THE INFLUENCE OF FACEBOOK SOCIAL INTERACTION ON HEALTHY EATING BEHAVIOUR AND WORK PRODUCTIVITY

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FACULTY OF BUSINESS AND ACCOUNTANCY
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ABSTRACT

In the current competitive global environment, one of the core determinants of the business success lies in the foundation to workplace productivity amongst the employees. The rise of social media in the health domain can have it play the role of an alternative channel for the promotion of healthy eating behaviour. Literatures outlined that social interaction on Facebook seems relevant towards the promotion of positive health behaviour(s). However, details pertaining to the interaction and its subsequent impact on health remains unexplored. This research examines the influence of Facebook social interaction on healthy eating behaviour and its subsequent impact on work productivity.

Using the quantitative research approach, data were collected using self-administered questionnaires. The questionnaires were distributed to working adults online who used Facebook, while its paper counterparts were distributed via snowball, purposive, and convenient sampling. A total of 770 usable responses were collected within 8 months. The structural equation model (SEM) technique was used to assess the proposed research framework.

All seven hypotheses proposed in this research were accepted. Both social ties and Facebook use were found to have a positive influence on social interaction on Facebook. The results indicated that social interaction on Facebook plays a significant role in improving healthy eating knowledge, leading towards more positive healthy eating attitude, which in turn results in healthy eating behaviour and increased work productivity.

This research pioneered the understanding of the role of Facebook for healthy eating behaviour and work productivity. It integrated two theories, namely social capital theory and consumer socialisation theory for the construction of a comprehensive theoretical framework, which describe the determinants and influence of Facebook social interaction

on individuals' healthy eating attitude, knowledge and behaviour, leading to increased work productivity. The theoretical contribution of this research lies in its extension and verification of social capital theory and consumer socialization theory in online settings, especially in the context of social media. Social ties and Facebook use are introduced as the new antecedents to the existing consumer socialization framework. The findings from this research provide an imminent foundation for organizations when formulating strategies for workplace healthy eating promotion for enhancing work productivity. Facebook can be used to as an effective tool and platform to reach and communicate with the employees about healthy eating.

This research confirmed that Facebook could help organizations reach their employees for cultivating healthy eating behaviour and increase work productivity. This research is noteworthy in its contribution towards the advancement of the discipline of health behaviour and productivity management with the application of social media.

ABSTRAK

Dalam pasaran global yang semakin mencabar pada masa kini, maka usaha meningkatkan kesihatan dan produktiviti telah menjadi fokus utama setiap perrniagaan untuk mengekalkan tahap persaingan mereka. Kajian-kajian lepas yang berkaitan dengan initiatif kesihatan di tempat kerja hanya memberi tumpuan kepada risiko amalan dan jarang diberi perhatian kepada amalan pemakanan yang sihat. Pemunculan media sosial dalam domain kesihatan pada masa kini boleh memainkan peranan sebagai saluran alternatif untuk mempromosikan amalan pemakanan yang sihat dalam konteks program promosi kesihatan di tempat kerja. Terdapat bahan-bahan literatur yang menunjukkan bahawa interaksi sosial di *Facebook* agak relevan untuk mempromosikan amalan-amalan kesihatan yang positif. Walau bagaimanapun, tidak ada kajian terhadap interaksi sosial dan impak terhadap kesihatan. Kajian ini mengisi kekosongan ini dengan mengkaji pengaruh interaksi sosial *Facebook* terhadap amalan pemakanan yang sihat dan impak seterusnya terhadap produktiviti kerja.

Dengan menggunakan kaedah kuantitatif, data-data kajian diperolehi melalui borang soal-selidik yang ditadbir sendiri oleh pengkaji. Borang soal-selidik ini diedarkan kepada golongan bekerja yang menggunakan *Facebook* melalui talian dan juga melalui pengedaran terus. Pemilihan sampel kajian adalah melalui kaedah persampelan bertujuan, *snowball* dan rawak. Sejumlah 770 respon bolehguna diperolehi dalam tempoh 8 bulan. Teknik *Structural Equation Model* (SEM) digunakan untuk menganalisis kerangka penyelidikan yang telah dicadangkan.

Kesemua tujuh hipotesis yang dicadangkan dalam kerangka kajian ini telah diterima. Didapati ikatan sosial dan penggunaan *Facebook* mempunyai pengaruh positif dalam interaksi sosial di *Facebook*. Dapatan juga turut menunjukkan bahawa interaksi sosial di *Facebook* memainkan peranan yang agak signifikan dalam meningkatkan pengetahuan

pemakanan yang sihat dan membimbing seterusnya kearah tabiat pemakanan yang positif. Pengetahuan dan tabiat ini membawa kepada amalan atau tingkah laku pemakanan yang sihat dan peningkatan produktivi kerja.

Kajian ini merintis pemahaman tentang peranan *Facebook* terhadap amalan pemakanan yang sihat dan produktiviti kerja. Dalam kajian ini, integrasi dua teori iaitu teori modal sosial dan teori sosialisasi pengguna menjadi panduan kepada pembangunan kerangka teroritikal yang komprehensif. Rintisan teori ini menerangkan faktor penentu dan pengaruh interaksi sosial *Facebook* terhadap amalan, pengetahuan dan sikap pemakanan yang sihat seseorang individu. Sumbangan teoritikal kajian ini berpusat kepada pengembangan dan pengesahan teori modal sosial dan teori sosialisasi pengguna terhadap persekitaran dalam talian, khususnya dalam konteks media sosial. Ikatan sosial dan penggunaan *Facebook* diperkenalkan sebagai antecedent yang baru kepada kerangka sosialisasi pengguna yang sedia ada. Dapatan dari kajian ini juga memberi pemahaman asas yang penting kepada organisasi ketika menggubal strategi promosi pemakanan yang sihat di tempat kerja masing-masing sebagai usaha meningkatkan produktiviti. *Facebook* boleh digunakan sebagai suatu alatan dan landasan yang berkesan untuk mencapai dan berkomunikasi dengan warga pekerja mereka tentang pemakanan yang sihat.

Kajian ini juga menentusahkan bahawa Facebook berguna membantu organisasi mencapai warga pekerja mereka dalam usaha memupuk amalan pemakanan yang sihat dan meningkatkan produktiviti kerja. Kajian ini penting dalam sumbangannya memajukan disiplin amalan kesihatan dan pengurusan produktiviti melalui aplikasi media sosial.

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LIST OF ABBREVIATIONS AND SYMBOLS

ABBREVIATIONS

AGFI	Adjusted Goodness of Fit Index
AMOS	Analysis of Moment Structures
AVE	Average Variance Extracted
CDC	Centers for Disease Control and Prevention
CFA	Confirmatory Factor Analysis
CFI	Comparative Fit Index
CMIN/DF	Normed Chi-Square
COM	Communality
CR	Composite Reliability
EFA	Exploratory Factor Analysis
FacebookUse	Facebook Use
GFI	Goodness of Fit Index
GOF	Goodness of Fit
H	Hypotheses
HEA	Healthy Eating Attitude
HEBeh	Healthy Eating Behaviour
HEKnow	Healthy Eating Knowledge
InfoExchange	Information Exchange
KMO	Kaiser-Myer-Olkin
MI	Modification Index
ML	Maximum Likelihood
MSA	Measures of Sampling Adequacy
NFI	Normed-Fit Index
PAF	Principal Axis Factoring
PCA	Principal Components Analysis
PNFI	Parsimony Normed Fit Index
RMR	Root Mean Square Residual
RMSEA	Root Mean Square Error of Approximation
RNI	Relative Noncentrality Index
RO	Research Objective
RQ	Research Question
SEM	Structural Equation Modelling
SMC	Squared Multiple Correlations
SocialSupport	Social Support
SoInteraction	Social Interaction
SoTie	Social Ties
SPSS	Statistical Package for The Social Sciences
SRC	Standardized Residual Covariance
SRMR	Standardized Root Mean Square Residual
SRW	Standardized Regression Weight
TLI	Tucker-Lewis Index
VIF	Variance Inflation Factor
WHO	World Health Organization

| WHP | Workplace Health Promotion |
| WorkProduct | Work Productivity |

SYMBOLS

%	Percent
±	Plus or minus
<	Less than
>	More than
≥	Equals or more than
≤	Equals or less than
p	Probability level
χ^2	Chi-square
Df	degrees of freedom
β	Beta
=	Equal

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CHAPTER 1

INTRODUCTION

1.1   INTRODUCTION

In the current competitive global environment, one of the core determinants of the business success lies in the foundation to workplace productivity amongst the employees. Employees' productivity (used interchangeably with work productivity in this thesis) is a core component of a company's ability to generate revenue (Prochaska et al., 2011), as those who are productive often make a big difference to company's bottom lines. Notably, employees' productivity is crucial towards organisational performance outcome (Datta, Guthrie, & Wright, 2005). There are many factors that can affect employees' productivity, some are controllable by the employers, while others are personal. Previous works identified work related factors that affect employees' productivity, such as psychosocial work characteristics (van den Heuvel, Geuskens, Hooftman, Koppes, & van den Bossche, 2010), job stress and job satisfaction (Hoboubi, Choobineh, Kamari Ghanavati, Keshavarzi, & Akbar Hosseini, 2017), organization culture (Terzioglu, Temel, & Uslu Sahan, 2016), and organisation environment practices (Delmas & Pekovic, 2018). Kirsten (2010) identified employees' health as non-work related factor that influences work productivity.

Indeed, an increasing body of work confirmed the link between employees' health and productivity (Brooks, Hagen, Sathyanarayanan, Schultz, & Edington, 2010; Kirkham et al., 2015; Lenneman, Schwartz, Giuseffi, & Wang, 2011; Mitchell & Bates, 2011; Robroek, van den Berg, Plat, & Burdorf, 2011). Intuitively, this makes sense. Productivity is bound to decrease when employees are unable to make it to work due to

health problems (absenteeism). Health problems also decrease employees' performance (presenteeism) (van den Heuvel et al., 2010). This was outlined by O'Donnell (2000) in his conceptual model that links health, productivity, and profit. He pointed out that when employees are physically and emotionally able to work and with a desire to do so, their performance increases, thus leading to increased work productivity and organisational profits.

Past research showed that health conditions and risks contribute towards the loss of work productivity (Fernando, Caputi, & Ashbury, 2017; Iverson, Lewis, Caputi, & Knospe, 2010; Mitchell & Bates, 2011; Zhang, Gignac, Beaton, Tang, & Anis, 2010). Evidences confirmed that medical condition and illnesses impact work productivity, where disease activity and functional ability are linked to work productivity (de Hooge et al., 2016). Commonly, the measurement of work productivity reduction are associated with specific diseases and chronic health conditions, such as diabetes (Lopez, Annunziata, Bailey, Rupnow, & Morisky, 2014), chronic obstructive pulmonary disease (Ding, Small, Bergström, & Holmgren, 2017), irritable bowel syndrome (Buono, Carson, & Flores, 2017; Michael et al., 2014), and rheumatoid arthritis (Burton, Morrison, Maclean, & Ruderman, 2006; Walker, Michaud, & Wolfe, 2005). However, recently modifiable health behaviour risks were found to be the top contributors to work productivity (Lenneman et al., 2011), such as unhealthy eating behaviour, physical inactivity, tobacco use and alcohol abuse. These modifiable health behaviour risks are found to be associated with various measure of work productivity such as the rate of both absenteeism, presenteeism, and job performance (Shi, Sears, Coberley & Pope, 2013). Among these modifiable health behavioural risks, unhealthy eating behaviour was identified as one of the top drivers that contribute to employees' productivity impairment (Lenneman et al., 2011). According to Shi et al. (2013), unhealthy eating seemed to be more relevant for

address due to its prevalence relative to other behaviour. Lenneman et al. (2011) stressed on the need to address health behaviour in the context of the highest level of work productivity impairment by considering its prevalence rate. Accordingly, the implicit cost in the context of work productivity loss due to unhealthy eating behaviour is anticipated to be significant, hence the cultivation of healthy eating behaviour is imperative for the improvement of work productivity (Byrne et al., 2016; Fitzgerald, Kirby, Murphy, & Geaney, 2016).

Healthy eating behaviour is the key to ensure balance and good nutrition intake. Past research has discussed the impact of nutrition on work productivity (Croppenstedt & Muller, 2000; Desai et al., 1984; Gopaldas & Gujral, 2003; Haddad & Bouis, 1991). Proper nutrition which is achieved by adopting healthy eating behaviour is an important factor towards increasing individuals' cognitive skills, making them feel more energetic and decrease the number of days lost to illness; all of which are expected to increase work output and productivity (Martorell & Arroyave, 1988).

The rise of social media in health domain render it relevant factor that contributed to individuals' total diet (Vaterlaus et al., 2015). According to Bissonnette-Maheux et al. (2015), social media provides the opportunities for interactive communication, which enable knowledge transition for healthy eating. In fact, several researchers have demonstrated the positive application of social media for healthy eating behaviour (Caplette et al., 2017; Dumas et al., 2017; Williams, Hamm, Shulhan, Vandermeer & Hartling, 2014). McGloin and Eslami (2015) pointed out that individuals' eating behaviour can be influenced via social media due to its ability in affecting healthy eating related knowledge and skills.

Numerous researches related to social media and health have addressed the role of social media for health behavioural changes (Cavallo et al., 2012; Valle, Tate, Mayer, Allicock,

& Cai, 2013). According to Murray, Burns, Tai, Lai and Nazareth (2005), online interaction and health communication between individuals would improve users' knowledge, which lead to health behaviour change and positive health outcome. In the majority of social media-based health promotion and intervention research, social media is used not only to delivery information, but it is also as social interaction platform to share information, facilitate discussion, and socially support users (Foster, Linehan, Kirman, Lawson, & James, 2010; Maher et al., 2015; Merchant et al., 2014; Ruotsalainen et al., 2015; Valle et al., 2013). As such, social interaction on social media seems to be relevant towards the promotion of positive health behaviour (Loss et al., 2014).

Among the social media platforms, emerging evidences revealed that Facebook can be leveraged for the promotion of positive health behaviour (Cavallo et al., 2012; Napolitano et al., 2013; Ramo, Thrul, Chavez, Delucchi, & Prochaska, 2015; Struik & Baskerville, 2014). There are two broad reasons why Facebook is of relevance for health behaviour promotion. First, Facebook provides a wide outreach to the population. It is recognised as the most popular social media platform, with ~ 79% of the internet users on it, which is more than double that of Twitter (24%), Pinterest (31%), Instagram (32%), and LinkedIn (29%) (Greenwood, Perrin, & Duggan, 2016). Also, Facebook topped the user list, with more than 1.9 billion monthly active users, while other social media platforms were reported to have much lower users, e.g. YouTube (1 billion), Instagram (600 million), Twitter (317 million), Pinterest (317 million), and LinkedIn (106 million) (Showers, 2017). (PricewaterhouseCoopers, 2011). Secondly, Facebook offers a variety of technical features that facilitate social interaction (Nadkarni & Hofmann, 2012). Several researchers confirmed the use of Facebook features for social activities, such as communications, consumption and broadcasting (Burke, Kraut, & Marlow, 2011), collaborative learning (Ractham & Firpo, 2011), social support (Bender, Jimenez-

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Marroquin, & Jadad, 2011; David, Anthony, & Pauls, 2015), and information exchange (Zhang et al., 2013).

Evidently, Facebook is used for social activities such as maintaining social connection (Ellison, Steinfield, & Lampe, 2007) and social interaction (Pempek, Yermolayeva, & Calvert, 2009). According to Foster et al. (2010), social interaction on Facebook is an influential factor that contribute to positive health behaviour. As a platform for social interaction, Facebook is perceived as a useful channel for communication and accessing social support and information resources (Vitak & Elllison, 2013). According to Deliens, Clarys, De Bourdeaudhuij, and Deforche (2014), Facebook is useful for obtaining healthy eating information and advice for healthy eating practices. As a two-way communication medium, Facebook has the potential to influence individuals' eating behaviour due to its ability to facilitate the sharing of content and provision of feedback among users and allow the users to interact about their eating behaviour and dietary choices. As such, social interaction is deemed to take place on Facebook which can contribute to healthy eating behaviour.

There has been much research on the factors influencing social interaction on Facebook. Existing research revealed that social ties create opportunities for social interaction and can help individuals to access resources such as information, social support on Facebook (Luarn et al., 2015; Rozzell et al., 2014; Vitak & Ellison, 2013). Facebook features such as like, comment, share, page, group are found to be useful to support social interaction especially for communication, to seek and provide information and social support among the users (e.g. Burke, Marlow, & Lento, 2010; Ractham & Firpo, 2011; Vitak & Elllison, 2012). Facebook was not specifically designed for health-related interaction nor does it explicitly target any particular community; but it has created unique opportunities for tracking the interactions between social connectivity and health (Centola, 2013). The

existing body of knowledge is still lacking in explaining individuals' healthy eating behaviour and its impact on work productivity through using Facebook for social interaction. This research intends to examine the effect of social ties and the use of Facebook features on social interaction and subsequently how it leads to healthy eating behaviour and its subsequent effects on work productivity.

1.2   PROBLEM STATEMENT

In order to maintain a competitive advantage edge, improving health and productivity at workplace(s) has become a critical focus for the survival of business across the globe. With strong evidences supporting the strong association of employees' health with work productivity (Fernando et al., 2017; Iverson et al., 2010; Mitchell & Bates, 2011; Zhang et al., 2010), many organisations initiated workplace health promotion (WHP) programmes, intending to improve employees' health-related behaviours and productivity (Anderson et al., 2009). It is encouraging to observe significant positive effects, especially on unhealthy eating behaviour and physical activity inactivity (e.g. Loeppke et al., 2010; White et al., 2015). While both physical activity and healthy eating were identified as the top health issues in driving employees' health and productivity strategy (Buck Consultants, 2010), many organisations focus on the promotion of physical activity while paying relatively little attention towards encouraging healthy eating behaviour(s). This may be due to the evidence on the effect of physical activity on work productivity being widely available (e.g. Lahti, Laaksonen, Lahelma, & Rahkonen, 2010; Proper et al., 2004; Thøgersen-Ntoumani, Loughren, Taylor, Duda, & Fox, 2014; van den Heuvel et al., 2005), which is not the case for healthy eating (Proper & van Mechelen, 2008).

Although there is much evidence supporting the connection between healthy eating behaviour and work productivity, the results are somewhat limited and inconsistent. For instance, healthy eating behaviour was found to be associated with presenteeism in longitudinal studies by Shi et al. (2013) and Kirkham et al. (2015), and productivity loss at work in a cross-sectional study by Robroek et al. (2011). However, no association was found between healthy eating and absenteeism in aforementioned studies. Contrarily, healthy eating behaviour was found to be related to absenteeism in a study by Fitzgerald et al. (2016). Pelletier, Boles and Lynch (2004) found that healthy eating behaviour is related to both absenteeism and presenteeism. These inconsistencies could be attributed to the differences in the measurement of healthy eating behaviour and outcome measurement in the case of productivity.

Previous WHP studies mostly target multiple health behaviour risks (e.g. Byrne et al., 2016; Loeppke, Edington, Bender, & Reynolds, 2013; White et al., 2015). According to Jensen (2011), studies estimating productivity gains from the effect of healthy eating remains limited. To date, there are only two renowned research that examine the effect of healthy eating behaviour on productivity (Fitzgerald et al., 2016; Katcher, Ferdowsian, Hoover, Cohen, & Barnard, 2010), and it must be pointed out that these studies did not detail the assessment of healthy eating behaviour and evaluation on the method of promotion of healthy eating behaviour that lead to a positive effect on productivity. As outlined by Ni Mhurchu et al. (2010), it is important to understand the effect of health behaviour change into hard outcomes, such as productivity. It should also be noted that the cause-effect relationships between healthy eating behaviour and related outcomes remained unclear. It is hard to draw definite conclusions on the need to address healthy eating for increased productivity, given the sub-optimal study designs and weak process evaluations (Geaney et al., 2013). This research attempts to close this gap via the

provision of insights into what and how the process need to influence healthy eating behaviour and increase productivity.

