

# Recent Development on the Effect of Smartphone Usage on Psychological Behavior

**Mohd Sazili Shahibi and Fazlina Abdul Aziz**

Faculty of Information Management, Universiti Teknologi Mara, Shah Alam  
UiTM Selangor, Malaysia

DOI: 10.6007/IJARBSS/v7-i8/3300 URL: <http://dx.doi.org/10.6007/IJARBSS/v7-i8/3300>

## **Abstract**

This paper presents the focus effects on four psychological traits which are locus of control, social interaction anxiety, the need for touch and materialism without considering the gender as indirect effect that can influence the compulsive usage and technostress. The proposed model has been empirically tested using collected data from a survey selected sample of respondents. Besides, this study provides supplementary information which beneficial to the related industries, researchers and practitioners as discussed. The purpose of this paper is to get more understanding and to expose related previous studies. This paper also explores the research framework of the study. In addition, the term used in this study will also be defined by understanding more about this research topic.

**Keywords:** Compulsive Usage, Materialism ,Psychological Traits, Technostress, Theoretical Review, Methodology Review

## **1. Introduction**

The evolution of the smartphone has changed the communities on people lifestyle and thoughts. Smartphone becomes more vibrant nowadays, and every person must have it in their possessions. The development of technology in the smartphone make every person more accessible and get connected to each other in their daily life. In addition, this make people only depend on the technology to make their life more alive by being linked up with the technology. Therefore, this makes an assumption of having a smartphone is really essential, and people may not be able to live without it.

Over the year, the usage of smartphone has increased, and it gives a big impact to the smartphone industry. Most of all students need the smartphone to make them connected with their friends and also the lecturer in the university. Some of them really used the smartphone in different ways such as using it to access the social network such as WhatsApp, Facebook, Twitter, and Instagram to get connected with their friends. Other than that, the email application, drop box apps and student portal being used by the student give them to access without using the desktop or laptop.

The study about smartphone has been done by other researchers in many countries, specifically developed country such as Japan, Taiwan, and Korea. For example, the study by Kim (2011) determined the case of smartphones as of late-2011 , it was reported that most

people involved in economic activities were using a smartphone, and more than 60% of 20–30 year-olds possessed a smartphone.

The smartphone users will become more addicted and more obsessed if the users do not control the usage of it. They have to balance their needs and requirements so that they will not face the problem. One of the problems of smartphone usage within the students is, less focus on the class. These obsessions of the smartphone make students do not focus in class and they will check their phone every time, although there are no messages, phone call or email that comes into the smartphones.

The purpose of this paper is to get more understanding and to expose related previous studies. This paper also explores the research framework of the study. In addition, the term used in this study will also be defined by understanding more about this research topic. Meanwhile, the literature also has been divided into sub-topics on the definition of the terms, previous research, theoretical review, methodological review and theoretical framework. In other words, the sub-topics of every definition is to help in better understanding the term that will be used.

Therefore, one of previous study that will be used as a framework with some modified. The theoretical review sub-topic and is specifically developed to explore other research papers that relate to this study. Five research articles have been studied in developing the research framework for this study. It outlines the conceptual framework for this study as well as the determinants that will be the effect of the psychological traits towards compulsive behavior with technostress. The methodological review will clarify with the reason for the method chosen in this study. This study tends to use a quantitative method for data collection where questionnaire will be distributed as an instrument. The theoretical framework sub-topic will explain the theoretical framework used. The theoretical framework consists of two dependent variables and four independent variables that are justified later in this chapter. The definition and description of each variable will be defined and hypothesis of the findings will then be proposed for this study.

## **2. Literature Review**

The usage of smartphone has been increasing every day and year by year due to the requirement by the user. The innovation of technology in a smartphone will make users addicted to a new application that had been provided. All the application that had been given in the smartphone usually will make the user more convenient and also user friendly. For example, some of the smartphones has a higher megapixel and the user do not need any digital camera like DSLR to bring it to the event or any function.

