' background and discussed the problem and different theoretical perspectives that explain the phenomenon under discussion.

Although previous researchers have explored the relationship between internet use, addiction, smartphone addiction, and different psychosocial factors with PWB, there is still a huge gap in the available literature. This gap is about the linearity of the relationship between independent variables and PWB without acknowledging the underlying mechanisms that could have mediated this relationship. This study will provide a comprehensive psychological well-being model in the virtual world, which cannot be seen in the existing literature. While keeping in mind, this knowledge gap mediated the moderated relationship between the internet, smartphone-related

behaviors, and psychological well-being. The next chapter will present a comprehensive review of the existing literature.

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