Currently, social media is touted as a relevant factor that contribute to individuals' total diet (Vaterlaus, Patten, Roche, & Young, 2015). It also seems effective in influencing health relate behaviour(s) (Laronjo et al., 2015; Maher et al., 2014). According to Bissonnette-Maheux et al. (2015), social media provide the opportunities for interactive communication, which enable knowledge transition in the case of healthy eating. Therefore, social media is proposed as an alternative channel for promotion of healthy eating behaviour (Deliens et al., 2014). Although there are increasing empirical evidences on the effectiveness of social media use for health behaviour promotion (Maher et al., 2014), there is still a lack of clarity on the internal mechanism of social media leading to positive health behaviour. Past research in the area of social media as a platform for health promotion and intervention mainly focused on summative and outcome evaluations instead of formative and process assessments (Balatsoukas, Kennedy, Buchan, Powell, & Ainsworth, 2015). For instance, most research reporting the effectiveness of social media only focused on evaluating the primary targeted outcomes, such as weight (Napolitano et al., 2013; Valle et al., 2013) and physical activities (Cavallo et al., 2012; Foster et al., 2010; Valle et al., 2013). Also, there is no studies involving the evaluation of formative and process assessments in health behaviour, specifically healthy eating.

According to Murray et al. (2005), online interaction and health communication between individuals would improve users' knowledge, leading to health behaviour change and positive health outcomes. In most social media-based health promotion and intervention research, social media is not only used to delivery information, it is also used as an interaction platform to share information, facilitate discussion, and socially support the users (Foster et al., 2010; Merchant et al., 2014; Ruotsalainen et al., 2015; Valle et al.,

2013). As such, interactions on social media seems to be relevant towards promoting positive health behaviour (Loss et al., 2014). Currently, the interaction on social media are merely assessed by analyzing replies to social media posts (Cavallo et al., 2012; Struik & Baskerville, 2014). The detail aspects of the interaction and its subsequent impact on health behaviour(s) are somehow unexplored. A few researchers suggested the need to examine interactions, particularly on how people interact with one another on social media (Zhang et al., 2013), and which type of interaction(s) support health behaviour (Maher, Ryan, Kernot, Podsiadly, & Keenihan, 2016). According to Gold et al. (2011), future studies should investigate the interaction process and its impact on related knowledge, attitudes, and behaviour for social media-based health promotion. This study intends to assess the social interaction process on social media and its related impacts, such as knowledge and attitude leading to health behaviour, such as healthy eating.

While it has been highlighted that social media is a powerful tool for health promotion due to its expansive reach and interactivity (Korda & Itani, 2013), a number of studies attempted to leverage existing popular social media platforms, such as Facebook to promote health behaviour(s) such as physical activity (Cavallo et al., 2012; Napolitano et al., 2013), and smoking cessation (Ramo et al., 2015; Struik & Baskerville, 2014). Facebook is not specifically designed for health-related interactions nor does it explicitly target any particular community. Nevertheless, it has created novel opportunities for elucidating the interactions between social connectivity and health (Centola, 2013). Past health intervention studies attempted to adopt Facebook as platform for social interaction and reported positive outcome on heath behaviour(s). However, these evidences were sparse and mixed due to the studies' limitations and designs. For instance, improvements in health behaviour were observed in health intervention studies with Facebook as a platform for social interaction, information delivery, and provision of social support

(Foster et al., 2010; Valle et al., 2013). Conversely, no significant health behaviour change was found when Facebook was used as supplementary platform for social interaction and social support (Cavallo et al., 2012; Herring, Cruice, Bennett, Davey, & Foster, 2014). It can also be noted that none of these studies explored how social interaction on Facebook lead to health behaviours, especially in the context of healthy eating behaviour. This research intends to elucidate the influence of Facebook social interaction upon healthy eating behaviour.

1.3   RESEARCH QUESTIONS

The main questions guiding this research include:

1. What is the determinant of Facebook social interaction?
2. What is the effect of Facebook social interaction on interaction outcomes that lead to healthy eating behaviour and work productivity?

The specific questions guiding this study are as follows:

1. Do social ties and Facebook use influence the social interaction on Facebook?
2. Does social interaction influence interaction outcomes namely Facebook users' healthy eating attitude and healthy eating knowledge?
3. Do these interaction outcomes namely healthy eating attitude and healthy eating knowledge lead to healthy eating behaviour?
4. What is the effect of healthy eating behaviour on work productivity following the social interaction on Facebook?

1.4   RESEARCH OBJECTIVES

The main objectives of this research are to examine the determinants of Facebook social interaction and the influence of Facebook social interaction on healthy eating behaviour leading to increased work productivity. Several specific objectives are formulated, as follows:

1. To determine the effect of social ties on social interaction

2. To identify the effect of Facebook use on social interaction

3. To explore on the effect of social interaction on healthy eating attitude

4. To investigate the effect of social interaction on healthy eating knowledge

5. To examine the effect of healthy eating attitude on healthy eating behaviour

6. To determine the effect of healthy eating knowledge on healthy eating behaviour

7. To investigate the effect of healthy eating behaviour on work productivity

1.5   SIGNIFICANCE OF THE STUDY

The significance of this study is embedded in understanding the influence of Facebook social interaction on healthy eating behaviour leading to increased work productivity. The use of social media for health purposes has been increasing, which makes it an important aspect that needs to be studied. The results can contribute knowledge to various stakeholders using social media in the health domain. This research pioneers the understanding of the role of Facebook for health behaviour and work productivity. The findings of this study will elucidate how the social interaction process is carried out on Facebook for healthy eating purposes and its influence on healthy eating behaviour leading to increased work productivity. This study will also provide useful information

pertaining to the determinants of Facebook social interaction. It is expected to produce several theoretical and managerial contributions to the body of knowledge.

Theoretical Contribution

By integrating the social capital theory and consumer socialization theory, this study developed an extended theoretical framework that describes the influence of Facebook social interaction on individuals' cognitions and behaviours in the context of healthy eating behaviour. Two variables namely Facebook use and social ties, are introduced as the new antecedents to the existing consumer socialization framework, which will provide a better understanding on the factors influencing social interaction on Facebook, subsequently influencing healthy eating knowledge, attitude and behaviour.

Most health intervention and Facebook related research focuses on health behaviours, such as physical activity, while none are focused on healthy eating. This research pioneers the exploration of the application of Facebook for healthy eating behaviour and its subsequent effect on work productivity. This is the first empirical evidence on the influential role of Facebook on positive health behaviour and subsequently improved productivity. It is therefore expected to expand the current knowledge on the fact that Facebook can be a positive source of influence for healthy eating behaviour and work productivity. This research also investigates the effect of social interaction on Facebook that contributes to healthy eating knowledge and attitude, leading to healthy eating behaviour. This will expand the available evidence on the influence of social environment on healthy eating from an online perspective.

Managerial Contribution

The findings of this research will highlight the effect of healthy eating on work productivity. This will raise the awareness of employers on the need to develop initiatives towards improving employees' healthy eating behaviour for increased work productivity. The results will contribute to the formation of strategies that improve employees' work productivity via healthy eating behaviour. The findings of this research will act as a guide for the development of workplace policies and initiatives targeting in improving healthy eating behaviour, which subsequently help increase productivity. For instance, it can provide information and education about healthy eating and guarantee the availability and increased option for healthy food for their employees.

This research highlights the influential role of Facebook in positive health behaviour, indicating the potential use of Facebook as a strategy delivery tool for workplace health programmes. Since this research provides insight into how social interaction takes place on Facebook and its influence on healthy eating behaviour; the health authorities and agencies can use it to plan, design, and develop the relevant healthy eating promotion programmes using Facebook. Also, the identification of the determinants of Facebook social interaction will provide useful knowledge for the development of strategy for increasing individuals' engagement to social interact on Facebook for healthy eating.

1.6   ORGANISATION OF THESIS

This thesis comprises of six chapters. Chapter one introduces the work and highlights the growing concern about the dramatic economic burden due to health-related impaired productivity and modifiable health behaviour risks leading to work productivity impairment. It also discusses the possible role of Facebook as the social interaction

platform for healthy eating bahviour which then lead to better work productivity. This is then followed by the problem statement, research objectives, and research questions. The significance of the study and definition of terms are also presented.

Chapter two details the literature on the topic. It starts with an introduction, which outlines an overview of work productivity and its effect of employees' health on work productivity. This will then be followed by the impact of one of the most significant health behaviour risk, namely healthy eating behaviour. Subsequently, the chapter will present the review on healthy eating behaviour and its determinants. A brief review will be presented on social media, its use for health domain, and its impact on health behaviour, focusing on healthy eating behaviour. Social interaction on social media will also be discussed. This will then be followed by a review on Facebook and its use for health and healthy eating behaviour. Finally, the determinants of Facebook social interaction will be presented. The chapter also include a detailed theoretical background of this research.

Chapter three presents the research framework and hypotheses. It begins with an overview of the model development and variables of this research. It then discusses the hypothesis development on the relationships between the variables. The proposed conceptual framework for this research will then be presented.

Chapter four details the research methodology adopted in the case of this research. It provides an overview of the research design and process. Next, the development and operation of the measures are presented. It will then be followed by discussion on the development and administration of the survey instrument.

Chapter five reports on the result of data analyses, which include data cleaning, test for multivariate assumptions, descriptive statistic of demographic profile, mean and standard deviation of the variables. The exploratory factor analysis and results of the reliability test

will also be presented. Next, the result of confirmatory factor analysis and hypotheses testing on the relationship will be presented.

Chapter six discusses the results and compares them to the theories and past empirical works. The findings are then summarised and the contribution of this research are discussed from three aspects, namely theoretical, managerial, and marketing contribution. Finally, the limitations and direction for future research are detailed. This chapter will then go on to conclude the thesis.

CHAPTER 2

LITERATURE REVIEW

2.1 INTRODUCTION

This chapter presents an overview of the context of this research, which is work productivity and health behaviour. It explores the effect of employee' health on work productivity, followed by focusing on the impact of one of the most significant health behaviour risk, namely healthy eating behaviour. Subsequently, it presents a short review of both individual and social determinants of healthy eating behaviour. Next a review on consumer socialisation theory and its application for eating behaviour is presented. A brief review on social media, its use for the health domain and its impact on health behaviour, particularly for healthy eating behaviour, is then presented. Social interaction on social media is discussed as well. Next, a review on Facebook is presented and previous studies pertaining to Facebook use for health and healthy eating behavior are reviewed, and critical issues in the research area are identified. Two determinants of social interaction, namely Facebook use and social ties, are identified. Finally, social capital theory is also reviewed as the theoretical background of this research.

2.2 WORK PRODUCTIVITY

Work productivity is a critical factor in determining the strength and sustainability of a company's overall business performance (Koopman et al., 2002). Employees' productivity has become a core determinant in how much revenue can be generated by a company. It is difficult for a company to maintain growth and profitability when employees' productivity drop (Prochaska et al., 2011).

The term productivity is broad in scope, and the definition depend on its setting and use. Generally, productivity refers to the relationship between generated inputs/outputs (Escorpizo, 2008). Productivity is referred as the efficient use of resources (e.g. labour, capital, materials) in the production of various goods and services. Specifically, work productivity is defined as the relation of the volume of specific work completed to the capacity of the employees (in numerical, cost or time term). It is regarded as an assessment of efficiency of the working employees (Prokopenko, 1987). In other words, work productivity is the amount of work produced in a given time frame and it is related to individuals' ability to complete tasks, as per their respective job descriptions.

Work productivity can be related to a variety of factors and can be influenced by both work and non-work related factors. Several studies showed that work related factors, such as psychosocial work characteristics (van den Heuvel et al., 2010), job stress and job satisfaction (Hoboubi et al., 2017), organization culture (Terzioglu et al., 2016), and organization environment practices (Delmas & Pekovic, 2018) have influence on work productivity. Also, it can be influenced by non-work related factors at a personal level, such as employees' health and well-being (Kisten, 2010; Mitchell & Bates, 2011).

Evidence from current literature has confirmed the association between employees' health with work productivity (Brooks et al. 2010; Kirkham et al., 2015; Lenneman et al., 2011; Mitchell & Bates, 2011; Robroek et al., 2011). Work productivity can decrease when employees are unable to be present at work due to health conditions (absenteeism) and due to health conditions, employees' performance are affected (presenteeism) (van den Heuvel et al., 2010). Health conditions affecting employees' performance at work could include health behaviour risk (e.g. unhealthy behaviour, physical inactivity), minor and acute health problems (e.g. common cold), chronic and more serious medical conditions (e.g. diabetes, arthritis) (e.g. Breton et al., 2013; Gignac, Cao, Lacaille, Anis,

& Badley, 2008; Tunceli et al., 2005). This was pointed out long ago by O'Donnell (2000) in his conceptual model linking health, productivity and profit. The ability to work is dependent on the health of the employees. When employees are physically and emotionally able to work and with desire to work, they perform better, which leads to increased productivity and organisational profits (O'Donnell, 2000).

Generally, work productivity can be analysed via the rate of absenteeism and presenteeism due to health conditions (Loeppke et al., 2009). Absenteeism is commonly measured by the number of days absent from work or work time missed due to illness/health conditions (e.g. Lenneman et al., 2011; Loeppke et al., 2009; Mitchell & Bates, 2011). On the other hand, presenteeism is commonly measured through the degree of work impairment or reduced working capability due to health (Lenneman et al., 2011; Mitchell & Bates 2011; Shit et al., 2013). Often, it is based on the self-assessment of on-the-job work performance (Loeppke et al., 2009; van den Heuvel et al., 2010) and also work performance relative to co-workers or one's norm (Mattke, Balakrishnan, Bergamo, & Newberry, 2007).

Measurement of work productivity is challenging despite the known effect of health condition on work productivity loss. There is lack of agreement in the measurement of work productivity, due to many ways, perspectives, and occupational settings in defining work productivity (Escorpizo, 2008). Majority of the established measurements include both absenteeism and presenteeism as indicators for work productivity (e.g. Davies, Santanello, Gerth, Lerner, & Block, 1999; Endicott & Nee, 1997; Goetzel, Ozminkowski, & Long, 2003; Lam, Michalak, & Yatham, 2009; Lerner et al., 1997; Kessler et al., 2003; Koopmanschap, 2005; Stewart et al., 1999; Van Roijen, Essink-bot, Koopmanschap, Bonsel, & Rutten, 1996) . However, there is a lack of uniformity in how these indicators can be measured. For example, the recall periods for self-reported data on absenteeism

and presenteeism varies between a week to 3 months. It was highlighted by Mattke et al. (2007) that self-reported data is valid and reliable if the recall period is short (i.e. 1-2 weeks). The methods used to measure presenteeism vary widely depending on the selected instrument. The measurement may include direct estimation of time loss or unproductive work time (e.g. Goetzel et al., 2003; Lam et al., 2009; Van Roijen et al., 1996), amount and quality of productivity loss using scale (e.g. Meerding, Ijzelenberg, Koopmanschap, Severens, & Burdorf, 2005), perceived impairment in productivity (e.g. Koopman et al., 2002; Lerner et al., 2001; Reilly, Zbrozek, & Dukes, 1993), and self-reported productivity relative to co-workers or one's norm (e.g. Davies et al., 1999; Lam et al., 2009; Shikiar et al., 2004; Stewart et al., 1999).

In addition, there is a lack of detailed methodological guidance on how work productivity should be measured (Zhang et al., 2011). Both objective and subjective measure approaches were adopted in previous research. Objective measure approach requires observed data (Escorpizo, 2008). For example, Lerner et al. (2003) measured objective productivity using the number of phone calls answered by the workers and the number of hours worked. Pransky et al. (2006) measured the number and types of bills processed by the workers and the number of worked hours for bill processing in capturing objective work productivity in their study. Although objective work productivity is a tangible way of quantifying productivity, there are issues in its application in the broad set of industries and occupations (Escorpizo, 2008). The objective measurement for productivity may not be feasible and are difficult to interpret or generalise (Pransky et al., 2006). The quantitative methods measuring output and input quantities used in the production process are usually not applicable to service companies. In service industry, productivity represents a more complex construct which emphases on efficiency and takes into account both quantity and quality aspect for inputs and outputs (Calabrese, 2012; Vuorinen,

Järvinen, & Lehtinen, 1998). Also, objective measure is not always available to capture work productivity in terms of presenteeism (Noben, Evers, Nijhuis, & de Rijk, 2014; Zhang et al., 2011)

Due to the unavailability and constraints of objective measures for work productivity, the subjective measurement approach is recommended (Zhang et al., 2011). Several established instruments used to assess work productivity, such as Health and Productivity Questionnaire, Health and Work Questionnaire (Shikiar et al., 2004) adopt subjective measurement approach by asking the respondents to rate their overall work performance and the quality and amount work produced. In some research, work productivity is measured based on the perception of employees on their own work productivity (e.g. Wattles & Harris, 2003), where it is measured as the degree that the employees consider themselves productive (Marans & Spreckelmeyer, 1981). In line with the recommendation from Zhang et al., (2011), this research adopts the subjective measure approach, where work productivity is referred as the degree to which individuals perceive their productivity and ability to perform task at work.

2.3 HEALTH AND WORK PRODUCTIVITY

Previous research showed that health condition and health risks can result in decreased work productivity (Fernando et al., 2017; Iverson et al., 2010; Mitchell & Bates, 2011; Zhang et al., 2010). Mitchell and Bates (2011) assessed on the productivity impact associated with multiple health conditions and lifestyle health risk factors. Both presenteeism and absenteeism are found to be significantly associated with the presence of health conditions and lifestyle health risks. Higher number of health risks and conditions were associated with lower levels of productivity. Also, similar direction of

changes was observed between productivity and number of health conditions, which means that those who suffered from fewer health conditions during follow up measurements also reported reduced productivity loss, while those suffering from increased number of health conditions from the baseline period to follow up measurement reported increased productivity loss.

Numerous studies have confirmed that individuals with health behaviour risks and those living unhealthy lifestyle are less productive at work and take more sick days (Robroek et al., 2011; van Duijvenbode, Hoozemans, van Poppel, & Proper, 2009). According to Shi et al. (2013), all health behaviour risks, namely unhealthy eating behaviour, physical inactivity, tobacco use and alcohol abuse are associated with the rate of both absenteeism, presenteeism and job performance. In another study conducted by Kirkham et al. (2015), physical inactivity and tobacco use were significantly associated with both absenteeism and presenteeism, while unhealthy eating behaviour and alcohol abuse were only found to be significant associated with presenteesim.

Evidently, the connection between health behaviour risk and work productivity has been confirmed; when individuals improve health behaviour risks, their work productivity will subsequently improve (Burton et al., 2006; Lenneman et al., 2011; Pelletier et al., 2004; Shi et al., 2013). The correlation between health risks reduction over time and productivity improvement was confirmed through a few of the longitudinal studies on work productivity. This was first confirmed by Pelletier et al. (2004), where positive changes in health risk were associated with positive changes in productivity. An improvement up to 9% for presenteeism and a reduction up to 2% for absenteeism were reported, with each risk factor reduction in their study. Similarly, Lenneman et al. (2011) confirmed that when individuals improved their health risk status by changing their health status from high risk (three or more modifiable health risks) to low risk (two or fewer

modifiable health risks), their productivity impairment levels were significantly reduced by 0.76%. In another study by Shi et al. (2013) on health behaviour risks which include unhealthy diet, inadequate exercise, tobacco use, excessive alcohol use and poor safety practice, it was reported that a 5% reduction on these health behaviour risks would yield a 0.31% reduction in absenteeism rate, $0.22 - 0.37\%$ reduction in presenteeism rate and 0.04% improvement in job performance.

Among the modifiable health behaviours risks, unhealthy eating behaviour was found to be the most frequently observed behaviour risk in studies examining the link between health and productivity (Pelletier et al., 2004).