The user behavior will also be affected if they are not controlling the usage of the smartphone. If they are used in a good way, there will get the benefit of it. But some of the students especially will use it for the bad situation such as record unnecessary video and published it online. This will make a great impact to the student and also to the community as well as to the country. As we know, the student as our leadership in the future. If they are not capable of being a leader in the future, nobody else will inherit the future leader.

The technology of a smartphone will give the impact to the student in their campus life. The previous research by Roberts and Pirog (2013) has been determined to investigate the drivers of technological addiction in college students – heavy users of Information and Communication Technology (ICT). The study had used the quantitative method that the respondents that involved from the two universities in the United States with 191 college undergraduates. The findings result found that materialism and impulsiveness drive both a dependence on cell phones and instant messaging. The findings of above previous study will support the variables that will be used in this study which is materialism.

Besides that, the past study by S.P Walsh et al. (2008) in their research was to explore the psychological factors relating a mobile phone used amongst Australian youth. The research method that had been done was qualitative method with 32 participants aged between 16 and 24 years old that took part in focus group discussion. The result of this study provided a solid foundation for further work investigating addictive patterns of mobile phone use amongst youth. Meanwhile, the other previous study by M. Salehan & A. Negahban (2013) has been found that the use of technology in a Social Networking Service (SNS) mobile application was a significant predictor of mobile addition. This research has used quantitatively with 214 respondent's students. The finding in this study was determined that the use of SNS mobile applications was affected by both SNS network size and the SNS intensity of the user.

Yusof Levent Sahin et al. (2009) has conducted a study to analyze the technostress levels of social networking website users through different variables. This study had been gathered from the online questionnaire with 765 participants. The study concluded that the social networking web page users have a medium level of technostress, mainly caused by environmental reasons as opposed to social factor. In addition, this study also found that age and familial monthly income also caused differentiation in technostress. The result of this study will support the variable that had will be used in this study which is technostress. For this reason, this will help the effect of smartphone usage by the students of UiTM.

Research by Lee et al. (2014), had highlighted the aim of the study of investigating the dark side of smartphone trend. The study was involved 325 participants and compared Structural Equation Modeling with competing models. In this study, they had suggested that compulsive usage of smartphones and technostress are positively related to psychological traits, including the locus of control, social interaction anxiety, materialism and the need for touch. The results of this study had given a practical implication of user-oriented smartphone design and also companies as well as government agencies as they combat the social ills brought on by smartphone (Lee et al. 2014).

A summary of five selected previous studies focusing on the aim, research methods and main finding is illustrated and presented in Table 1. All of these studies do provide much clearer finding that is associated smartphone usage or factors that affected the smartphone usage.

*Table 1. Summary of selected previous studies*

<b>Author</b>	<b>Aim of Study</b>	<b>Research Method</b>	<b>Main Findings</b>
James A. Roberts & Stephen F. Pirog (2013)	To investigate the drive of technological addiction college students – heavy user of ICT	Quantitative (191) from two US universities)	Materialism and impulsiveness drive both a dependence cell phone and instant messaging
Shaari P.Walsh, et al.(2008)	To explore the psychological factors relating to mobile phone use amongst Australian youth	Qualitative-focus group (32 youth)	The study provided a solid foundation for further work investigating addictive patterns of mobile use amongst youth
Mohamed Salehan & Arash Negahban (2013)	To get use of SNS mobile applications are affected by both SNS network size and the SNS intensity of the user	Quantitative (214 students)	To show the use of SNS mobile application is affected by both SNS network size and the SNS intensity of the user
Yusuf Levent Sahin & Ahmad Naci Colkar (2008)	To analyze the technostress levels of social networking website users through different variables	Quantitative (765 participants)	The study found that age and familial monthly income caused differentiation in technostress level
Y.-K Lee, et al. (2014)	To investigate the dark side of smartphone trend		The compulsive usage of smartphone and technostress are positively related to psychological traits, including locus of control, social interaction anxiety, materialism and the need for touch.