2.4   UNHEALTHY EATING BEHAVIOUR AND WORK PRODUCTIVITY

Unhealthy eating behaviour is associated with work productivity loss (Robroek et al., 2011). Current evidence suggested that productivity impairment is exacerbated by obesity (Fitzgerald at al., 2016) and unhealthy eating behaviour was found to have a mitigating effect on obesity (Milani & Lavie 2009; Jensen, 2011) and subsequently, work productivity. Cash et al. (2012) explained that unhealthy eating behaviour may operate through body mass index (BMI) to affect work productivity. BMI is weight-for-height measure which classify individuals as underweight (BMI$\leq$18.49 kgm^{-2}), normal weight (BMI=18.50–24.99 kgm^{-2}), overweight (BMI=25.00–29.99 kgm^{-2}) or obese (BMI$\geq$30.00 kgm^{-2}). Generally, obese individuals are more chronically ill and consequently they will have more absence from work due to sickness as compared to non-obese individual (van Duijvenbode et al., 2009; Sanchez Bustillos, Vargas, & Gomero-Cuadra, 2015). Obesity has been linked to a number of chronic diseases such as cardiovascular disease, diabetes, cancer (Akil & Ahmad, 2011; Pi-Sunyer, 2009) and these health problems can lead to as

high as 39.2 million lost workdays (Wolf & Colditz, 1998). Unhealthy eating behaviour such as overconsumption of energy dense food e.g. fast food (Rosenheck, 2008) and soft drinks (Gibson, 2008) have been shown to be linked to weight gain, contribute a significant impact on BMI as well as the risk of obesity (World Health Organization, 2008). As such, unhealthy eating behaviour is deem relevant to work productivity.

According to Lenneman et al. (2011), unhealthy eating behaviour is one of the top five drivers contributing to employees' productivity impairment. Their study demonstrated that productivity impairment rate was significantly greater by 1.8% for individuals who were at high risk for unhealthy eating behaviour relative to those who were at low risk. It was also reported that a 23% decrease in risk status for unhealthy eating behaviour would result in 0.25% of reduction productivity impairment. In term of absenteeism, the predicted absent days of individuals with unhealthy eating behaviour were reported to be 1.1 day higher than those who hold healthy eating behaviour (Fitzgerald et al., 2016). Systematic review by Cancelliere et al. (2011) indicated that unhealthy diet is one of the risk factors contributing to presenteeism. By using the longitudinal study approach, Shi et al. (2013) found that employees who were at high risk for unhealthy eating behaviour were 1.08 times more likely to report presenteeism. Similarly, Kirkham et al. (2015) found that employees who were at risk of unhealthy eating behaviour would have 0.5 day more in presenteeism and report a higher productivity cost loss of US$249 relative to those not at risk. They also reported that unhealthy eating behaviour had a significant effect on older employees aged 45 and above, where those reporting unhealthy eating behaviour take 0.05 day more in absenteeism.

The truth cost of work productivity loss due to unhealthy eating behaviour is anticipated to be greater compared to other modifiable health behaviour risks. According to Lenneman et al. (2011), it is more costly to employers when the prevalence of the health

risk is high. The prevalent rate for unhealthy eating behaviour was the highest (70%) compared to physical inactivity (43.6%), tobacco use (13.5%) and excessive alcohol use (4.1%) (Lenneman et al., 2011). In another study by Shi et al. (2013), unhealthy eating behaviour was reported to be the most prevalent health behaviour risk (64%) compared to physical inactivity (49%), tobacco use (7.7%) and excessive alcohol use (5.8%). Hence, unhealthy eating is deemed to be more relevant to address due to its prevalence relative to other behaviours.

From the aforementioned studies, it is evident that cultivation of healthy eating behaviour is imperative for better work productivity (Byrne et al., 2016; Fitzgerald, Kirby, Murphy, & Geaney, 2016). Healthy eating behaviour is the key to ensure balance and good nutrition intake. Proper nutrition which is achieved by adopting healthy eating behaviour is an important factor towards increasing individuals' cognitive skills, making them feel more energetic and decrease the number of days lost to illness; all of which are expected to increase work output and productivity (Martorell & Arroyave, 1988).

2.5   HEALTHY EATING BEHAVIOUR

Healthy eating is an essential determinant for individuals' overall health. Healthy eating is defined as the adherence to the nutrition recommendations of WHO with the maintenance of normal body weight at body mass index between 20 – 25 kgm-2 (World Health Organization, 2003). Evidences confirmed that healthy eating can reduce the risk of non-communicable diseases such as diabetes, heart diseases and cancer and people can maintain a good health (World Health Organization, 2013).

There are various concepts and definitions of healthy eating adopted in previous research. The most common themes include "balance diet", "healthy eating style", "food contents

and nutrients", "balance and variety" (Akamatsu, Maeda, Hagihara, & Shirakawa, 2005; Chang, 2017; Ranilović, Markovina, Žnidar, & Barić, 2009). Generally, healthy eating habits and behaviour are associated with healthy food consumption such as higher in fruits and vegetables intake and lower in fat intake (Wardle, Parmenter & Waller, 2000), lower intake of sweet and savoury snacks (Visschers, Hartmann, Leins-Hess, Dohle, & Siegrist, 2013). Notably, most agree that healthy eating behaviour should include the limitation of fat, saturated fat, sugar, salt, while increase in the consumption of whole grain food, fruit and vegetables, eat a balance diet and drink lots of water (Ranilović et al., 2009).

Healthy eating behaviour is the key to ensure balance and good nutrition intake. It enables individuals to achieve good health; that is "a state of complete physical, mental, and social wellbeing, and not merely the absence of disease or infirmity" (Australian Bureau of Statistics, 2001). This can be attained from a healthy diet which include consumption of a variety of food from different groups of nutrients including carbohydrates, protein, fat, vitamin, mineral and water (Diaz, 2017). In adherence to healthy eating behaviour, World Health Organization (2014) advised on eating a lot of fresh fruits and vegetables with the intake of at least 5 portions of fruits and vegetables per day; reducing the amount of total fat intake to less than 30% and saturated fat to less than 10% of total energy intake; reducing salt consumption to less than 5g per day and reducing sugar intake to less than 10% of total energy intake.

Past researches have constructed structured measurement tools for the assessment of healthy eating behaviour such as the Dietary Risk Assessment (Jilcott et al., 2007), Adolescent Food Habits Checklist (Johnson, Wardle & Griffith, 2002), Healthy Eating Behavior Inventory (Shimazaki et al., 2016). It can be noted that some of the researches focused on specific aspects, such as nutrient balance, eating pattern and restriction to assess healthy eating behaviour. For example, Dietary Risk Assessment examines the

frequency of various food intake to assess nutrient intake (Jilcott et al., 2007), Adolescent Food Habits Checklist focuses on assessing the pattern of eating behaviour of young people by examining the food habit related to fat, sugar, fruit and vegetable intake (Johnson, Wardle & Griffith, 2002). Also, healthy eating behaviour is assessed along with other health related behaviours in some health studies where the assessment is based on the intake of several important diet component such as fruit, vegetable, fat, sugar and salt intake (Moorman & Matulich, 1993).

Generally, the assessment of healthy eating can be conducted by examining self-perceived or actual measures on dietary behaviour (Hearty, McCarthy, Kearney, & Gibneya, 2007). In nutrition studies, most instruments adopted actual measures approach by focusing on the assessment of nutrient intake via method such as diet recall, dietary record, food frequency questionnaire and record etc. (Bingham et al., 1994; Biro, Hulshof, Ovesen, & Cruz, 2002; Cavadini et al., 1999). However, Govig et al. (2009) argued that these measurement approach required trained personnel which can be labour intensive and costly and may not be able to capture individuals' usual diet. The act of recording individuals' diet intake may influence their food choices, therefore, the dietary record cannot be the representative of individuals' usual diet intake. Also, it is difficult to capture individuals' actual diet intake via diet recall approach since it requires individuals to accurately to recall and report their diet intake. With the abovementioned limitation and shortfall of actual measurement approach, this research adopts the self-measurement approach whereby healthy eating behaviour is measured as the degree to which individual perceives the healthy eating behaviour that he/she has.

2.6 INDIVIDUAL DETERMINANT OF HEALTHY EATING BEHAVIOUR

Past research demonstrated that individual level factors such as nutrition knowledge, eating attitude (e.g. Deliens et al., 2014; Hearty et al., 2007) are more important determinants of healthy eating behaviour. Nutrition knowledge contributes to healthier eating behaviour in terms of the choices for daily meals and types of drinks. According to Variyam et al. (1998), knowledge is one of the influencing factors on individuals' food intake and behaviour. Certain dietary knowledge is needed to make changes in one's eating pattern (Deliens et al., 2014). Generally, if people know the "how" (the benefits of eating certain food) and the "why" (why the food provides particular benefits), they are more likely to consume a particular food (Wansink, Westgren, & Cheney, 2005). As such, knowledge seemed to be the main underlying factor affecting consumers' food choices, which then lead to the consumption of healthy food and healthy eating behaviour (Brečić, Gorton, & Barjolle, 2014; Carrillo, Varela, Salvador, & Fiszman, 2011).

In order to accurately analyse individuals' healthy eating behaviour, it is necessary to account for the psychological factors such as attitude that shape the behaviour (Senauer, 2001). There is a notion that attitude in some way guide, influence, direct, shape and predict actual behaviour (Kraus, 1995). Forming appropriate attitudes toward certain behaviour is important for individuals' behavior. According to Hearty et al. (2007), it is important to consider eating attitude as the target variable, especially in improving healthy eating behaviour because individuals who formed positive attitude towards healthy eating are more compliant to the guidelines for healthy eating.

2.6.1 Healthy Eating Attitude

According to Naughton, McCathy and McCathy (2013), individual's compliance to dietary recommendation is likely associated with attitude. The increased awareness of the role of food as an important contributor to health has led to increased attention on healthy eating attitude (Kearney, Kearney & Gibney, 1997).

Attitude is a psychological tendency expressed by the evaluation on a particular entity with some degree of favour or disfavour (Eagly & Chaiken, 1995). According to Ajzen (1989), attitude can be inferred from three categories of responses: cognition, affect and conation. Cognitive responses consist of the perception reaction and expression of belief about attitude object. On the other hand, affective responses include the physiological reaction and the expression feeling towards attitude object. Attitude inferred from conation responses include the expression of behavioural intentions and overt behaviour with respect to attitude object. These evaluation responses can be based upon feeling, cognition or prior experience, value and belief (Eagly & Chaiken, 1995; Verplanken & Holland, 2002). According to Kaus (1995), attitude in some way will guide, influence, direct, shape and predict actual behaviour. As the fundamental component of behavioural motivation, attitude is generally regarded as the overall evaluation of performing a behaviour (Ajzen & Fishbein, 1977, 2000). It is likely that individuals will engage in a behaviour that supported by their respective attitudes (Ajzen & Fishbein, 2005). As such, it is likely that individuals who are positive towards healthy eating behaviour would be practice it.

Healthy eating attitude (HEA) is regarded as what constitutes "healthy" eating and how important healthy eating is to an individual (Hearty et al., 2007). Attitude toward healthy eating is often included as one of the components in determining factors related to food selection and consumption (e.g. Jun, Kang, & Arendt, 2014; Roininen, LÄHteenmÄKi,

& Tuorila, 1999; Zandstra, de Graaf, & Van Staveren, 2001). It is normally determined by individuals' attitude toward the healthfulness of food and perception on eating healthily. For example, Roininen et al. (1999) determined the attitudes by exploring individuals' perception on healthy eating in relation to food intake, interest in consuming reduced-fat foods and eating foods that do not contain additives and are unprocessed. Some researchers examined attitude toward healthy eating by focusing on a single aspect of healthy eating such as certain diet or nutrient e.g. low fat and low cholesterol diet (Hollis, Carmody, Connor, Fey, & Matarazzo, 1986), salt consumption (Marakis, Tsigarida, Mila, & Panagiotakos, 2014), fish consumption (Pieniak, Verbeke, Olsen, Hansen, & Brunsø, 2010), functional food (Labrecque, Doyon, Bellavance, & Kolodinsky, 2006; Ong, Norizan, Ooi, & Taranjeet, 2014).

The interpretation of HEA differ based on nationality. Akamatsu et al. (2005) examined Japanese workers' attitude towards healthy eating. 'Eating a nutritionally balanced diet' and 'eating plenty of vegetables' were the most emphasised theme in the analysis of attitudes towards healthy eating. It was found that healthy eating attitude is a multi-dimensional construct that consists of 'eating styles and habits' and 'foods and nutrition'. Chang (2017) explored how Taiwanese tourists construe healthy eating and their attitude corresponding attitude towards it. The conceptualization of healthy eating attitude was distinguished into two themes namely "food content and nutrient" and "balanced diet and eating habit". Food content and nutrient theme based HEA comprised of the avoidance or restriction of less healthy food such as meat, salty food, high sugar food, deep fried food; avoid excessive calorie and fat intake; not taking supper; consuming food high in fiber and food without too much seasoning. A balanced diet and eating habit theme based HEA comprised healthy eating behaviour such as acquiring enough energy from the

eating process to maintain a healthy equilibrium, eat various foods, keep regular meals, maintain nutrient balance.

Different from others, Kearney et al. (2001) determined HEA via self-reflection on individuals' dietary behaviour. It is worth noting that numerous studies adapted HEA analyses primarily from Kearney et al. (2001)'s attitudinal questionnaire, which determined responses to statements such as "I make conscious efforts to try and eat a healthy diet", "I try to keep the amount of fat I eat to a healthy amount", "I don't need to change my diet as it is healthy enough" (e.g. Hearty et al., 2007; Sun, 2008). In this research, healthy eating attitude is referred as the degree to which individual perceives the attitude that he/she has toward healthy eating.

2.6.2 Healthy Eating Knowledge

According to Variyam, Blaylock, Smallwood and Basiotis (1998), knowledge is one of the influencing factors on individuals' food intake and behaviour. Certain dietary knowledge is needed to make changes in one's eating pattern (Deliens et al., 2014). Often, individual's dietary knowledge is examined using a Nutrition Knowledge Questionnaire (Parmenter & Wardle, 1999) which covers four aspects: (1) awareness on dietary recommendation for healthy eating, (2) knowledge about nutrient content in different food, (3) daily food choices, (4) awareness between the link of diet and diseases. Differ from others, Dickson-Spillmann, Siegrist and Keller (2011) measured dietary knowledge by examining both declarative and procedural knowledge. Declarative dietary knowledge is factual knowledge, knowledge of "what is" while procedural dietary knowledge is the skill and strategies knowledge linked to how to do something (Worsley, 2002).

Verbeke (2008) pointed out that mixed results were reported in empirical studies investigating the impact of knowledge on dietary behaviour and further commented that it is important to distinguish between the two knowledge constructs: subjective and objective knowledge. Subjective knowledge refers to what individuals think they know and can also be indicative of perceived or self-rated knowledge. Objective knowledge refers to what an individual actually know, where can normally be assessed by tests (Brucks, 1985). For example, subjective knowledge for healthy eating is referred as the perceived knowledge that individuals think they have in the case of healthy eating. On the other hand, objective knowledge for healthy eating is the actual knowledge that individuals have, which is normally assessed based on the recommendations for healthy eating, nutrient content in different food, link between diet and disease (e.g. Ares, Giménez & Gámbaro, 2008).

Previous researches reported that subjective knowledge is a stronger driver for consumer behaviour relative to objective knowledge (House et al., 2004; Pieniak, Verbeke, Brunsø, Olsen, & Fish, 2006; Pieniak, Aertsens & Verbeke, 2010). According to Verbeke (2008), the more consumers are convinced of being knowledgeable (subjective), the less their factual knowledge (objective) matters in the context of the determinant of food choices and dietary behaviour. There are substantial evidences in nutrition research showing that subjective knowledge results in higher impact on food consumption relative to objective knowledge. For example, Gámbaro, Ellis, & Prieto (2013) found that subjective knowledge about olive oil is related to higher consumption of olive oil relative to objective knowledge. House et al. (2004) reported that people with higher subjective knowledge are more willing to eat genetically modified food. Pieniak et al. (2010) concluded that subjective knowledge is more important in explaining the consumption of organic vegetables. Hence, in this research, healthy eating knowledge is measured as the

perceived knowledge about healthy eating. Within the context of this research, healthy eating knowledge is referred as the degree to which individual perceives the knowledge that he/ she has pertaining to healthy eating.

2.7   SOCIAL DETERMINANT OF HEALTHY EATING BEHAVIOUR

Eating behaviour is often influenced by social context (Higgs & Thomas, 2016). Evidently, social influence has been found to influence individuals' behaviour (Cialdini & Goldstein, 2004) and this include eating behaviour (Herman, Roth, & Polivy, 2003; Robinson, Thomas, Aveyard, & Higgs, 2014).

Among the social influence literatures, there are substantial studies confirmed the role of social norm on eating behaviour (Croker, Whitaker, Cooke, & Wardle, 2009; Higgs, 2015; Mollen, Rimal, Ruiter, & Kok, 2013; Robinson, 2015). According to Robinson (2015), social norm refers to what most people do or approve of. Social norm is a standard that guides and or constrains a behaviour without force of law and which is understood by members of a group (Cialdini & Trost, 1998). It is theorised to influence individuals' behaviour by providing the individuals with the information that is socially appropriate or adaptive for them to behave and this emerged out from the interaction with others. (Cialdini & Trost, 1998).

As eating often occurs in social context (Higgs, 2015), people eat differently when they are with other people and when they are alone. For example, when people eating in pairs, they tend to match each other's intake (Herman et al., 2003; Robinson, Tobias, Shaw, Freeman, & Higgs, 2011). There have several studies explained on influence of social norm on eating behaviour and the underlying mechanism. According to Higgs and Thomas (2016), individuals' dietary choices tends to converge with those of their close

connection especially when they find that adapting to others' behaviour is adaptive and rewarding. People are more likely to follow an eating norm when it is perceived as socially accepted and is relevant based on social comparison. Modelling occurs when the norm is set by another present person or communicated by textual information or environment cues where people tends to adjust their dietary intake accordingly.

Modelling is one of the most important social influence on eating behaviour (Feeney, Polivy, Pliner, & Sullivan, 2011; Vartanian, Spanos, Herman, and Polivy (2015). According to Feeney et al. (2011), modelling persist even when another person is not physically present where individuals are exposed only to written information of others' dietary intake. In addition, it is noted that there is no different in the strength of modelling for both live confederate and remote confederate. Review conducted by Cruwys, Bevelander, and Hermans (2015) suggested that modeling has relevance for encouraging healthy eating. Several studies have demonstrated positive modelling effect on healthy eating (i.e. fruit and vegetable consumption) (Howland, Hunger, & Mann, 2012; Robinson & Higgs, 2013).

Robinson, Thomas, Aveyard, and Higgs (2014) pointed out that eating norm is a form of information social influence where information about the eating behaviour of people is communicated with others and thus guide individuals into certain eating behaviour. A substantial body of research has shown that social norm messages and information constitute an important source of influence on healthy eating behaviour. Stok, de Ridder, de Vet, and de Wit (2012) examined how social norm-based messages can influence on individuals' fruit intake. They found that high peer fruit consumption message was associated with greater fruit consumptions. Croker, Whitaker, Cooke, and Wardle (2009) revealed that the provision of healthy eating related information would influence individuals' food intake to select healthier food options. According to Higgs, Liu, Collins,

and Thomas (2019), healthy eating behaviour can be encouraged by providing information about others' eating behaviour.

Social support is another social influence that is important for eating behaviour (de Ridder, Kroese, Evers, Adriaanse, & Gillebaart, 2017). Past research has indicated that social support is a determinant of fruit and vegetable intake (Fuemmeler et al., 2006; Langenberg et al., 2000; Shaikh, Yaroch, Nebeling, Yeh, & Resnicow, 2008; Steptoe, Perkins-Porras, Rink, Hilton, & Cappuccio, 2004). Typically, social support is divided into few subtypes, which include emotional, instrumental, appraisal and informational support (Weiss, 1974). Informational support can involve the provision of information about healthy eating which include benefit, impact, healthy food options etc. Instrumental support can involve providing healthy food and also other equipment which help in healthy food preparation. Appraisal support exist in the form of provision of comments and advices for healthy eating. Emotional support can involve expression of pride when one eats healthy. Existing literature has confirmed that social support from family, parents, church members, peer have positive influence on healthy eating behaviour (Chandler, Landry, & Roofe, 2017; Ingstrup et al., 2019; Langenberg et al., 2000; Thrasher, Campbell, & Oates, 2004; Wang, Pbert, & Lemon, 2014).

As highlighted by Cialdini and Trost (1998), social influence is the central component of social interaction. Social interaction is about how people participate in a social network, and also describes the social behaviour of how people interact and socialise with each other. Individuals interact to share information and knowledge, communicate idea, and create and maintain relationships. Communication and information provision during social interaction play significant roles in providing knowledge, shaping individuals' attitude and thus redirecting their decision making in food choices and eating behaviour.

For the past few decades, social interaction has been well recognized as the social influence factor towards eating behavior (Dabbaghian, Mago, Wu, Fritz, & Alimadad, 2012; McKinley, 2009; Thornton et al., 2006). When individuals socially interact, socialisation is assumed to have taken place (McLeod & O'Keefe, 1972). Socialisation is regarded as a learning process where a person may acquire cognitions and behaviours from the socialisation agents via the process of modelling, reinforcement and social interaction (Moschis & Churchill, 1978). The consumer socialization framework seems to be well suited to explain individuals' eating behaviour. During social interaction, individuals may learn about others' healthy eating behaviour via peer modelling. Modelling occurs when others provide information about food intake in a given situation, which allow individuals to learn about their peers' food intake norm based on the given information (Herman, Roth, & Polivy, 2003). Past research has indicated the potential of consumer socialisation framework to explain individuals' eating behaviour (Nicklas et al., 2001; Chan, Prendergast, Grønhøj, & Bech-Larsen, 2010; Mohammed Shobri, Wahab, Ahmad & Ain, 2012; Pedersen, Grønhøj, & Bech-Larsen, 2012)

2.8   CONSUMER SOCIALISATION THEORY

Consumer socialisation is defined as the processes by which people acquire skills, knowledge, and attitudes relevant to their role as consumers in the marketplace (Ward, 1974). The concept of consumer socialisation was first discussed by Ward (1974) focusing on children and later used to discuss the development of consumption related attitude, behaviour and cognition in children and adolescents.

Consumer socialisation theory predicts that socialisation affects individuals' cognitive, affective and behavioural attitude. Socialisation is frequently referred as the learning of

social roles and process where individuals learn to participate effectively within a social environment (Ward, 1974). It can be explained based on two models of human learning: the cognitive development model and the social learning model (Moschis & Churchill, 1978). The cognitive development model views learning as a cognitive-psychological process of adjustment to one's environment and emphasises the interaction of personal and environmental factors. The model of cognitive development also suggests that socialisation is a function of qualitative changes (stages) in cognitive organisation taking place between infancy and adulthood (Moschis & Churchill, 1978). Social learning model in contrast, emphasises the source of influence (commonly known as socialization agent) which transmit norms, attitudes, motivations, and behaviors to the learner.

Combining these models, Moschis and Churchill (1978) developed a consumer socialisation conceptual framework (refer Figure 2.1). They viewed consumer learning as the cognitive-psychological process of adjustment to one's environment and also as a social process. The learning thus enables individuals to become consumers.
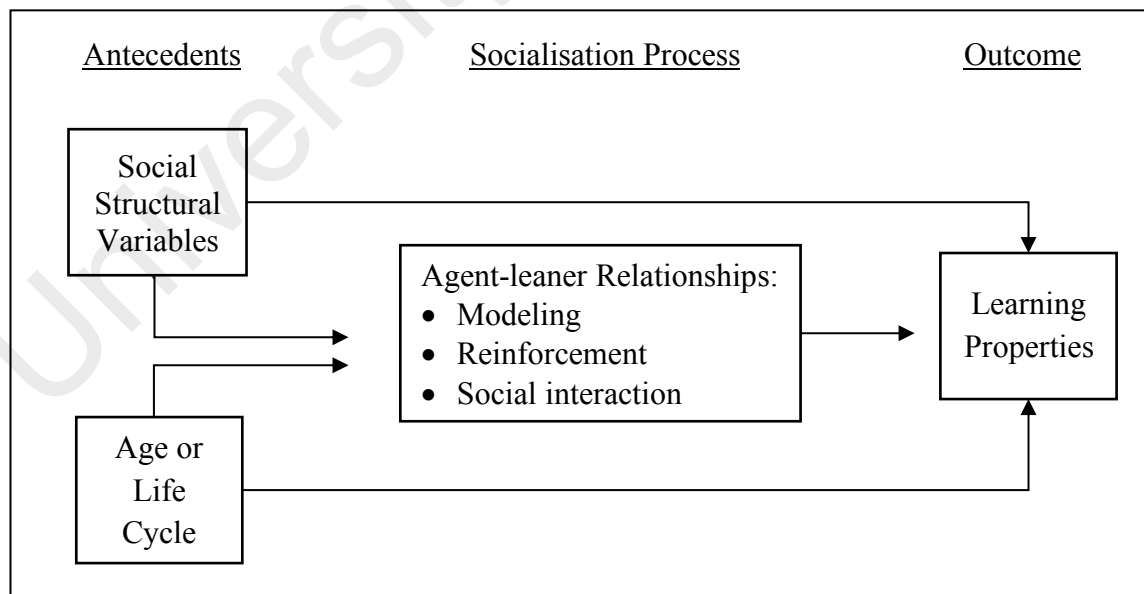
Figure 2.1: A Conceptual Model of Consumer Socialisation
Source: Moschis, G. P., & Churchill Jr, G. A. (1978). Consumer Socialisation: A Theoretical and Empirical Analysis. Journal of Marketing Research, 599-609.

Consumer socialisation consists of three components: antecedents, socialisation process and outcome. There are five variables in the model initially presented by Moschis and Churchill (1978). The first variable is social structural variables. The second variable is age or life cycle position which refers to when socialisation takes place in one's life. The third variable is socialisation agent or a source of influence. The socialisation agent may be any person or organisation involved in the socialisation process due to the frequency of contact with the individual, primacy over the individual, and control over rewards and punishments given to an individual (Brim, 1966). The fourth variable is the type of learning process involved in socialisation. The fifth variable is consumer learning properties (content behaviour), the outcome of the socialisation process, which is normally referred to attitude, skill, knowledge and behaviour that contributes to role playing in a social context.

Socialisation is assumed to be taking place when a person interacts with the socialisation agents in various settings (McLeod & O'Keefe, 1972). During the learning process, a person may acquire cognitions and behaviours from the socialisation agents via the process of modeling, reinforcement and social interaction. Modeling refers to the imitation of socialisation agent's behaviour. The modeling mechanism is largely based on Bandura (1969)'s idea of observational learning where individuals consciously emulate attitude and actions of the social agents such as peers, family members or media content. Reinforcement can be either positive (reward) or negative (punishment) mechanism used by the socialisation agent. Social interaction is the type of learning involved and may include the combination of modeling and reinforcement. Both social structural variables and age or life cycle position are the antecedents to the socialisation process involving the socialisation agent and learning process (the type of leaning process which actually operating). The socialisation process will then directly affect the

consumers' learning properties (Moschis & Churchill, 1978). In short, the consumer socialisation perspective suggests that interaction between the learner and agent in special social setting influence consumer behaviour.

Socialisation in Adulthood

The initial concept of consumer socialisation introduced by Ward (1974) was focusing on children, however, socialization is not limit to children or adolescents, as per Brim (1968), instead it continues throughout life as socialisation experienced in childhood is insufficient to meet the demands in later years. As individual move through the life circle, the emphasis in socialisation will move from motivation to ability and knowledge and from concern on values to concern on behaviour (Brim, 1968). Goodwin and Sewall (1992) argued that people do experience socialisation throughout adulthood because the life changes that people undergo alter the effectiveness and desirability of previous consumption patterns. When individuals enter adult stage in the life cycle, they will continue to learn different consumption behaviour as changes in the existing patterns of behaviour occur (Moschis & Smith, 1985). Berger and Berger (1979) described childhood socialisation as primary socialisation whereby it is a process where the children become participant members of society while adulthood socialisation as the secondary socialisation. They further elaborated that secondary socialisation occur when individuals enter a specific social world and are expected to learn a specific social role. As individual enter adulthood, there is a need to learn in order to respond to new demands that do not stop at the end of childhood and they must continually learn to play new or altered roles and to relinquish old ones (Smith & Moschis, 1984). Hudson and Brown (1983) were among the first researchers that applied consumer socialisation concept to explore on adult preventive health care behaviour. They emphasized that since preventive health care

behaviour change over in individuals' life cycle, therefore socialization perspective helps in providing better understanding on what, how and why these changes occur.

Application of Consumer Socialisation Theory for Healthy Eating Behaviour

Past research indicated that consumer socialisation framework can be used to explain individuals' eating behaviour. Parents and family members are found to be the main socialisation agents in the socialisation process that influence children's eating behaviour. For example, Nicklas et al. (2001) explained that parents' preferences, beliefs and attitudes towards food shape their children's food-related beliefs, attitudes, knowledge, preferences and consumption, which in turn influence their eating behavior. Pedersen et al. (2012) unfolded the roles of both parents and children in the process of healthy eating socialisation. Chan et al. (2010) investigated the influential role of parent, friends, teacher, government publicity for healthy eating among Hong Kong and Danish adolescents and found that parents were the most influential socialization agent. Differ from others, Mohammed Shobri et al. (2012) focused on adult eating behaviour and investigated the influence of family, peers and television advertisement towards the consumption of fast food.

Past research on healthy eating behaviour primarily adopted theories such as theory of planned behaviour (e.g. Åstr⊘sm & Rise, 2001; Chan & Tsang, 2011; Conner, Norman, & Bell, 2002; Grønhøj, Bech-Larsen, Chan, & Tsang, 2013; Povey, Conner, Sparks, James, & Shepherd, 2000) and social cognitive theory (e.g. Anderson, Winett, & Wojcik, 2007; Anderson, Winett, Wojcik, & Williams, 2010; Doerksen & McAuley, 2014; Sheeska, Woolcott, & MacKinnon, 1993). Compared to these theories, consumer socialization theory is found to be more appropriate to be the foundation for this research.

Brug (2008) commented that there is lacking in the previous studies that primarily focused on determinants of eating behaviours at individual level and argued that eating behaviour should be determined by both individual level and environmental factors. Unlike theory of planned behaviour which only focus on the determinant at individual level, consumer socialisation theory takes into account of both individual factor (i.e. knowledge) and environment factor (i.e. peer influence) in determining healthy eating behaviour. What people choose to eat is indeed influenced by a complex and interrelated set of determinants of eating behaviour and this include different cognitions and environmental factors (Brug, Oenema, & Ferreira, 2005). Social cognitive theory focus on personal (e.g. knowledge, expectation), behavioural (e.g. self efficacy, skill) and social factors (e.g. social norm, influence, reinforcement) to explain healthy eating behaviour, however, the evaluation of these determinants were not in formative and process approach. Brug et al., (2005) emphasised that broader approach is required to give deeper understanding on healthy eating behaviour and this can be done by integrating different cognitions and also environmental factors. It was also highlighted that formative and process evaluation approach is in need to give an in depth understanding on health behaviour (Rootman & Goodstadt, 2001) as well as to include the channels that may work to influence the behaviour (Brug et al., 2005).

Both individual and social factors play substantial role in influencing individuals' behaviour. The understanding of the how these factors determine healthy eating behaviour require formative and process approach, therefore a suitable theoretical approach is in need to understand how individual engage into healthy eating in social context and also to provide deeper insights on the influence of both individual and social factors on healthy eating behaviour. The adoption of consumer socialisation theory seems to be promising in providing more comprehensive and understanding on healthy eating

behaviour. Consumer socialisation theory posits that socialisation is a learning process which lead to outcome that normally referred to attitude, skill, knowledge and behaviour and socialization agent is a source of influence. It is anticipated that individuals learn through social interaction process and gain healthy eating knowledge, attitude and behaviour. As such, consumer socialisation theory is relevant in providing in-depth understanding on the influence of social interactions on the socialization process that lead to these outcomes and the role of socialisation agent as the media through which attitudes, and knowledge are transmitted to the socialising individuals.

Socialisation Agents

A socialisation agent is regarded as a source of influence in various social setting who transmit norms, attitudes, motivation and also behaviour to the learner (Moschis & Churchill, 1978). According to Moschis (1987), information can be communicated by socialisation agent to the learner through various mechanisms. Firstly, the socialisation agent may communicate certain norms and expectation to the learners (consciously or subconsciously) when they perform certain acts. Secondly, the socialisation agent may influence other's behaviour via both positive and negative reinforcement when they attempt to communicate certain desires with others. Thirdly, the socialisation agent may influence learner's behaviour through overt communication process which often referred as the social interaction mechanism.

In the past, parents or family, school and peers have been identified as the primary socialization agents (Bellenger & Moschis, 1982; Carlson, Grossbart, & Walsh, 1990; Chan et al., 2010; de Gregorio & Sung, 2010; Grossbart & Crosby, 1984; Mohammed Shobri et al., 2012). In the digital era, more attention has been paid on media as

socialisation agent such as television, movie, radio, internet web sites, newspaper, magazine (Churchill & Moschis, 1979; de Gregorio & Sung, 2010; Lee, Salmon, & Paek, 2007; Paek, Reber, & Lariscy, 2011; Sherry, Greenberg, & Tokinoya, 1999). Recently, with the increasing popularity of social media over the traditional types of mass media, there is potential that social media can play a role as socialization agent. This is due to the unique features that social media possess for social interaction and multilevel communication within the social group and its ability to facilitate the acquisition of information that allow the users to learn the related knowledge and skills. Scholars have conduct studies on peer communication on social media and further confirmed that peers on social media act as socialisation agent and play an influential role on attitudes and behaviour (Chu & Sung, 2015; Muralidharan & Men, 2015; Wang, Yu & Wei, 2012).

2.9   SOCIAL MEDIA

The use of social media has grown tremendously over the past decades due to the advancement of information and communication technologies and internet innovations. The growth of social media use continues to accelerate around the world, with global penetration rates of 37% with an estimation of 2.789 billion active users (Chaffey, 2017). By employing mobile and web-based internet technologies, social media provide an interactive platform for people to share, create, discuss and modify contents generated by the users (Kietzmann, Hermkens, McCarthy, & Silvestre, 2011). Kaplan and Haenlein (2010) defined social media as a group of internet-based applications that build on the ideological and technological foundations of Web 2.0, which allowed for the creation and exchange of user generated content. Social media are typically classified into 6 types which include collaborative projects (e.g. Wikipedia), blogs, content communities (e.g. YouTube, Flickr, SlideShare), social networking sites (e.g. Facebook), virtual game

worlds (e.g. World of Warcraft, EverQuest), and virtual social worlds (e.g. Second Life) (Kaplan & Haenlein, 2010).

Social media have different sets of functionality and usage. Kietzmann et al. (2011) proposed a honeycomb framework of seven social media functional blocks to understand how social media activities vary in terms of their function and to develop related social media strategy. These functional blocks are identity (e.g. self-presentation), conversations (e.g. communicate with others), sharing (e.g. knowledge exchange), presence (e.g. others' reality perception), relationships (e.g. related to others), reputation (e.g. social standing), and groups (e.g., form communities). By applying uses and gratifications theory, Whiting and Williams (2013) explained on the uses and gratifications of consumers using social media, namely social interaction, information seeking, pass time, entertainment, relaxation, communicatory utility, convenience utility, expression of opinion, information sharing, and surveillance/knowledge about others. According to Luchman, Bergstrom and Krulikowski (2014), social media usage is associated for 2 dimensions namely fun-related (e.g. entertainment), content specific (e.g. getting information), depending on their respective levels. Accordingly, there are 4 types of social media use, which are (1) information seeking (high content specific/low fun related), (2) focused entertainment (high-content-specific/high-fun-focused), (3) purpose driven (low-content-specific/low-fun-focused) and (4) socially-driven fun (low-content-specific/high-fun-focused).

A variety of theories and models are used in social media research. Generally, these theories can be categorised into three groups, namely (1) personal behaviour theories, (2) social behaviour theories, and (3) mass communication theories based on the aspects focused upon (Ngai et al., 2015). Personal behaviour theories such as theory of planned behaviour, theory of reasoned action and technology acceptance model are commonly used to examine individual behaviour in using social media. For example, Pelling and

White (2009) used theory of planned behaviour to determine the psychosocial variables that predict the social media usage. Peslak, Ceccucci and Sendall, (2012) determined the elements that influence individual's decision to use social media by using theory of reasoned action. Technology acceptance model (TAM) is used to determine the actual usage behaviour of social media (Pinho & Soares, 2011; Rauniar, Rawski, Yang, & Johnson, 2014). Also, TAM is used to assess the adoption of social media in different fields, such as collaborate learning among students (Al-Rahimi, Othman, & Musa, 2013), sharing travel experience among travelers (Kang & Schuett, 2013), sharing medical knowledge and lifelong learning among physicians (McGowan et al., 2012). Differ from personal behaviour theories, social behaviour theories such as social capital theory, social influence theory, consumer socialisation theory are used to study the social phenomena and behaviour while using social media. Social capital theory is a popular theory in social media research, which emphasises the role of social connection in achieving goals (Ngai et al., 2015). This theory is useful in the field of social capital drawn from relationships among the social media users (Ellison, Steinfield, & Lampe, 2011). Social influence theory is used to determine the influential factors leading to the participation of individuals on social media (Cheung, Chiu, & Lee, 2011). Consumer socialisation theory predicts the effect of communication process on cognitive, affective and behavioral attitudes among the social media users (Wang, Yu, & Wei, 2012). Accordingly, the users learn about values, attitudes and skills through the communication and social interaction with others on social media, which will influence multiple aspect of users' behaviour. Finally, mass communication theories such as uses and gratifications theory and media richness theory exploit the concern of the mass communication effect on individuals' activities in social communities (Ngai et al., 2015). Uses and gratifications theory is commonly used to as a foundation for understanding why and how individuals use social media to fulfill their respective needs (Bonds-Raacke & Raacke, 2010; Park, Kee, &

Valenzuela, 2009; Quan-Haase & Young, 2010; Raacke & Bonds-Raacke, 2008). For instance, Bonds-Raacke and Raacke (2010) found that students used Myspace and/or Facebook to support their information, friendship and connection needs. Park et al. (2009) found that students used Facebook to support 4 primary needs, which are socializing, entertainment, self-status seeking, and information. In this research, social behavior theories will be used since they are applicable to study the social phenomena and behaviour while using social media.

A number of social media studies reported the application(s) of social media in different setting for specific purposes. Critical literature review by Ngai et al. (2015) showed that social media is used in various domains such as organizational communications, marketing, customer relationship management, education and training, knowledge sharing and collaborative activities. In the past decade, a phenomenon that should be mentioned is the diversity in form and function of social media for health communication (Chou, Hunt, Beckjord, Moser, & Hesse, 2009; Colineau & Paris, 2010; Moorhead et al., 2013). Social media play an increasingly prominent role in healthcare. The general public, patients and health professionals are using social media platforms such as Facebook and Twitter to communicate about health issues (Moorhead et al., 2013).