### 2.4 Theoretical Review

This section deal with the theoretical review of all the variables identified and selected as presented in the theoretical framework. The theoretical review is based on five articles selected. The details of the study and the theoretical framework used will be presented in this study.

The first theoretical framework reviews for this study is from a study entitle “The dark side of smartphone usage by Yu- Kang Lee, Chun Tuan Chang and You Lin and Zhao –Hong Cheng in 2014. They surveyed 325 respondents and compared the Structural Equation Modelling with competing models. This study is determined the dark side of the smartphone trend which considered psychological traits which are include locus of control, materialism, social interaction anxiety and the need for touch. The first two factors that were found to be significantly influenced because the tendencies and reduced powers of self-control with an external locus of control to more likely use the smartphone wisely.

The gender plays a difference moderating role in the relationship between various psychological traits and compulsive usage with five factors that had been mentioned earlier. The researcher argues that the aim, findings, and theoretical framework, develop by this author is related to the current study, and the gender variables is not included in this study.

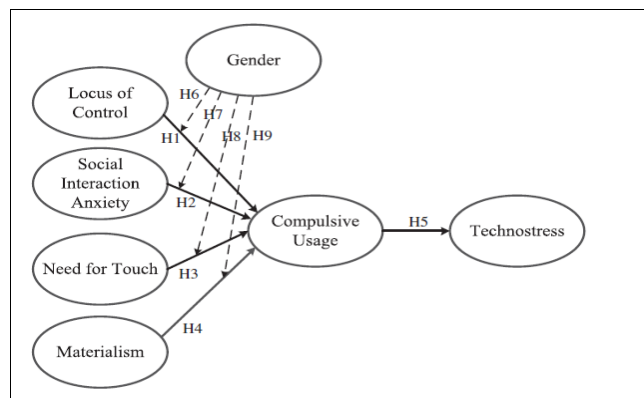


Figure 1: Theoretical framework on link between psychological traits and the compulsive usage and technostress by Lee et al. (2014).

The second theoretical framework reviews for this study is from a study entitle “A preliminary investigation of materialism and impulsiveness as predictors of technological addictions among young adults” by Roberts & Pirog in 2013. The study was conducted through survey involving 191 college undergraduates from two Universities in the US the aim to investigate the drivers of technological addiction in college students – heavy users of Information and Communication Technology (ICT). Factor analysis supported the discriminant validity of Ehrenberg, Juckes, White and Walsh’s (2008) Mobile Phone and Instant Messaging Addictive Tendencies Scale. The path model indicates that both materialism and impulsiveness impact the two addictive tendencies, and that materialism’s direct effect on these addictions has a noticeably larger effect on cell phone use than instant messaging. The researcher argued

that the aim of this study and those factors associated with materialism relevant and can be applied to the researcher, current study and therefore should be tested with the context being studied. This study finds that materialism and impulsiveness drive both a dependence on cell phones and instant messaging.

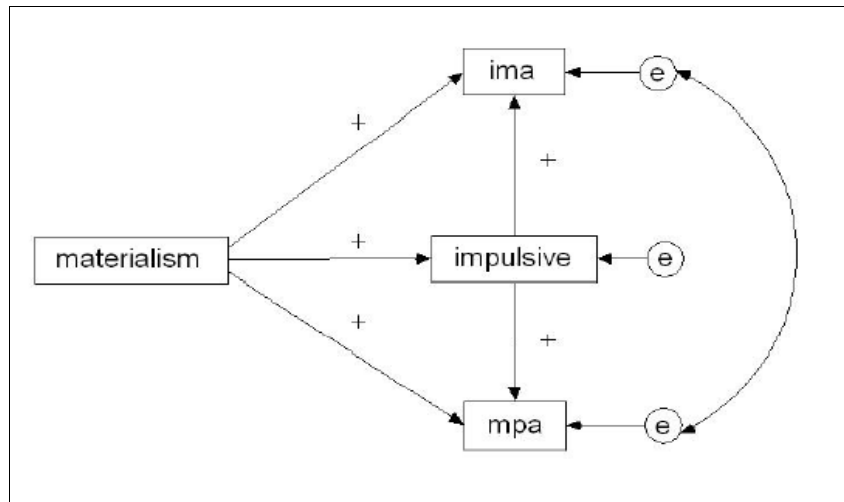


Figure 2: Theoretical framework of hypothesized relationships between materialism, impulsiveness and technological addictions by Robert & Pirog (2013).