2.9.1 Social Media and Health

The use of social media in the health domain is fast gaining popularity. It is no longer purely used for friendship or social networking. Social media has brought a new dimension to healthcare, where it provides a platform for people to communicate and discuss health issues (Moorhead et al., 2013). Research shows that people use it to share personal health information and experience, seek health related information and discuss

personal health issues (Lin, Zhang, Song & Omori, 2016; Oh, Lauckner, Boehmer, Fewins-Bliss, & Li, 2013; Oh & Kim, 2014; Shaw & Johnson, 2011). According to Pew Internet and American Life Project Report in 2011, 23% of the social media users followed their friends' personal health experience or updates on social media, 15% obtained health information, 11% posted comments, queries or information about health or medical matters, 9% joined a health related group on social media (Fox, 2011). Another survey conducted by Pricewaterhouse Coopers (2012) showed that 42% of social media users sought health related consumer review on social media, 32% explored on friends'/family health experiences, 29% viewed information of others' health experiences and 29% viewed the health related video/images posted by patients on social media. They also reported that 80% of the social media users are likely to share health information and take part in health related activities on social media. Clearly, people access health content on social media and social media provide opportunities for health related endeavours.

Social media is unique as it enables timely dissemination of health and safety information and expand reach to more broad and diverse users while facilitating interactive communication, connection, engagement and information sharing (Centers for Disease Control and Prevention, 2011). Through social media, personalised and reinforced health messages are easily tailored or disseminated to specific users, which empower people to make healthier decisions (Centers for Disease Control and Prevention, 2011). These features allow health advocators and providers to turn to social media platforms such as Facebook, Twitter, Youtube to circulate health information (Vance, Howe, & Dellavalle, 2009). For example, Mayo Clinic's Facebook wall page provide links ranging from risk factors of tuberculosis to various medical encyclopedias which can be shared to many others. CDC utilised content communities such as Flickr and YouTube to share

information about swine flu and H1N1 during the outbreak (Gupta, Tyagi, & Sharma, 2013)

Social media can serve as a channel for social support and facilitate a sense of connectedness among individuals (Korda & Itani, 2011), which can potentially influence individual's health behaviour (Laranjo et al., 2015). Various social support groups are formed based on common health interest on Facebook, especially those related to chronic diseases such as breast cancer, colorectal cancer and diabetes (Torre-Díez, Díaz-Pernas, & Antón-Rodríguez, 2012). According to Zhang et al. (2013), members in health groups on Facebook interact for information exchange, emotional support and contribute in community building. They also share their personal experience in managing own medical problems and provide opinion and advice to peers, as a mean of support to others.

Recently, the use of social media is becoming more common among patients with chronic diseases when managing their medical conditions. For example, patients with diabetes seek health information on social media, especially on diabetes treatment options, ways to cope with diabetes, nutrition and alternative or complementary therapists (Shaw & Johnson, 2011). Patients also interact with peers on social media for emotional support (Colineau & Paris, 2010). Chung (2014) used uses-and-gratifications framework to determine what motivate patients to use social media. The strongest motivation was to seek information, where they wanted to learn more about the health condition, to find out about treatment and to seek for advice from people with similar health problems. They also like to help others on social media by sharing their own personal experiences. It was reported the patients are aware of the availability of information and emotional support on social media. In addition, some patients use social media to provide feedback on the doctor's performance following consultation (Kadry, Chu, Kadry, Gammas, & Macario, 2011).

Similarly, social media is becoming more prevalent within the field of health promotion, with healthcare professionals and agencies adopting it for health education and interventions e.g. weight management (Chang, Chopra, Zhang, & Woolford, 2013; Napolitano et al., 2013), physical activity (Cavallo et al., 2012), sexual health promotion (Gold et al., 2011), H1N1 flu pandemic disease (Reynolds, 2010; Walton, Seitz, & Ragsdale, 2012). Facebook, Twitter and YouTube are common social media platforms being used for this purpose (Balatsoukas et al., 2015). In the USA, public health is expanding the use of social media for health promotion and this is evident by 60% of the state health departments using at least one social media application (Thackeray, Neiger, Smith, & Van Wagenen, 2012). Korda and Itani (2013)'s review provides an understanding on the use of social media for health promotion. Accordingly, its promise as a powerful tool for health promotion lies on its expansive reach and interactivity, which enable both anonymity and social networking based on users' preference. These have corresponded to the essential characteristic of settings for health promotion. As such, social media can be used as an outreach tool to educate and engage individuals for sharing and distributing health related messages (Loss et al., 2014). The potential of social media for health promotion lies on it offers the opportunity to initiate on going exchange of ideas and experiences about certain health concerns and foster "word of mouth" communication sharing the health content among the users (Thackeray, Neiger, & Keller, 2012)

In essence, the important aspect of using social media for health communication is that it can provide easy access of health information and valuable peer, social and emotional support (Moorhead et al., 2013). Its ability to support communication and social interaction in real time at relatively low cost render it suitable for use in the health domain.

2.9.2   Impact of Social Media on Health Behaviour

Social media such as Facebook, Twitter seems able to encourage health behaviour (Centola, 2013; Maher et al., 2016). When people interact with others on social media and learn from shared information, it helps raise awareness and knowledge. While interacting with others on social media, individuals observe and learn about their peers' health behaviour via the experiences, practices and shared actions. This would alter their thinking patterns and attitudes, subsequently resulting in behavioural change (Centers for Disease Control and Prevention, 2011). In short, the interaction process on social media make individuals learn and model the health behaviour from those they are interacting with and subsequently change their health behaviour.

The role of social media towards instigating health behavioural changes has been explored and confirmed with modest evidence. Positive effects were reported on health behavioural change in studies using social media for online health promotion (Balatsoukas et al., 2015) and online health intervention (Laranjo et al., 2015). Aspects of social media such as social support, peer pressure, empowerment, interactive information and emotional sharing appear to have the potential to influence individuals' health behaviour, however, theory driven studies to confirm how these social media aspects play the roles in behaviour change remains scarce (Balatsoukas et.al., 2015). Notably, most social media-based health studies did not mention or apply any theory or framework in the case of health intervention (Laranjo et al., 2015). Currently, social cognitive theory is the only theory that was used, as in studies by Turner-McGrievy and Tate (2011) and Valle et al. (2013).

Social media was found to be effective in influencing lifestyle health behaviour related to non-communicable diseases (e.g. tobacco and alcohol consumption, eating behaviour, physical activity and sedentary behaviour). Significant improvements were found in

physical activity and eating behaviour in some of the social media interventions programmes (Maher et al., 2014). Baghaei et al. (2011) reported that social media can positively predispose individuals' attitude toward a healthy lifestyle. Their study focused on investigating the effectiveness of a family oriented online social network, namely SOcial FAmilies (SOFA) in influencing health behaviour. SOFA aimed to provide motivational and emotional support to influence families' attitude and behaviour towards adopting a healthy lifestyle. It has integrated health related educational information, covering information on diet, recipes, menu plans, shopping list, exercise, alcohol management recommendations, success stories, quizzes and other health-related links. They found that increased engagement with SOFA result in a significant change in users' attitude regarding the feelings of control over their health and noted the changes in diet, exercise and smoking habits following the use of SOFA.

The use of social media to induce health behaviour change is evident (Korda & Itani, 2013; Laranjo et al., 2015). To date, a wide variety of health behaviour has been targeted with physical activity being the most popular (Maher et al., 2014). There are quite a number of social media based physical activity intervention studies (Cavallo et al., 2012; Foster et al., 2010; Valle et al., 2013), but information is scarce on other health behaviours, in particular for healthy eating.

2.9.3 Social Media and Healthy Eating

Social media was reported to be relevant factor that contributed to individuals' total diet (Vaterlaus et al., 2015). As a two-way communication medium, social media is able to connect people that are transitioning towards healthier food options (Bublitz, & Peracchio, 2015). It provides opportunities for knowledge transition for healthy eating via interactive

communication (Bissonnette-Maheux et al., 2015). According to Zilberman and Kaplan (2014), individuals use social media to share what they eat, recipes and food preparation methods. As such, social media is credited for expanding food choices by providing access to a variety of food information and recipes to users (Vaterlaus et al., 2015). This basically means that individuals' food choices and eating habits can be influenced by social media.

Among social media platform, blogs were found to be useful in promoting healthy eating. Dumas et al. (2017) demonstrated the possible application of blog for the provision of nutritional knowledge and feedback on participants' behaviour for vegetable and fruit intakes. Similarly, Caplette et al. (2017) confirmed the viability of using an evidence-based healthy eating blog to promote fruit and vegetable consumption. They demonstrated that participants of the healthy eating blog have a significant difference of additional 1 serving fruit and vegetable intake as compared to control group.

Williams et al. (2014) examined the use of social media in promoting healthy diet through a systematic review of randomized controlled trials. Five studies reported improvement on their subjects' diets, with a significant decrease in dietary fat consumption among users exposed to social media. McGloin and Eslami (2015) detailed on how social media can support dietary behaviour change. The aspects that could support dietary behaviour change efforts include reach, engagement, research, segmentation, accessibility and potential to build credibility, trust, collaboration and advocacy. Accordingly, the techniques used to influence individuals' dietary behaviour are deemed to be similar to traditional healthy eating promotion programme; to positively affect healthy eating related knowledge, skills and self-efficacy. Nevertheless, though positive results of dietary changes were observed from social media-based studies, it was pointed out that

the methodologies that go beyond basic evaluation criteria and true measures of these behaviour change have yet to be developed.

Eating behavior can be communicated virtually on social media via textual or video information (e.g. upload post on food going to consume/has consumed) (Holmberg, Chaplin, Hillman, & Berg, 2016). Previous research showed that individuals use social media to obtain and share dietary information, such as what food they eat, recipes and food preparation techniques (Bissonnette-Maheux et al., 2015; Zhang et al., 2013; Zilberman & Kaplan, 2014). As such, social interaction on social media appears to facilitate the communication of food information among users, which lead to changes in food intake.

In addition, social media seems to have the potential for facilitate social influence towards eating behaviour by supporting social interaction for eating. During social interaction, individuals may learn about others' eating behaviour via peer modelling. Modelling occurs when others provide information about food intake in a given situation, which allow individuals to learn about their peers' food intake norm based on the given information (Herman, Roth, & Polivy, 2003). According to Vartanian, Spanos, Herman and Polivy (2015), modelling is one of the most powerful social influence on food intake, where people adjust their food intake according to their peers. Virtual peer modeling effect was found to have positive influence on individuals eating bahviour (Bevelander, Anschütz, Creemers, Kleinjan, & Engels, 2013; Bevelander, Anschütz, & Engels, 2012; Hermans, Salvy, Larsen, & Engels, 2012; Romero, Epstein, & Salvy, 2009). Notably, experimental studies have confirmed effectiveness of the peer modeling effect in a social media setting (Bevelander et al., 2012; Bevelander et al., 2013). Bevelander et al. (2013) provide the preliminary evidence that social modelling eating behaviour can occur through social interaction on social media.

Given these points, social interaction on social media is likely to account for changes in dietary behaviour. Past research revealed that social interaction is the core characteristic of social media, which correspond to essential characteristics of setting for health promotion that promote health behaviour change (Loss et al., 2014). As such, social interaction on social media has the potential in the promotion of healthy eating behaviour.

2.10   SOCIAL INTERACTION ON SOCIAL MEDIA

Social interaction is defined as a mutual exchange between two or more individuals who possess a common or shared history. The information is communicated both verbally and nonverbally (Lewinski & Fisher, 2015). Individuals interact to share knowledge, communicate idea, and create and maintain relationships. Social interaction is about how people participate in a social network, and also describes the social behaviour of how people interact and socialise with each other.

When individuals socially interact, socialisation is assumed to have taken place (McLeod & O'Keefe, 1972). According to consumer socialization theory, individuals develop consumption related attitudes, knowledge and behaviour by learning from the socialisation agents and interacting with them (Moschis & Churchill, 1978). During the learning process, a person may acquire cognitions and behaviours from the socialisation agents via the process of modeling, reinforcement and social interaction. Peers on social media act as socialisation agents that will influence the attitude(s) of individuals (Wang et al., 2012). On social media, individuals learn attitudes and behaviour via interaction with their peers (i.e. communicates with peer via post and comment, exchange information). The modeling process may occur on social media if individuals try to imitate the behaviour shown by the peers, e.g. consume a healthy food, which was shared

and recommended by peers. Reinforcement happens when one's act is agreed upon, liked and praised by peers (reward), and receive bad comments or are boycotted by their peers (punishment).

According to Ahuja and Galvin (2003), communication is the key in the socialisation process. As highlighted by Wang et al. (2012), peer communication via social media is a new form of consumer socialisation. On social media, peer communication is referred as the interaction among the users. Taking into account that communication on social media is a computer mediated, it can be divided into three types: (1) one-to-one communication, (2) one-to-many interaction and (3) intergroup discussion (Bou-Franch, Lorenzo-Dus, & Blitvich, 2012). For example, YouTube encompasses the elements of one-to-many interaction and intergroup discussion (Bou-Franch et al., 2012) while social network sites such as Facebook encompasses all three modes of communications. On Facebook, one-to-one communication is done via personal message sent to the receiver. One-to-many interaction takes place in many ways on Facebook; firstly, personal message can be sent to multiple receivers at one time, with all the receivers able to view the sent messages simultaneously via the message threads. Second, users can also interact with others through posts upload with others comment and likes on the posts. Third, users can create "Pages" which enable them to share information with others who liked the Page. Facebook carries a special feature of "Facebook Group", which facilitates intergroup discussion. This feature enables users to create their own groups for any subject of interest; based on their theme, interest, motive etc. Members of the group can post updates, link and photos; they can discuss and share ideas, comments with the participants in the group.

Socialisation is also viewed as a knowledge sharing communication process (Ahuja & Galvin, 2003). This is based on definition by Nonaka and Takeuchi (1995) where socialisation is a process of sharing experience and creating tacit knowledge, such as

mental models and technical skills. In a virtual community, socialisation involves information exchange, which includes both information seeking and provision (Ahuja & Galvin, 2003). Information provision is defined as knowledge being extended or shared to another group members, while information seeking is defined as the act of gaining knowledge from other members of the group. Previous research confirmed the feasibility and acceptability of Facebook as a platform for health related information exchange (Greene, Choudhry, Kilabuk & Shrank, 2011; Naslun et al., 2016; Zhang et al., 2013). Within this research context, information exchange activities include sharing personal experience on healthy food (e.g. food consumed, food prepared by own self) and selecting healthy food at grocery stores and food outlet, recipes for healthy meals, facts and information about healthy diet, links to health eating guidelines (e.g. American Dietetic Association); posting questions or statement enquiring on the nutrition values of certain food, browsing member's wall pages to seek for information pertaining to healthy eating, sending private message to particular members to inquire about certain food and requesting advices.

It should be also pointed out that social media is transforming the facets of social interaction where social support is notably common on social media (Frison & Eggermont, 2015; Greene et al., 2011; Zhang et al., 2013). Social interaction on social media is related to multiple types of social support (Li, Chen, & Popiel, 2015). According to Cobb (1976), social support is defined as information that leads one to believe that they are cared for and loved, esteemed and valued, and belong to a network of communication and mutual obligation. Social support also has been defined as the flow between people of emotional concern, instrumental aid, information or appraisal (House, 1986). There are various types of measures for social support, depending on the definition. Typically, social support is divided into few subtypes, which include emotional, instrumental, appraisal and

informational support (Weiss, 1974). Emotional support is related to the care, love, sympathy and understanding and/or esteem or value from others (Thoits, 1995). Instrumental support refers to tangible support, where material aids or behavioural assistance are provided (Sherbourne & Stewart, 1991). Information support refers to the act of offering information, advice, guidance or feedback, which can help to solve problems. Appraisal support is related to help in decision making, provide appropriate feedback or helping to decide which course of action to take. Emotional and informational supports are commonly observed on social media. For example, on Facebook, emotional support was found among non-patients users for surgery (Davis et al., 2015). Both information and emotional aspects were found among members in Breast Cancer Group on Facebook (Bender et al., 2011). Appraisal support exists on Facebook in the form of comments and advices given by peers to help individuals for decision making. For example, an individual may upload a photo consists of two canned soups with different brands enquiring which is better, and their online friends could comment informing them about their preferred choices. The appraisals will then help the individual decide which brand they should purchase. Instrumental support is rarely available on social media as the users are meeting online. However, instrumental support may exist indirectly, for example, an individual may ask for assistance on an idea for helping orphanage, on top of providing suggestion, some may volunteer to provide assistance using tangible goods such as donating clothing.

In sum, social interaction on social media involved 3 components which include communication, information exchange and social support. As per consumer socialisation theory, it is anticipated that all these components of social interaction will lead to the acquisition of healthy eating attitude, knowledge and behaviour. Among the social media platform, Facebook was suggested as a platform for social interaction as it is perceived

as a useful channel for communication and accessing social support and information resources (Vitak & Elllison, 2013). Within the context of this research, social interaction is regarded as how individuals interact with each other via the component of communication, information exchange and social support for healthy eating purposes.

2.11   FACEBOOK

The most remarkable development in the social media is none other than the rapid and continuous growth of Facebook (Zhang et al., 2013). As of the third quarter of 2017, Facebook had over 1.37 billion active users visiting the site on a daily basis, which is an increase of 16% year-over-year (Facebook, 2017). It was reported that the share of Facebook users who check in daily increased from 70% in 2015 to 76% in 2016 (Greenwood et al., 2016).

In the USA, Facebook is the most popular social media platform where nearly 79% of internet users use Facebook, which is more than double of that of Twitter (24%), Pinterest (31%), Instagram (32%) and LinkedIn (29%) (Greenwood et al., 2016). With more than 1.9 billion monthly active users, Facebook is the most popular social media worldwide. Other social media platforms were reported to have much lower monthly users e.g. YouTube (1 billion), Instagram (600 million), Twitter (317 million), Pinterest (317 million), LinkedIn (106 million) (Showers, 2017).

According to Pew Research Center's survey in 2016, younger online adults top the list of Facebook users, with an impressive percentage of 88% of internet users aged 18-29 being Facebook users, followed by those age 30-49 with 84%, and 72% for those age 50-64. As expected, the older generation of online adults (aged above 65) were the lowest at 62% (Greenwood et al., 2016). As such, Facebook is the best place to reach millennials and

Gen X aged 18-49, especially at workplaces, where 75% of the users typically spend at least 20 minutes on Facebook daily (Showers, 2017).

Due to its popularity and extended user profiles, various research on its feasibility for a multitude of uses have been conducted. The initial research on Facebook focused on the use of Facebook, particularly on who is using Facebook (Ryan & Xenos, 2011), what they use it for (Sheldon, 2008), why they use it (Nadkarni & Hofmann, 2012), why they use the different features of Facebook (Smock, Ellison, Lampe, & Wohn, 2011) and its use for social networking (Nadkarni & Hofmann, 2012; Pempek et al., 2009). Later, due to its tremendous popularity, researchers began looking into how Facebook can be used for different purposes such as civic engagement (Warren, Sulaiman, & Jaafar, 2014), political engagement (Conroy, Feezell, & Guerrero, 2012), food marketing (Dunlop, Freeman, & Jones, 2016; Freeman et al., 2014; Gaber & Wright, 2014; Raghupathi & Fogel, 2013), education and learning (Kabilan et al., 2010; Miloševic´ et al., 2015; Ractham & Firpo, 2011), public health communication (Jha, Lin, & Savoia, 2016; Kite, Foley, Grunseit, & Freeman, 2016), health promotion and intervention programme (Cavallo et al., 2012; Napolitano et al., 2013; Valle et al., 2013).

2.11.1 Facebook and Health

With the rise of social media use in health domain, researchers began investigating the use of Facebook for health purposes such as for health information sourcing (Greene et al., 2011; Zhang, 2013), public health communication (Jha et al., 2016; Kite et al., 2016), health promotion and intervention programme (Cavallo et al., 2012; Napolitano et al., 2013; Valle et al., 2013); users engagement in health promotion programme (Merchant et al., 2014); health related social support (Oh et al., 2013). As one of the largest social

media platforms with wide outreach to the population, Facebook has the potential for health promotion (Zhang et al., 2013). Public health organisations recognised the fact that Facebook can be used to engage the public for health promotion (Thackeray et al., 2012). In the USA, Facebook is used by the State Health Departments for public health communication to disseminate information on various health related topics such as healthy living, communicable diseases etc. (Jha et al., 2016).

According to Greene et al. (2011), Facebook has become a venue for health information seeking and sharing. People are using Facebook to exchange health information, encompassing a wide range of topics related to health conditions and diseases management (Al Mamun, Ibrahim, & Turin, 2015; AlQarni, Yunus, & Househ, 2016; Greene et al., 2011). The majority of the information shared on Facebook is about the users' personal experience in disease management, such as diabetes and hypertension (AlQarni et al., 2016; Greene et al., 2011). Facebook users use both Facebook Group and Facebook Page to engage with other users for the purpose of seeking and providing health information (Al Mamun et al., 2015; AlQarni et al., 2016; Greene et al., 2011; Hale, Pathipati, Zan, & Jethwani, 2014; Zhang et al., 2013)

Recently, a large number of online health communities have emerged on Facebook. Facebook users with common interest in health issues and chronic diseases got together in open or close groups to create and maintain online communities that are useful, supportive and trustworthy. Facebook, in this case, serves as a medium for health communication and social support. Several studies explored the use of Facebook groups for health communication and social support and their contents were varied for multiple chronic diseases such as diabetes (AlQarni et al., 2016; Greene et al., 2011; Zhang et al., 2013), breast cancer (Bender et al., 2011; Torre-Díez et al., 2012), colorectal cancer (Torre-Díez et al., 2012). Zhang et al. (2013) examined the characteristics and interaction

of an active Diabetes group on Facebook and found that medical information (e.g. symptoms, complication, diagnoses, tests, treatment and medications) and other related lifestyle management information (e.g. pertaining diet and exercise) were shared in the group. The members in the group were interested to know what food work for them, what their peers ate, their diet habits and the amount of exercise that were undertaken, all of which their keenness to compare and emulate their peers. Moreover, members also shared their personal experience and provide opinion and advice to peers as support. Interactions between the users are normally structured around three elements namely information, emotion, and community building. These interactions enabled the cultivation of social support, specifically social, informational, emotional and appraisal support among members in the group. It also provides a sense of companionship, which imposes social influence upon each other. Besides using the group feature, social support is also likely to occur via other Facebook features such as post on the walls, conversation on Facebook and Facebook page. According to Davis et al. (2015), individuals seek social support for health-related issues (e.g. surgery) through post and the receipt of response posts from other Facebook users. Facebook Page was found to be useful for users to provide and/or obtain informational and emotional social support to/from other users (Ballantine & Stephenson, 2011). When it comes to the types of health-related social support sought by Facebook users, Oh et al. (2013) found that emotional support is the most predominant health-related social support sought among Facebook users and this is followed by esteem, tangible and appraisal support.

Due to Facebook possessing extensive reach and useful features that can accommodate information sharing, social support, companionship and social influence in real time (Zhang et al., 2013), it has the potential to deliver health behaviour risk promotion and intervention. The engagement of individuals in Facebook oriented health behavioural

intervention are generally operationalised as posting, commenting or liking of content on Facebook (Cavallo et al., 2014; Thrul, Klein, & Ramo, 2015; Valle et al., 2013). According to Apatu, Alperin, Miner and Wiljer (2013), people alter their behaviour as a result of reading information on the Facebook. Loss et al. (2104) explained in detail on how Facebook can be a novel setting for health promotion. They pointed out that health promotion intervention can be conducted by setting up a Facebook site on health-related issues and enroll participants to become "fan" of the site. At this site, the participants can obtain the health messages and exchange their ideas on health issues. Morris et al. (2011) demonstrated that Facebook has the potential to disseminate health behaviour by defining Facebook as an environment that can effectively nudge individuals to initiate and maintain lifestyle changes. Accordingly, when individuals communicate on Facebook, perceptions are formed about peers' behaviours; these perceptions of social norms will then influence individuals to follow and change their own behaviour.

A systematic review by Laranjo et al. (2015) revealed that Facebook is the most utilized social media platform for health behavioural change. Several research findings suggested that Facebook is feasible for supporting health promotion and intervention and induce positive effect on individuals' health. A number of studies have explored on the efficacy and feasibility of Facebook in bringing changes to health risk behaviour such as physical activity (Cavallo et al., 2012; Valle et al., 2013), tobacco use (Ramo et al., 2015; Struik & Baskerville, 2014; Zhang, Yang, & Li, 2012). For instance, Naslun et al. (2016) explored on the feasibility and acceptability of using Facebook as a platform for healthy lifestyle intervention programme, focusing on weight loss via healthy eating and exercise. In their study, the Facebook group was created as a platform for the participants to exchange information (e.g. posting healthy eating and exercise related contents); share their personal success and challenges towards achieving healthy lifestyle goals and

support and encourage others. The participants were positive about Facebook for helping them learn from others' experience of success and struggles during lifestyle changes and provide and receive support from others. In another study, Valle et al. (2013) examined the use of Facebook for physical activity intervention. They concluded that Facebook served as a channel to deliver information pertaining to physical activities and also as a platform for social interaction and social support. Interestingly, a significant increase in the duration of physical activity was observed among the participants. Separately, Napolitano et al. (2013) compared the use of Facebook in a weight loss program, where Facebook group served as the portal to access intervention contents such as handout, podcast, access to information about healthy activities and events etc. Significant weight loss was reported by the participants who had access to the Facebook group. While the abovementioned studies confirmed the tremendous potential of Facebook for health promotion and health behaviour change, there are a few studies reporting that Facebook is unfeasible towards the promotion of health behavioural change (e.g. Cavallo et al., 2012; Ruotsalainen et al., 2015).

Generally, Facebook is not specifically designed for health-related interaction nor explicitly target any particular health community; nevertheless, it has created novel opportunities to trace the interactions between social connectivity and health (Centola, 2013). There is evidently encouraging information about the feasibility of Facebook for accessing health information and social support, as well as to promote health behavioural change.

2.11.2 Facebook For Healthy Eating

The adoption of Facebook for health promotion program has revealed that Facebook is can be useful to obtain healthy eating information and advice (Deliens et al., 2014). Notably, healthy eating is one of the themes often included in Facebook based health promotion and intervention programmes (e.g. Napolitano et al., 2013; Naslund et al., 2016; Park, Nahm, & Rogers, 2016). Nutrition tips, recipes, healthy food choices, prompt reminder on self-monitoring of calorie intake, prevention of meal skipping and late night snacking were among the topic shared in these studies (Napolitano et al., 2013, Naslund et al., 2016). Also, posts related to diet and nutrition on Facebook page were found to be useful as a reminder and motivator to make healthier choices (Woolley & Peterson, 2012).

Despite its popularity, there is little evidence that confirms the benefit of Facebook towards encouraging healthy eating behaviour. This may be due to the lack of studies on the use of Facebook solely for the promotion of healthy eating. In addition, healthy eating behaviour was not included as a measurement outcome in past Facebook based health intervention studies, despite the fact that healthy eating was promoted in these studies (e.g. Napolitano et al., 2013; Naslund et al., 2016). The only Facebook study related to healthy eating was conducted by Leis et al. (2013) in the context of determining the features and use of groups related to healthy eating on Facebook. They found that many of the Facebook open groups (40%) were promoting dietary products that claimed to aid healthy eating rather than sharing on healthy eating information. Nevertheless, it must be noted that this study is only limited to 156 Facebook groups, with Spanish as medium language.

According to Higgs and Thomas (2016), eating behaviour is strongly influenced by social context, where individuals' dietary choices tend to converge with close social connections. People are likely to follow socially accepted eating norms. These norms are primarily set

by others', with inclusion of social expectation and environmental cues. As a two-way communication medium, Facebook has the potential to influence individuals' eating behaviour due to its ability to facilitate the sharing of content and provision of feedback among users. Facebook users may interact with one another by posting messages, photos, videos, links and by liking, commenting on others' posts on their eating behaviour and dietary choices. As such, social interaction is deemed to take place, which creates online communities on Facebook. Merchant et al. (2014) suggested that health initiatives can leverage Facebook communities via the creation of Facebook page to reach the users for health promotion and intervention purposes. To date, no empirical research has assessed the use of Facebook for healthy eating purposes, therefore, this research attempts to examine the social interaction on Facebook focusing on healthy eating behaviour.

2.11.3 Facebook Use

Due to the tremendous evolution of Facebook, it now offers a variety of technical features to fulfill different needs and purposes. Features are the technical tools that facilitate communications and interactions among users (Lee et al., 2014; Smock et al., 2011). Within the context of this research, Facebook use refers to the use of various Facebook features such as Like, Comment, Share, Page, Group etc. for healthy eating purposes.

On Facebook, users can post statuses or comments and upload videos or photos on their own "wall" or others'. Status updates are short messages posted by users that are visible to other users on "News Feed", which is a feature that assemble the Facebook activity of one's friend network. The "wall" is the hub of a user's profile, displaying the aggregated posts, videos, photos generated by the user, as well as other contents and comments generated by Facebook Friends (Smock et al., 2011). Users can share their moment via

live videos, express their feeling or activity with designated icons, and share their locations with others by "checking in".

Facebook has special features for users to express their agreements on other posts, videos, and photos via the "like" button. Recently, this feature has been enhanced with additional respond icons available such as "love", "haha", "wow", "sad" and "angry". Facebook has also created special features, namely Facebook Page and Facebook Group, which enabled users to stay more connected (Hicks, 2010). Facebook Page can be designed to be official profile for public figures, business, organizations and other entities to create authentic and public presence on Facebook, while Facebook Group is meant for small group communication and users who wish to share their common interest and opinions. Facebook users join groups based on common cause, issue or activities to discuss issues and share related content. Users who "liked" the selected pages or joined selected groups will receive uploaded post on these pages or groups in their respective "news feeds".

The use of Facebook features has been conceptualised as active and passive activities for various purposes. Wise, Alhabash and Park (2010) described the use of Facebook features such as liking a wall or post of a page, browsing on newsfeed as passive actions for information acquisition. According to Burke and Kraut (2014), browsing and looking at friends' profile and photo, viewing and reading friends' broadcasted content on news feeds are passive activities for content consumption. Differ from others, Taylor and Strutton (2016) categorised looking through own news feed and the conversations friends are having as passive activities. Active activity is related to content contribution which include the use of Facebook feature such as uploading photo, commenting on wall (Bender et al., 2011; Burke et al., 2010). In addition, posting status update of oneself and commenting on friends' page are regarded as active activities too (Taylor & Strutton, 2016).

The features available on Facebook are regarded as a collection of tools that can be utilized to address different needs (Smock et al., 2011). Facebook can fulfill the informational needs of users. Users are able to obtain information via "News Feed", which appears on each user's homepage. "News Feed" provides updates on the activities and information shared by others within the connection. "News Feed" contains general broadcasts, such as status updates, links and photos as well as public interaction between the user's friends and those friends' friends (Burke et al., 2011). Moreover, Facebook enable users to obtain information by posting questions on others' "Wall" and obtain feedback from others when they "comment" on the post or via "message" and "chat" to privately obtain information. Facebook users can provide information by updating their own "status" or "share" information, such as useful photos, videos, links, and events to others from Webpages or others' postings, which will automatic appear in "news feed" of those in the connection. The recent created feature of "Live Video" enables real time information sharing among Facebook users. On top of these, users can create "Facebook Pages" which enable them to share information with others who liked the Page. Facebook also has a feature namely "Facebook Group" which facilitates intergroup discussion. It enables users to create their own groups based on common interests and allow the members to contribute to the content by posting updates, links and photos. They can also discuss and share ideas, comments and provide social support to members in the group. Facebook Group has the option to be public available or private, where it is only accessible to invited members only (Hicks, 2010). Facebook Group is more suitable for small group communication by using Chats and Collaborate on group documents compared to a Facebook Page, which is better for disseminating contents using the Notes and the News Feeds (Hicks, 2010).

Several researchers have explored the use of Facebook for various social activities. Firstly, Facebook use is shown to be related to communication and information exchange among users. Young (2011) examined how specific Facebook tools are used to communicate and socialise. They found that status update and photo posting are used to engage friends for online conversations and to strengthen bonds with offline friends. Burke et al. (2011) categorised Facebook use into 3 types of social activities, namely directed communication, passive consumption and broadcasting. Directed communication is carried out via message, wall posts, "like" button, inline comments, photo tagging and is more likely for maintaining relationship with existing social ties. Passive consumption occurs when one reads others' update through News Feed, photo and profile viewing. Broadcasting is regarded as a type of undirected communication involving activities such as status updates, photo shared, application stories and other items posted on one's own wall. Unlike directed communication, both passive consumption and broadcasting are more suitable for information exchange. In another study exploring the use of Facebook as tool to enhance communication and collaboration for learning, Ractham and Firpo (2011) reported that Facebook features such as discussion and photos are deemed the most useful in knowledge sharing with others especially for learning purposes. They also concluded that wall, comment and private message are useful communication and collaboration tools. Secondly, Facebook use can be used to provide or obtain social support. Bender et al. (2011) found that wall posts are the most frequently used Facebook feature among users of breast cancer-related Facebook Groups for social support. According to Davis et al. (2015), wall post and response comment on the wall posts provide the opportunity to seek and receive social support. On the other note, Zhang et al. (2013) concluded that wall posts are useful in providing and seeking of information and emotional support on top of community building. It is apparent from the aforementioned studies that Facebook use is

suitable for supporting various social activities such as communication, information exchange and social support.

2.11.4 Social Ties on Facebook

The substantial growth in social media has eliminate space and time barriers for people to connect, which enable them to expand their social network more easily on top of maintaining their current social ties (Ellison et al., 2007; Zhang et al., 2013). Facebook is one of the social media platforms that connect both relationally close and non-close social ties (Valenzuela, Park, & Kee, 2009). According to Ellison, Steinfield and Lampe (2007), Facebook is used to maintain existing social ties created offline. Contrarily, Hsu, Wang and Tai (2011) argued that Facebook is a mechanism for new friends to get more acquainted rather than for increasing acquaintanceships amongst closer friends.

A tie is said to exist between communicators whenever they share or exchange resources such as goods, services, information or social support (Haythornthwaite, 2002). Thoits (2011) defined social ties as the connection and contact with other people via membership in primary and secondary groups. Primary groups are smaller in size, informal, intimate and enduring, may include family members and friends. Secondary groups are larger with more formal interaction and members' knowledge on one another is less personal, example include work and religious organization. Chiu, Hsu and Wang (2006) defined social ties in a more simple form by referring social ties as the strength of the relationship, the amount of time spent and frequency of communication between members.

Nelimarkka and Karikoski (2012) provided a new perspective on the concept of social ties. A two-dimensional model of social ties was presented in which it can be applicable to understand the social ties on Facebook. The first dimension illustrates the publicity of

the social ties to others (i.e. public or private). Public ties are those that can be detected by others, while private ties can only be detected by two individuals forming that ties. The second-dimension measures how active the ties are, especially in terms of interactivity (i.e. active or passive). Based on these suppositions, there are four types of social relations namely social, personal, nominal and latent relation. For example, on Facebook, individual who is actively commenting on others' walls is said to have social relation, whereby the ties are publicly visible and the individual engage in active communication. On the other hand, individual who keeps his/her tie connection private but maintains active communication via private massager on Facebook is an example of personal relation. Nominal relation is observed on Facebook when individual accepts others' friendship connections (i.e. in friend list) and keeps them visible to others, but unlike social relation, there is no active communication. Similar to nominal relation, the communication for latent relation is passive communication, but the friend's connection online is kept private on Facebook.

According to Luarn and Chiu (2015), social ties on Facebook can be determined by the time spent and the use of Facebook features. Individual who spends more time on Facebook and uses Facebook features such as "comment on wall post", "like on wall post," and "like on video" to understand information and respond to others are found to have stronger social ties compared to those who have bare minimum of effort to keep the relationship ongoing, with little concern for time spent and privacy tools (Hsu et al., 2011; Luarn & Chiu, 2015). Within the context of this research, social ties are referred as the degree to which individual connects to other users on Facebook which is represented by the strength of the relationships, the amount of time spent and the frequency of the communication on Facebook.

Empirical research confirmed that social ties create opportunities for social interaction and can help people access resources such as information, social support on Facebook (Luarn et al., 2015; Rozzell et al., 2014; Vitak & Ellison, 2013). However, the social ties preferred for accessing and providing information and social support on Facebook remains debatable. For instance, Zhao, Wu and Xu (2010) reported that weak social ties play a role in the dissemination of information on Facebook, but Vitak and Elllison (2013) reported otherwise, where strong social ties are more prominent in information dissemination. This is also the case for social support. For example, according to Vitak and Elllison (2013), weak social ties on Facebook offers social support, contrary to what was posited by Luarn et al. (2015), who reported that strong social ties on Facebook provide more social support relative to weak social ties. It is notable that existing studies were unable to accurately measure tie strength due to its dependence on the quantity and quality of interaction between people (Luarn & Chiu, 2015). Given the above, more research is needed to understand how social ties are related to social interaction, especially in the context of its role in accessing and providing information and social support on Facebook.

2.12   SOCIAL CAPITAL THEORY

The proposition of social capital theory lies in the network relationship constituting a valuable resource for conducting social affair, which provides the members with collectivity-owned capital, embedded within a network of mutual acquaintance and recognition (Bourdieu, 1986).

Social capital is defined as "the sum of the actual and potential resources embedded within, available through, and derived from the network of relationships possessed by an

individual or social unit" (Nahapiet & Ghoshal, 1998). The concept of social capital enables individuals to act together more efficiently to purse shared objectives and obtain benefits derived from the social structures (Putnam, 1995). In other words, it posits that individuals and groups can obtain resources and values from their connections to each other (Lin, 1999; Paxton, 1999).

According to Putnam (2000), there are two forms of social capital namely bonding and bridging social capital. Bonding social capital describes the benefits/resources that acquired from close relationships which include emotional and social support. Bridging social capital is refers to the benefits/resources that derived from loose or casual connections and acquaintances such as information.

Nahapiet and Ghoshal (1998) proposed three dimensions of social capital namely structural (the connection pattern), relational (the kind of relationships people developed through interactions) and cognitive (resources that provide shared goals of meaning among parties). Structural dimension refers to the overall connection pattern that include who and how individuals are connected (Burt, 1992). The structural dimension emphasizes the connection patterns that provide certain advantages to individuals, like how people can use their personal contacts to obtain information or access to specific resources (Nahapiet & Ghoshal, 1998). Collectively, structural social capital encompasses mutually beneficial collective behavior through established roles of the individuals and supplemented by rules, precedents and procedures of social networks (Hitt et al., 2002). Relational dimension describes the kind of personal relationships that individuals have developed via interaction. It also focuses on the connection characters of the relationship between individuals which often characterised via trust of others, cooperation and the identification that an individual within relationships (Nahapiet & Ghoshal, 1998). Cognitive dimension refers to the resources that provide shared

interpretations among parties. It captures the concepts of share vision and/or values which in turn benefits the involved parties (Nahapiet & Ghoshal, 1998).

According to Nahapiet and Ghoshal (1998), social capital is one of the important factors dictating the development of intellectual capital, the knowledge and knowing capability of a social collectivity. The aforementioned facets of social capital transpired that social network or structures are built based on the way of how individuals are connected and these social network or structures offer certain resources or benefits to individuals within the network. Also, these social network or structures is deemed to facilitate the access to potential or actual resources or benefits. Hence, this acknowledges the potential power of connection between individuals. The structural dimension of social capital is the center of interest in this research whereby the connection among the individuals is in focus. Within the context of this research, the way of how individuals are connected (name as social ties) and the resources or benefits acquired (i.e. information and social support during social interaction) are studied.

The importance of social capital theory is evident from the literature with extensive empirical studies depicting the significance of social capital to a conclusive set of socioeconomic phenomena (Durlauf, 2002; Krishna, 2001). Adam and Roncevic (2003) emphasized the importance of social capital theory and stated that social capital has boosted a series of very important empirical research and theoretical debates which have stimulated much reconsideration of the significance of human relations, networks, organizational forms for the quality of life and developmental performances. Notwithstanding, existing studies have supported conclusive evidence on the importance of social capital theory and provided useful observations of its economic and social influence (Jack & Jordan, 1999; Montgomery, 2000; Volpi, 2001). Requena (2003) also found that several fundamental and significant concepts such as social support, social ties,

integration and social coherence are emphasized in social capital. This view is strongly supported by Rothstein (2003) who finds that the real strength of social capital theory is its rare attribution of combining micro level causal mechanisms with macro sociological structures, which is scarcely found in other social sciences theory.