The third theoretical framework review for this study is from a study entitled “Social networking on a smartphone: When mobile phones become addictive in 2013 by Mohamed Salehan and Arash Negahban. This study surveyed 214 responses of students in a public university in Southeast United States. The study adopted Partial Least Squares to validate the model in the study. The finding showed that use of mobile social networking applications is a significant predictor of mobile addiction. The researcher then argues that this theoretical framework can be adopted and tested in the current study since it share the same medium that is a smartphone. Those related variables used in this study are relevant to researchers, current study.

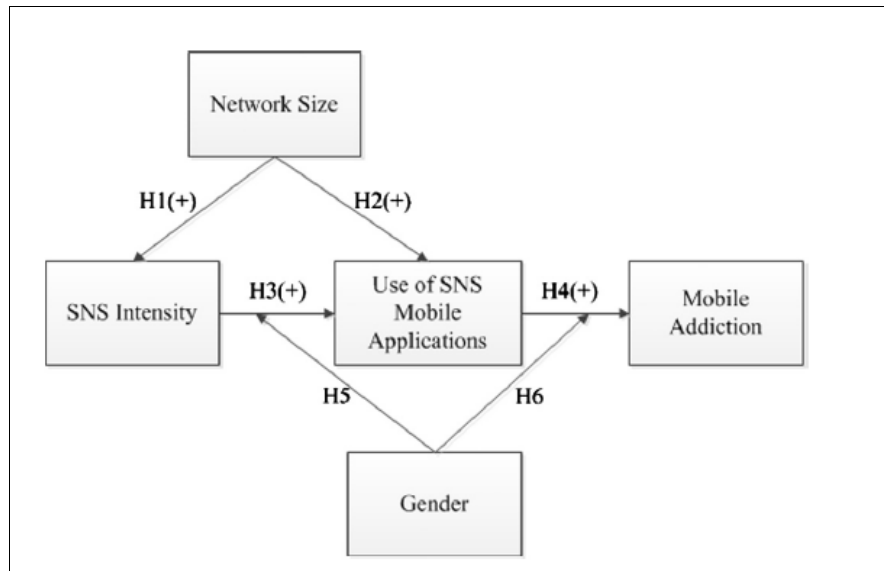


Figure 3: Theoretical framework for the use of social networking mobile application can associate with mobile phone addiction by M. Salehan & A. Negahban (2013).

The fourth theoretical framework reviews for this study is from a study entitle “Factors influencing smartphone use and dependency in South Korea by N. Park, et al. in 2013. The study surveyed 852 residents. The study included that some of individual’s psychological antecedents like motivation for social inclusion and other factor use of smartphones, innovativeness, behavioral activation system (BAS) and locus of control. The study also found BAS and locus of control showed the unique contribution to use it the smartphone. The study also revealed that dependency smartphone affect by antecedents in usage of smartphones. The researcher then argues that this study share the same interest and relevant to the current study. One of the variables of locus of control included in this study.

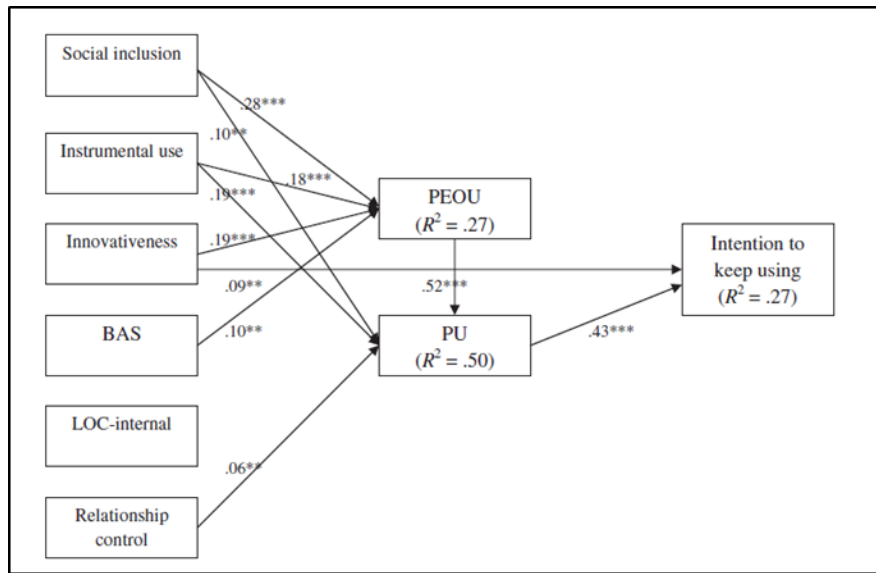


Figure 4: Theoretical framework on factors affecting the South Korean people's use of smartphone by N. Park et al. (2013)

The fifth and the last theoretical framework review for this study is from a study entitled "A model of the relationship between psychological characteristics, mobile phone addiction and use of mobile phones by Taiwanese university female students by F.-Y Hong, et al. in 2012. This study surveyed 269 Taiwanese university students using Rosenberg's self-esteem scale, Lai personality inventory, a mobile usage questionnaire and mobile phone addiction. The findings of this study showed that social extraversion and anxiety have positive effects on mobile phone addiction. Please refer figure 2.5 for details on the framework.

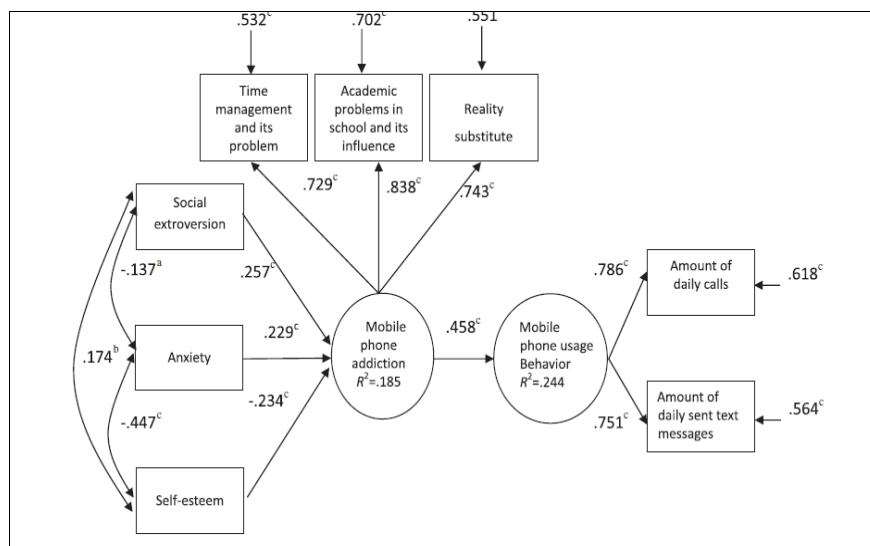




Figure 5: Theoretical framework on psychological characteristics, mobile phone addiction and mobile usage behavior model by Hong et al. (2013).

### 2.5 Methodological Review

This section will justify about the approach and methods used in this study. According to Collis and Hussey (2009), a methodology is an approach to the process of the research, encompassing a body of methods and a method is a technique for collecting and/or analyzing data which are guided by the research paradigm selected and relies on various issues and consideration such in data collection and analysis.

Based on the past study, it was identified that most of the study of this subject is conducted through a quantitative method of survey via questionnaire as an instrument. The researcher argued and intended to conduct this research by using the quantitative method for data collection and analyzed the data quantitatively using statistical tests. The reason for choosing the quantitative methodology also was driven by the research paradigm (explain later in the chapter three).