Evidently, social capital theory has been used in social media research to explore aspects of social capital aspects such as social capital building among teenagers and university students (Ahn, 2012; Bohn, Buchta, Hornik, & Mair, 2014; Ellison et al., 2007; Raza, Qazi, & Umer, 2017; Valenzuela et al., 2009), the influence of culture on social media use and social capital building (Ji et al., 2010), the relationship of self-esteem with social capital (Steinfield, Ellison, & Lampe, 2008), the effect of Facebook use on social capital (Burke et al., 2011). These reveal the present of social capital on social media.

Application of Social Capital Theory on Facebook

According to Nahapiet and Ghoshal (1998), social capital is one of the important factors dictating the development of intellectual capital, the knowledge and knowing capability of a social collectivity. The structural dimension emphasizes the connection patterns that provide certain advantages to individuals, like how people can use their personal contacts to obtain information or access to specific resources. As such, the structural dimension influences the intellectual capital development via access to parties for knowledge exchange. Individuals can obtain resources from their respective connections (Paxton, 1999).

On Facebook, the concept of social capital describes the benefits and resources that individuals can derive form their social ties, for example access to information, social support (Ellison, Steinfield & Lampe, 2011). The implication of the Facebook for social

capital has gained much of the researchers' attention (e.g. Ellison, Steinfield, & Lampe, 2007; Steinfield, Ellison & Lampe, 2008; Valenzuela, Park, & Kee, 2009). Ellison et al. (2007) was one of the pioneer researchers that examine the implication of Facebook for social capital.

According to Vitak, Ellison and Steinfield (2011), Facebook appears to be relevant for the accumulation of social capital. On Facebook, social capital is described as the resources embedded in the social relationship and connection amongst users (Ellison, Vitak, Gray, & Lampe, 2014). Resources may include access to information and emotional support (Ellison, Gray, Lampe, & Fiore, 2014). Social ties are potentially well suited to support the shaping of social capital (Ellison et al., 2011; Luarn, Kuo, Chiu, & Chang, 2015; Vitak & Ellison, 2013). On Facebook, individuals capitalise on their connections to obtain resources such as information and support. Past research has revealed that social ties create opportunities for social interaction and can help people access resources such as information, social support on Facebook (Luarn et al., 2015; Rozzell et al., 2014; Vitak & Ellison, 2013). Social ties play a role in providing the access provide access to social support and informational resources.

According to Ellison et al. (2007), the use of Facebook has substantial influence on social capital. According to Smock et al. (2011), Facebook features such as status updates, comments, wall posts, private messages, chat, and Groups are utilized in multiple ways to meet the different needs and support a wide range of social activities. Several researchers have shown how Facebook features are used to support communication, social interaction, to seek and provide information and social support (e.g. Burke, Marlow, & Lento, 2010; Ractham & Firpo, 2011; Vitak & Elllison, 2012). Lee, Kim and Ahn (2014) pointed out that Facebook features are associated with the management of social capital. They demonstrated that the use of Facebook features such as wall, friend,

comment, news feed, like, message, photo, and chat was positively associated with both bonding and bridging social capital.

CONCLUDING REMARK

This section concludes the application of two theories namely consumer socialisation theory and social capital theory as the theoretical foundation of this research. According to Arguel, Perez-Concha, Li, and Lau (2018), there is no consensus in the theoretical approach to explain the effect of social media on health behaviour. The selection of theory as the foundation of a research depends on many factors and research parameters such as the types of components that thought to be important to the behaviour sought, the approach to determine the behaviour outcome (e.g. continuum/ stage process), the technological platform involved etc.

The review earlier has presented some of the theories applied for research related to eating behaviour and social behaviour on social media. The most adopted theories for healthy eating behaviour in the past research such as theory of planned behaviour and social cognitive theory are less appropriate to be selected as the foundation of this research. Theory of planned behaviour focuses on only individual level factor while social cognitive theory focuses on both individual level and environment factors of healthy eating behaviour; both of these evaluations are in formative and process approach. As this research aims to determine the determinants and the influence of social interaction on healthy eating behaviour, the formative and process approach is in need to understand how individuals engage into healthy eating in social context and also to provide deeper insights on the influence of both individual and social factors on healthy eating behaviour. Hence, consumer socialisation theory is found to be more appropriate in providing more

comprehensive and understanding on healthy eating behaviour. According to consumer socialisation theory, social interaction is posited as a socialisation process which lead to the outcome that normally referred as attitude, skill, knowledge and behaviour. In addition, consumer socialisation theory provides in-depth understanding of the role of socialisation agent as the media for such outcomes. With the adoption of consumer socialisation theory as the theoretical foundation for this research, the role of Facebook and peers on Facebook as socialisation agent are determined.

As presented in earlier review, Facebook is relevant for social capital accumulation. Social capital is a concept that seeks to explain how the structure in the network can help individuals to obtain certain resources; by connecting with others, individuals first build up social capital and then use this social capital to obtain desired outcome. In this research, it is anticipated that social ties on Facebook will provide the access and help individuals obtain benefit and resources such as information and social (during social interaction) which then lead to healthy eating attitude, knowledge and behaviour. Facebook use may also play a role in facilitating social capital accumulation for healthy eating. Therefore, social capital theory was selected as the theoretical foundation.

CHAPTER SUMMARY

This chapter review literature on work productivity and health behaviour risk, especially healthy eating behaviour. The review on healthy eating behaviour revealed its role for better work productivity. Also, based on literature review on social media and its use for health, it is evident that Facebook is feasible for health promotion and intervention efforts. As pointed out by Loss et al. (2014), social interaction is the core characteristic of social media corresponding to the essential characteristics of setting for promoting health

behavioural change. It is believed that social interaction on Facebook have a positive influence on healthy eating behaviour, leading to the improvement of work productivity. The determinants of social interaction, namely Facebook use and social ties were elucidated. The theoretical background of this research was detailed and concluded.

CHAPTER 3

RESEARCH FRAMEWORK AND HYPOTHESES

3.1   INTRODUCTION

This chapter details the research framework of this study. It is divided into three main sections. Section one provides an overview of the model development based on the theoretical foundation and variables discussed in the previous chapter. Section two discusses on the development of the hypotheses and the relationships between the variables and section three details the proposed conceptual framework for this research. The last section summaries the chapter.

3.2   MODEL DEVELOPMENT

This section presents the research model, depicting the determinants that activate and stimulate the healthy eating behaviour from using Facebook as social platform for social interaction, leading to increased work productivity. The research model was developed based on social capital theory and consumer socialisation theory. The constructs for the research model extracted from the consumer socialisation theory were (1) "social interaction", (2) "healthy eating knowledge", (3) "healthy eating attitude", (4) "healthy eating behaviour". The "social ties" construct was selected based on social capital theory, while "Facebook use" and "work productivity" were selected based on literature review.

3.2.1 Overview of the Theoretical Model

Consistent with the concept of consumer socialisation, this research attempts to analyse the social interaction process on Facebook that influence individuals' attitude, knowledge and behaviour, particularly in the context of healthy eating for improvement in work productivity. Consumer socialisation theory suggests that individuals develop related attitudes and behaviour by learning from socialisation agents via constant interactions (Churchill & Moschis 1979). In line with this supposition, we argued that both peers on Facebook and Facebook itself are socialisation agents. The social learning processes are expected to take place when individuals learn from peers on Facebook via communication and exposure to Facebook's content.

Consumer socialisation is relevant to Facebook due to its origin in learning perspective. Past research confirmed the use of Facebook for learning (Kabilan et al., 2010; Miloševic´ et al., 2015) and highlighted on how various Facebook features facilitate it (Ractham & Firpo, 2011). As such, Facebook is regarded as a communication platform that allows users to interact with each other, seek and obtain information, learn from others', especially in the context of knowledge and experiences. Typically, socialisation is assumed to occur when face-to-face interaction takes place among consumers who know each other e.g. parents and children (Pedersen et al., 2012), family members and adolescents (Moschis & Churchill, 1978). As Facebook provides a virtual platform for people to interact and possesses the ability to facilitate the acquisition of information and social support that allow the users to learn the related knowledge and skills, thus the socialisation process is assumed to occur.

In this research, the socialisation process is referred as the social interaction that takes place on Facebook. As highlighted by Moschis and Churchill (1978), social interaction is the type of learning involved and may be include the combination of modeling and

reinforcement; since Facebook is a virtual platform for social interaction, learning is expected to take place on Facebook. Via social interaction, users are expected to learn about healthy eating from peers and resources available on Facebook. Typically, individuals who are highly positive about adhering to the healthy eating guidelines and adopt healthy eating behaviour are more likely to communicate information about healthy eating and share with others on how they engage into healthy eating behaviour when they interact with others on Facebook. Facebook users can also learn about healthy eating via uploaded posts and information shared on wall posts. These help Facebook users to obtain knowledge about healthy eating which may then lead them to engage healthy eating behaviour. On top of this, observational learning is expected to take place on Facebook where individuals consciously emulate their peers' healthy eating attitude and behaviour. The comments posted by Facebook users may also act as both positive and negative reinforcement for healthy eating. The comments posted by Facebook users may also act as positive/negative reinforcements for healthy eating. For example, positive comments encourage individuals to continue engaging in healthier eating behaviour while negative comments raise individuals' attention and the need to adopt healthy eating behaviour. Based on this supposition, it is expected that social interaction on Facebook will affect the socialization outcomes of attitude, knowledge and behaviour in the case of healthy eating. As it is evident that healthy eating behaviour is positively related to work productivity (Fitzgerald et al., 2016; Jensen, 2011), it is anticipated that these social interaction outcomes for healthy eating will affect work productivity.

The proposition of social capital theory lies in the network relationship constituting a valuable resource for conducting social affair, which provides the members with collectivity-owned capital, embedded within a network of mutual acquaintance and recognition (Bourdieu, 1986). Individuals can obtain resources from their respective

connections (Paxton, 1999). According to Nahapiet and Ghoshal (1998), social capital is one of the important factors dictating the development of intellectual capital, the knowledge and knowing capability of a social collectivity. The structural dimension emphasizes the connection patterns that provide certain advantages to individuals, like how people can use their personal contacts to obtain information or access to specific resources. As such, the structural dimension influences the intellectual capital development via access to parties for knowledge exchange. The structural dimension of social capital is the center of interest in this research whereby the connection among the individuals is in focus.

Facebook appear to be well suited to social capital accumulation (Ellison et al., 2011; Vitak & Elllison, 2013; Vitak et al., 2011). Social ties is potentially well suited to support the shaping of social capital (Ellison et al., 2011; Luarn, Kuo, Chiu, & Chang, 2015; Vitak & Ellison, 2013). On Facebook, individuals capitalise on their connection ties to obtain resources such as information and support. Vitak and Elllison (2013) commented that social ties on Facebook could facilitate social interaction and provide access to social support and informational resources. Accordingly, weak social ties offer social support while close social tie helps information exchange. In this research, social ties is anticipated to be an additional variable that provides a more comprehensive and in-depth understanding of the socialisation process, and as such, it was proposed as a new antecedent for the existing consumer socialization framework.

Based on the literature review, Facebook use was found to be related to social activities such communication, seeking and provision of information, social support (Bender et al., 2011; Burke et al., 2011; Davis et al., 2015; Ractham & Firpo, 2011; Zhang et al., 2013). Vitak and Elllison (2013) explored on how Facebook use facilitate social interaction , which include information exchange and social support. It was suggested that Facebook

use may transform the way individuals interact. As such, Facebook use was proposed as a new antecedent for social interaction for the existing consumer socialisation framework.

3.3   HYPOTHESIS DEVELOPMENT

3.3.1   Relationship Between Antecedent Variables and Social Interaction

3.3.1.1 Social Ties and Social Interaction

According to social capital theory, individuals can obtain resources from their respective connections (Paxton, 1999). It is suggested that the network of relationship, also known as social ties provide the opportunity to access embedded resources (Nahapiet & Ghoshal, 1998). Tsai and Ghoshal (1998) regard social ties as the channel for information and resource flows, where individuals may gain access to others' resources via social tie. It has been verified in an offline setting that social tie is an influential factor on resources exchange and knowledge acquisition in business organisations (Tsai & Ghoshal, 1998; Yli-Renko, Autio, & Sapienza, 2001). People with strong ties are likely to interact more frequently and intimately, share and exchange more information, support each other emotionally and reciprocally (Haythornthwaite, 2002). Later, the role of social ties in influencing knowledge sharing and information exchange was confirmed for an online setting (Chiu et al., 2006; Lu & Yang, 2011; Luarn et al., 2015)

On social media, people are brought together with a share interest and goal primarily for interaction, social support and information exchange (Greene et al., 2011; Oh et al., 2013; Zhang et al., 2013). They attempt to develop social relationship and bond with others on social media. Individuals with strong social ties are more likely to communicate with their peers (Wang et al., 2012). According to Kwakh and Park (2016), social ties have a

positive influence on knowledge sharing activities. Individuals engage into in more knowledge sharing activities when social ties are stronger. Similarly, Chu and Kim (2011) found that social ties are positively related to individuals' interaction on social media in the case of seeking and passing information.

Chung, Nam and Koo (2016) suggested that the bond among members on social media facilitate information sharing and increasing interpersonal communication. In the past, strong ties have been shown to encourage the transfer useful knowledge among people (Levin & Cross, 2004); however, this may not be true in the case of an online setting especially for social media. Via numerical experiments on large-scale online social networks that include Facebook, Zhao et al. (2010) reported that weak ties play a subtle role in the information diffusion on Facebook. Accordingly, weak ties act as bridges that connect isolated communities and enable information sharing. Similar results were found by Bakshy, Rosenn, Marlow and Adamic (2012) who suggested that weak ties may play a more dominant role in the dissemination of online information.

According to Wright, Rains and Banas (2010), individuals' motives to communicate with strong or weak tie network members appear to be the key in social support mobilization. Typically, close ties are shown to be strongly contribute to perceptions of social support relative to weak ties (Haythornthwaite, 2002). However, it was also pointed out that certain individuals prefer to seek support via weak tie networks instead of a strong one, as weak tie network is able to provide access to more diverse perspective and information that might not be available in close relationship (Adelman, Parks, & Albrecht, 1987). As such, several scholars outlined the role of weak ties in the provision of social support, particularly in the case of an online setting (Wright & Bell, 2003). Wright et al. (2010) explained that weak ties carry fewer role obligations than strong ties, which potentially allow for lower discomfort from the communication of negative or non-normative sources

of social support seeking. Besides, individual may choose support from weak ties because they may offer more objective feedback than close ties.

While exploring the use of Facebook in accessing social support and informational resources, Vitak and Elllison (2013) found that the social ties on Facebook could facilitate social interaction. They suggested that weak ties offer social support while close ties facilitate information exchange. By referring to strong tie as close relationship and weak tie as non-close relationship, Rozzell et al. (2014) compared the effect of close and non-close relational tie on social support. They found that individuals receive social support from both non-close and close partners on Facebook, but have greater access to non-close tie. On the other hand, Luarn et al. (2015) argued that strong ties are more committed to each other, interact frequently, share and exchange more intimacy, thus making it more likely for them to engage in emotional and instrumental exchange. By measuring the use of Facebook features such as like, comment and private message as the reflection of social support, they confirmed that individuals with strong ties on Facebook provide more social support to each other compared to those with weak ties.

Extending the above findings to this research, it is expected that social ties has an influential effect on online interactions, encompassing communication, information exchange and social support. It is hypothesised that:

H1: Social ties has a positive influence on social interaction

3.3.1.2 Facebook Use and Social Interaction

Facebook is a platform for social interaction and it is perceived as a useful channel for communication and gaining access to social support and information resources (Vitak &

Elllison, 2013). Several researchers explored Facebook use for social interaction activities. Facebook features such as message, wall post, like, comment, photo tag are related to communication while status update, news feed, share, wall post on own wall are related to information sharing (Burke et al., 2011).

Smock et al. (2011) studied on the motives that led to the use of various Facebook features and found that those who are motivated for social interaction would use most of the Facebook features, such as comment on Facebook, write on Friends' Walls, send private message and use Facebook chat. They also found that individuals tend to be more active in the use of status update and use Facebook Group when they are motivated to share information. In other words, individuals who are likely to use Facebook features are also likely to interact and share information.

Vitak and Elllison (2013) outlines how the use of Facebook facilitate the exchange of information and social support. Accordingly, status update makes it easier to exchange support-related messages with peers on Facebook, including both prompts for the provision of social support. Group feature provides access for social support while like a status update or write on wall post provides social support. Also, wall post facilitates information distribution; individuals may write on wall post to seek information or even send private message to obtain personal advice(s).

Burke et al. (2010) analyzed the relationship between Facebook user activities and social capital. They classified the activities into three: (1) directed communication (i.e. comment, like, wall posts, tag); (2) passive consumption (i.e. read news feeds, photo and profile viewing); (3) broadcasting (i.e. status updates, photo shared, application stories and other items posted on own wall). It was found that direct communication has the predicted relationships to bonding social capital. According to Putnam (2000), bonding social capital is observed when the benefits are obtained from close and personal relationships

such as emotional support while bridging social capital describes the benefits derived from loose relationships or casual acquaintances such as information. As such, it is anticipated that the use of Facebook features such as comment, like, wall posts, tag for directed communication could lead to emotional support.

Lee et al. (2014) conducted similar study and found that Facebook features are distinctively used to manage bridging versus bonding social capital. Their results showed that people who frequently use Like hold greater bonding capital, indicating that they may click on the Like button to show interest and provide emotional supports and affection to the poster. It was found that individuals who use the Wall more frequently have greater bridging social capital compared to those who use it less frequently. This implied that people use Wall for interaction. Also, preference for Facebook features such as wall, comment, news feed, like, message, photo, and chat are positively associated with both bonding and bridging social capital. Preference for status and group appeared to be positively related to bridging but not bonding social capital. These findings indicated that the use of various Facebook features is related to benefit and resources from the connection ties made on Facebook. As such, it may imply that the use of Facebook features influence on the social activities such as social support and information seeking.

Among Facebook features, the wall is one of the most examined features in past research. The wall was found to be related to social interaction. For example, it provides the opportunity to seek and receive social support (Bender et al., 2011; David et al., 2015); provide and seek of information (Zhang et al., 2013); information sharing (Struik & Baskerville, 2014) and communication (Ractham & Firpo, 2011).

There have been some initial efforts that explores the use of Facebook features since Facebook was evident to support health promotion and intervention. Wall post and comment were used for information sharing and community building to provide various

support (Greene et al., 2011). Merchant et al. (2014) analysed how interaction took place on Facebook Page designed to support a weight loss programme. Features such as status update, photo, link, poll, like and comment were used for interaction between the health coach and the participants. It is noted that like was the most common used feature for interaction followed by comment.

Previous studies revealed that Facebook features seems to be positively related to social activities on Facebook. Within the context of this research, Facebook use is regarded as the use of Facebook features and social interaction consists of social activities such as communication, information exchange and social support, it is anticipated that the Facebook use will have a positive influence on social interaction. It is hypothesised that:

H2: Facebook use has a positive influence on social interaction

3.3.2   Relationship Between Social Interaction and Outcomes Variables

3.3.2.1 Social Interaction and Healthy Eating Attitude

Past research has revealed that consumer socialisation framework can be applied to explain the formation of attitude following the socialisation process on social media. For example, Wang et al. (2012) showed that during socialization process, peer communication on social media is positively associated with product attitude. Accordingly, communication with peers acts as an informational influence which allow individuals to learn and observe from their peers, and ultimately affect their attitudes on the product, and subsequently purchase intention. Several researchers have revealed the impact of social media use on attitude. In the context of health, Li, Han, Guo and Sun (2016) demonstrated on how social media can be used for malaria prevention and its effect

on the related attitude and practice. They found that the attitude for malaria prevention improved significantly among individuals who have the access to information and social support on social media. Similarly, Baghaei et al. (2011) reported that online social network can positively predispose individuals' attitude toward a healthy lifestyle. They found that higher engagement for interaction on social network result in a significant change in individuals' attitude toward a healthy lifestyle. All these facts showed that social interaction on social media has a direct impact on attitude.