In addition, using survey also will help the researcher in testing the relationship that the result can be generalized to the population being studied. This is very important for the researcher since data collected from the respondents will be using the quantitatively and then would drive fact and figure which could be explained for better understanding.

Table 2: Methodological review

Author	Methodology
Y.-K Lee, et al. (2014)	Quantitative (survey)
Robert & Pirog (2013)	Quantitative (survey)
M. Salehan & A. Negahban (2013)	Quantitative (survey)
N. Park, et al. (2013)	Quantitative (survey)
F.-K Hong, et al. (2013)	Quantitative (survey)

### 3. Theoretical Framework

There are four independent variables, and two dependent variable involve in this study. These variables have been identified from the theoretical review and previous study section. The definition of each variable can be found in this section along with the variable description and related with another study. In this study the relationship between the independent variables and dependent variables will be examined and hypotheses are proposed in this section.

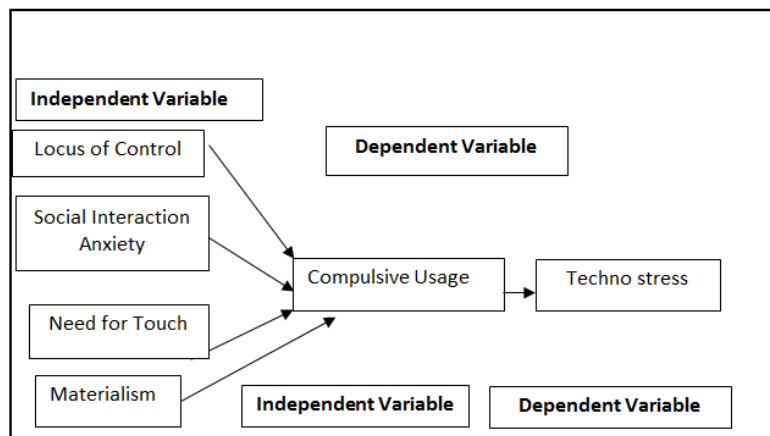


Figure 6. Theoretical Framework

### 3.1 Locus of Control (LOC)

Rotter (1954) has defined locus of control as a person’s about control over life events which was being widely used as an antecedent to individual’s social behaviors or decision-making. A few years later, the locus of control refers to an individual’s perceptions about the cause of event in people’s life and also the ability to affect the outcome through the people’s own actions (Rotter, 1966). Basically, the locus of control has been applied in various fields, especially in health psychology according to research by (N. Park et al. 2013).

A previous study by Wallston, Maids and Wallston (1976) found that health –related information seeking is a joint function of the person’s locus of control beliefs and the value placed on health. Meanwhile, Martin and Saleh (1984) have been explored that person with an internal locus of control derives greater benefits from social support than do those who have more external orientation. In addition, some of the researcher's thoughts that locus of control had a relationship between the technologies used in the area of ICT.

For example, the research by Chak and Leung (2004) had been exposed that a higher internal locus of control is linked with less addictive internet behavior. Leong (2011) had discovered that an increased sense of control over the environment was positively associated with successful computer use. In this study, the assumption can be made is the investigation the relationship between locus of control and technology use in not directly.

N. Park, et al. (2013) has been concluded that the individuals with a high locus of control are likely to be more willing to use smartphone given that smartphone provide numerous functions and features with which users feel that they control the events taking place around them. Another research has been explored that locus of control influences how one copes with stress (Qiang et al. 2010). While the other research by (Ng et al. 2006) found that internally engage in problem-focused coping behaviors to reduce stress by making and following plans. These arguments of this study proposed the following hypothesis:

### *3.2 Social interaction anxiety*

Schlenker and Leary (1982) have been defined that social interaction anxiety is an excessive fear of social situations or interactions with others, and being evaluated or scrutinized by other people, particularly when encountering strangers in public settings. In addition, Caplan (2007) found that the need to reduce anxiety motivates socially anxious people to minimize their chances of making undesired impressions on others. Leary (1983) also explored that acute social anxiety leads to social withdrawal and isolation. Meanwhile, Morahan- Martin and Schumacher (2003) and Yen, et al. (2012) have shown that lonely and anxious individuals positively benefit from on-line interaction.

Takao, et al. (2009) found that the problematic internet use and smartphone use may share the same properties because both of them are related to communication tools and interpersonal interaction. However, the group of people is likely to develop problematic or excessive Internet use behavior. These arguments of this study proposed the following hypothesis:

### *3.3 Need for Touch*

The need for touch defined as a preference for the extraction and utilization of sensory information obtained through touch or the haptic system (Peck & Childers, 2003a; Peck & Childers, 2003b). Therefore, Oulasvirta et al. (2012) also indicated that 35% of phone usage sessions are touching behaviors. In addition, Y.K Lee et al. (2014) found that need for touch is emphasized in this research since the more hedonic satisfaction the smartphone brings, the more users with a stronger need for touch may become more compulsive and depend on the smartphone. Based on the arguments, this study proposed the following hypothesis:

### *3.4 Materialism*

Richins & Dawson (1992) have explored that materialism is, a person's belief about the importance of material possession in people's life. In addition, Belk (1985) has been found that an individual with a high level of materialism, described as "materialistic", considers material possessions to be central to people's life and identity. As general, the material is based on the people's perception of the thing that they want in their life. The materialism is affected by consumer's reasoning when evaluating purchases, and influences their post-purchase satisfaction (Richins, 2004).

While the other research by Rindfleish, Burroughs & Wong (2009) and the result was positively that is related to the luxury goods (Tatzel, 2002; Wong & Ahuvia, 1998). In addition, the previous study by Chang (2008) had been defined that individuals consider the latest smartphone model to be a symbol of material possessions. In the study of Lee et al. (2014) had predicted that materialism may be resulted in compulsive usage of the smartphone. Based on these arguments:

### *3.5 Compulsive usage*

The compulsive usage define by O’Guinn and Faber (1989) as “response to an uncontrollable drive or desire to obtain, use, or experience a feeling, substance, or activity that leads the individual to repetitively engage in behavior that will ultimately cause harm to the individual and/or others”. Therefore, it will measure the pattern of competitive which including all the person's behavior such as window shopping, eating and also all activities that have been doing every day as mentioned by (Parylak, Koob & Zorrilla, 2011).

In addition, the smartphone is having the ability to quickly access has been studied by (Oulasvirta et al., 2012). Other than that, the study by Matusik & Mickel (2011) had been found that the compulsive behaviors are addicted to be more satisfied, adverse consequences of psychological distress such as depression and stress are more likely to be induced as well. Lee at al. (2014) has been found that the technostress can be served as a useful sign of stress. Based on the arguments, this study proposed the following hypothesis:

### *3.6 Technostress*

The technostress is defined as “The Consequence of Technology” by Champion (1988) which concluded that the rapidly and changing technology would be affecting the person’s life. In the research by Brod (1982) has been found that the probability factors that can effect on technostress as being depend on the level of technical experience of the user, age, pressure of supervision during used, general working and also environment in the situation or event.

Some of the research technostress is by Enis (2005) which determined the six fundamental factors that librarians used in connecting with technostress that action that's been regarding this issue. In addition, Enis (2005), also defined that the technological innovations will change very rapidly because of that, the technostress will be more affected by the user.

## **4. Conclusion**

All the variable defined for this study to review in this chapter. This chapter also gives a better understanding of smartphone usage and the relationship between the compulsive behavior and technostress. The theoretical framework of this study can be seen in the Figure 1 to Figure 5 and review on the methodology has been done in this chapter. For this reason, theoretical framework used in this study has been presented in Figure 6. In addition, this review will help in getting to understand about the topic and assist in the development of a research framework. Methodology used and variables applied in this study has been clearly reviewed, define and justified in this chapter along with the definition of the related term use in this study.

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