In line with the consumer socialization theory, this research argued that socialization is deemed to occur on Facebook since it is regarded as the platform for social interaction. Social learning processes are anticipated to take place whereby during social interaction, individuals are expected to exposure to Facebook content and communicate, seek and obtain information, learn from their peers on healthy eating. These will then lead them to have better attitude for healthy eating. In addition, observation learning is also expected to occur as individuals may emulate their peers' healthy eating attitude.

According to Verbeke (2008), communication and information provision efforts changes individuals' attitude and alter their decision making, especially in the case of food intake. The impact of communication on individuals' food intake depend on the knowledge obtained from the interaction process. On top of this, it is also well documented that social interactions influence on eating behaviour (e.g. Dabbaghian et al., 2012). Accordingly, when individuals interact with each other, those with similar eating attitude and behaviour tend to form groups and practice similar eating behaviour. Social interaction and social support have been recognised as the influencing factors towards eating attitude and behavior (e.g. McKinley, 2009; Thornton et al., 2006), however, these evidences were based on face-to-face interaction. As pointed out previously, social interaction is referred as the socialisation process on social media, and individuals learn from peers via

interaction and modeling. Generally, modeling occurs when a norm is set by another person (e.g. eating companion). On social media, model is not physically present, but the norm is communicated via textual information (e.g. upload post on healthy food going to consumed/has consumed). Peer modeling effect was tested within a social media setting. Bevelander et al. (2013) investigated the possible effect of palatable food intake of peers on the food intake of youngsters via social media interaction. It was confirmed that youngsters conform to their peer's food intake via social media. As such, it is anticipated that the interaction on social media has influence towards eating attitude and behavior. It is hypothesised that:

H3: Social interaction has a positive effect on healthy eating attitude

3.3.2.2 Social Interaction and Healthy Eating Knowledge

A sizeable body of research showed that social media is used for information sharing and exchange (e.g. Cho, Park, & Kim, 2015; Kwahk & Park, 2016; Pi, Chou, & Liao, 2013) Others addressed the potential process outcome such as knowledge gain. According to Barker, Dozier, Weiss and Borden (2013), individuals attain both focused and incidental knowledge when they interact on social media, which means that individuals gain knowledge that they are seeking but also gain other knowledge incidentally.

Recent research revealed that knowledge can be transferred via online interaction. Li et al. (2016) demonstrated that when individuals interact on social media, the information shared and social support on social media lead to significant improvement in knowledge related to malaria prevention. Similarly, Mayer and Harrison (2012) found that individuals who accessed ''Safe Eats'' Facebook reported increased food safety knowledge. Accordingly, Facebook provides a meaningful leaning social environment

and serves as a social interaction venue. The communication and sharing of ideas among users lead to the improvement in food safety knowledge. Dagan, Beskin., Brezis and Reis (2015) studied the use of Facebook for nutritional learning and found that individuals who joined the social group for interaction and are exposed to peers' performance in healthy eating exhibited significant improvement in the knowledge relative to those who did not.

According to Verbeke (2008), knowledge is a cognitive reaction of exposure to communication process, which subsequently result in a behavioural change. The communication and information provision efforts during the interaction process changes individuals' knowledge, then alter their decision making, especially on food choice and dietary behaviour. Based on consumer socialisation theory, individuals who learn from their peers through communication and interaction will gain related knowledge (Moschis & Churchill, 1978). During social interaction on Facebook, individuals are expected to learn about healthy eating from peers and resources available on Facebook. They can learn about the healthy eating knowledge when they communicate information about healthy eating and share with others on how they engage into healthy eating behaviour. Besides, they can gain knowledge about healthy eating via reading uploaded posts and information shared on wall posts.

It is hypothesised that:

H4: Social interaction has a positive effect on healthy eating knowledge

3.3.2.3 Healthy Eating Attitude and Healthy Eating Behaviour

In order to accurately analyse individuals' healthy eating behaviour, it is necessary to account for the psychological factors such as attitude that shape the behaviour (Senauer,

2001). There is a notion that attitude in some way guide, influence, direct, shape and predict actual behaviour (Kraus, 1995). Forming appropriate attitudes toward certain behaviour is important for individuals' behavior. According to Hearty et al. (2007), it is important to consider eating attitude as the target variable, especially in improving dietary behaviour because individuals who formed positive attitude towards healthy eating are more compliant to the guidelines for healthy eating.

Past nutrition studies have confirmed the influence of eating attitude on dietary consumption and behaviour. Various dietary related attitudes have been examined and almost all reported significant influence on the related dietary consumption and behaviour. For instance, Shepherd and Stockley (1985) examined the attitude related to consumption of high-fat foods and found that it is associated with the frequency of high-fat food consumption. According to Pieniak et al. (2010), attitude towards organic vegetables have a direct and relatively strong positive relationship with organic vegetables consumption. Nasreddine, Akl, Al-Shaar, Almedawar and Isma'eel (2014) found that consumers' attitude towards salt was associated with salt consumption behaviour such as reducing its intake. Similarly, Moon and Rho (2017) found a positive relationship between attitude towards low sodium diet and dietary behaviour related to sodium. Generally, individuals who reported positive attitude related to diet and healthy eating tend to make healthier food choices (Milošević, Žeželj, Gorton, & Barjolle, 2012; Roininen et al., 1999) and have healthier diet intake such as following a low fat diet (Kristal, Bowen, Curry, Shattuck, & Henry, 1990), decreased consumption of high fat snacks (Zandstra et al., 2001), increased consumption of fish (Pieniak et al., 2010) and increase consumption of vegetables and fruit (Zandstra et al., 2001).

According to Wardle (1993), attitude towards healthy food is a strong predictor of healthy eating behaviour. This is evident in Hearty et al. (2007)'s study measuring healthy eating

attitude and dietary behaviour among Irish adults. Compared with individuals with negative attitude towards healthy eating, individuals with positive healthy eating attitude consumed significantly higher amount of healthy food such as whole meal bread, fruits, vegetables, fish and significantly lower amount of less healthy food such as chips, sugar and confectionary. It was then concluded by Hearty et al. (2007) that healthy eating attitude is related to the measurement of dietary behaviour. This finding remained unchanged for the subsequent National Adult Nutrition Survey among Irish adults conducted during 2008–2011 where having a healthy eating attitude is significantly and positively related to healthy eating behaviour (Naughton et al., 2013). Similarly, Aggarwal, Monsivais, Cook and Drewnowski (2014) found that positive attitude toward healthy eating was associated with higher quality diet intake which include higher consumption of fruits and vegetables. There are sound empirical evidences in nutrition research confirming that attitude is related to dietary behaviour.

In accordance to consumer socialization theory, both attitude and behaviour are the outcome of the learning from the socialization process. Individuals are anticipated to form positive healthy eating attitude which ultimately translated into the adoption of healthy eating behaviour. It is anticipated that the healthy eating attitude following the social interaction on Facebook will influence individuals' healthy eating behaviour. It is hypothesised that:

H5: Healthy eating attitude has a positive effect on healthy eating behaviour

3.3.2.4 Healthy Eating Knowledge and Healthy Eating Behaviour

Consumer knowledge play an important role in explaining consumer behaviour. According to Variyam et al. (1998), knowledge is one of the influencing factors on

individuals' food intake and behaviour. Certain dietary knowledge is needed to make changes in one's eating pattern (Deliens et al., 2014). Generally, if people know the "how" (the benefits of eating certain food) and the "why" (why the food provides particular benefits), they are more likely to consume a particular food (Wansink, Westgren, & Cheney, 2005).

Historical nutrition studies confirmed a link between nutrition knowledge and food intake, where nutrition knowledge is an important determinant for the consumption of healthy food (Ljubicic et al., 2017). Past research confirmed that high level of nutrition knowledge is linked to higher intake of healthy food such as fruits and vegetables and lower in fat and salt intake (De Vriendt, Matthys, Verbeke, Pynaert, & De Henauw, 2009; Gámbaro, Raggio, Dauber, Claudia Ellis, & Toribio, 2011; Marakis et al., 2014; Spronk, Kullen, Burdon, & O'Connor, 2014; Wardle et al., 2000). Nutrition knowledge also contributes to healthier eating behaviour in terms of the choices for daily meals and types of drinks. For instance, individuals with higher nutrition knowledge tend to decrease consumption of less healthy food such as high-fat and high-sugar foods (Gambaro et al., 2011, Kostanjevec, Jerman & Koch, 2013), fast food (Mirsanjari, Muda, Ahmad, Othman, & Mosavat, 2012). On top of this, they are more likely to follow a healthy diet in accordance to dietary recommendation and increase intake in food from cereal, milk, fruit and vegetable group (Dickson-Spillmann & Siegrist, 2011; Kostanjevec et al., 2013; Krešić, Kenđel Jovanović, Pavičić Žeželj, Cvijanović, & Ivezić, 2009; Wardle et al., 2000). Nevertheless, some of the research did not find report an association between knowledge and food consumption. For example, although many confirmed on the association between higher nutrition knowledge and higher fruits and vegetables intake, Sharma, Gernand and Day (2008) did not find this association among Mexican American population; instead, the positive associations were only found for grains, dairy products,

meat, beans and water intake. In other studies, nutrition knowledge has no impact on dietary fat and saturated fat intake (De Vriendt et al., 2009; Shepherd & Stockley, 1985; Stafleu, Van Staveren, De Graaf, Burema, & Hautvast, 1996). It is also interesting to note that some research indicated that nutrition knowledge is not associated with healthy eating but it is negatively associated with unhealthy eating behaviour such as decrease in fast food consumption (Deliens et al., 2014; Williams, Thornton, & Crawford, 2012).

Nutrition knowledge is the knowledge of nutrients and nutrition (Worsley, 2002), which can be used to examine people's understanding on healthy eating (Parmenter & Wardle, 1999). Similarly, in this research, healthy eating knowledge refers to the perceived knowledge that individuals think they are having for healthy eating while healthy eating behaviour refers to healthy food consumption behaviour. Knowledge is the main underlying factor affecting consumers' food choices, which then lead to the consumption of healthy food and healthy eating behaviour (Brečić et al., 2014; Carrillo et al, 2011). It is anticipated that similar correlation exists between healthy eating knowledge and healthy eating behaviour.

In accordance to consumer socialization theory, both knowledge and behaviour are the outcome of the learning from the socialization process. Individuals are anticipated to acquire healthy eating knowledge during socialisation which then lead them into the adoption of healthy eating behaviour. It is anticipated that the healthy eating knowledge following the social interaction on Facebook will influence individuals' healthy eating behaviour. It is hypothesised that:

H6: Healthy eating knowledge has a positive effect on healthy eating behaviour

3.3.3 Relationship between Healthy Eating Behaviour and Work Productivity

The impact of nutrition on work productivity has been discussed by a number of researchers (e.g. Croppenstedt & Muller, 2000; Desai et al., 1984; Gopaldas & Gujral, 2003; Haddad & Bouis, 1991). Nutrition deficiencies can result in decreased work capacity and output (Haas & Brownlie, 2001). Several researches reported that certain nutrients are related to productivity e.g. vitamin A (Weinberger, 2003), iron (Weinberger, 2004), iodine (Gopaldas & Gujral, 2003). Vitamins and minerals such as iodine, zinc, folate, iron and vitamin A are crucial towards physiological processes in the brain and affect cognitive function (Lam & Lawlis, 2017; McMillan, Owen, Kras, & Scholey, 2011). Improper diet intakes such as high intake of fat and sugar are related to poorer cognitive performance (Francis & Stevenson, 2011; Ginieis, Franz, Oey, & Peng, 2018; Kalmijn, 2000). Proper nutrition, which is achieved by adopting healthy eating behaviour is an important factor towards increasing individuals' cognitive skills, making them feel more energetic and decrease the number of days lost to illness; all of which are expected to increase work output and productivity (Martorell & Arroyave, 1988).

Some researchers have suggested that the promotion of healthy eating behaviour lead to better work productivity. Jensen (2011) explained that this productivity gain can be achieved via a chain effects: intervention → knowledge → behaviour → health → productivity. Researchers are convinced on this hypothetical assumption of productivity gain following the promotion of healthy eating at workplace and several studies were conducted to confirm its positive outcomes. Katcher et al. (2010) assessed the outcome of the implementation of a worksite nutrition programme focusing on healthy vegan diet and found significant improvement in health-related quality of life and work productivity. A significant reduction of 6.1% in work impairment was observed among those who participated in the worksite nutrition programme. Also, the participants reported a

significant increase in physical functions, general health, vitality, and mental health over the 22-week study period compared with the control group who did not have any changes in their diet. It was then concluded that these improvements in quality of life translates to improved work productivity. As such, healthy eating behaviour is deemed relevant for individuals' health enhancement, which then lead to increased work productivity. Similarly, Fitzgerald et al. (2016) investigated the effectiveness of a workplace dietary intervention trial namely the Food Choice at Work Study on work productivity. They found that healthy eating behaviour is negatively associated with absenteeism and reduced expected frequency by 50%. In their study, healthy eating behaviour was represented by DASH (Dietary Approaches to Stop Hypertension) score where high DASH scores indicate a healthy eating pattern, consisting of low intake in fat, sodium and processed food, high intake of fruit, vegetables, legumes, and nuts; moderate amounts of low-fat dairy products. Those who reported high DASH scores have lower predicted number of days absent (1·9 day) compared to those reporting low DASH score (3·0 day). It was concluded that consuming a healthy diet (i.e. high fruit and vegetable consumption, low in fat, sugar and salt consumption) can significantly reduce the frequency of absenteeism and potential for absence.

From the aforementioned studies, healthy eating behaviour seems to be related with work productivity. Thus, it is hypothesised that:

H7: Healthy eating behaviour has a positive effect on work productivity.

3.4   PROPOSED CONCEPTUAL FRAMEWORK

Based on the previous discussion, the proposed conceptual framework of the research is presented in Figure 3.1 below. This research has applied social capital theory and consumer socialization theory as the theoretical foundation of the research to provide a comprehensive understanding of the determinants (Facebook use, social ties) affecting social interaction on Facebook, which lead to increased healthy eating knowledge, attitude and behaviour that contribute to work productivity.
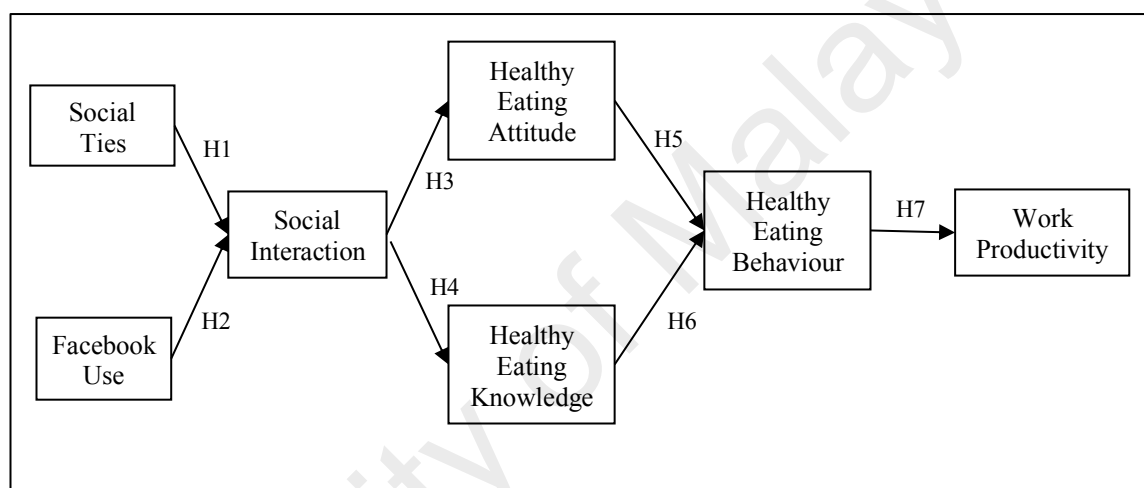
Figure 3.1: Proposed Conceptual Framework

CHAPTER SUMMARY

This chapter illustrated how the research model and hypotheses are developed based on two theories namely social capital theory and consumer socialisation theory and literature review discussed. According to consumer socialisation theory, individuals develop related knowledge, attitudes and behaviour by learning from socialisation agents via social interaction. This research aims to provide both theoretical and empirical analysis to explain how social interaction on Facebook influence Facebook users' healthy eating knowledge, attitude and behaviour which then lead to work productivity. Social capital theory is used as the theoretical basis to explore how social ties contribute to social

interaction on Facebook. Based on the literature review, this research proposed that Facebook use and social ties are antecedents for social interaction. This research also explores on how healthy eating behaviour lead to increased work productivity. This is a pioneering research in the sense that it provides an understanding on how social interaction result in healthy eating behaviour in an online context, which translates into increased work productivity.

CHAPTER 4

RESEARCH METHODOLOGY

4.1. INTRODUCTION

This chapter details the research methodology adopted in this study. Section one provides an overview of the research design and process. Section two describes the development and operationalization process of the measures, while section three details the development of survey instrument. Section four describes the administration process of the survey, while section five detail the assessment method for measurements, measurement models and the structural model. The reliability and validity of this research are also established in this section. The final section summarises this chapter.

4.2. OVERVIEW OF RESEARCH DESIGN AND PROCESS

The research design constitutes the blueprint for collection, measurement and analysis of data. It involves the development of plan and structure of the research based on its express purpose, which typically include type of research, data collection method and time frame, scope and unit analysis, research environment, research instrument and data analysis methods (Cooper, Schindler, & Sun, 2006).

This research aims to investigate the influence of Facebook social interaction on healthy eating behaviour and work productivity. As such, it explains how the influential relationships take place and focuses on the verification of the hypothesis development in the proposed research model detailed in Chapter 3. In this research, empirical data

collection was conducted for statistical analysis, which was then used to verify the proposed hypotheses. A positivist approach was deemed appropriate for understanding the relationships between the variables and findings. Typically, the positivist approach is used to describe an approach of research based on the assumption that knowledge can be discovered by collecting data through observation, measurement and experimental to establish truth (Somekh & Lewin, 2011). As such, this research applied the refinement of the positivism philosophy to empirically investigate the effect of social interaction on Facebook towards healthy eating behaviour and work productivity. The effect of factors related to social interaction on Facebook are also examined. It is noted that this research used the deductive approach, where collection of quantitative data was required to test the hypotheses developed based on consumer socialization theory and social capital theory (as discussed in Chapter 3). In order to obtain a large amount of data from sizable population, the survey strategy was adopted. A survey questionnaire was thus designed for the purpose of data collection. This research also employed cross-sectional design, as the data were collected only once and working adults who used Facebook were selected as representative of the population, one sample of respondents.

The research process consists of three phases (refer figure 4.1). Phase 1 encompass the research model and measures development. First, in-depth literature review was conducted to obtain information and knowledge in work productivity, health behaviour and social media. This review provided insights on various possibilities to close the gaps and extend the existing knowledge in the area of work productivity, health and social media research. Based on the selected theoretical foundation and literature review, hypotheses and research model were developed. Research measurements and instrument (questionnaire) were then developed for data collection and validation of research model. The developed questionnaire was sent to panel of academic and practitioners for pre-

testing in order to establish the suitability, effectiveness, and adequacy of research measurements and instrument. Both content validity and face validity were subsequently confirmed. Next, a pilot test was conducted to rectify any inadequacy in the questionnaire before commencing with the actual survey. Phase 2 involved survey and data analyses. The questionnaires were distributed to working adults who used Facebook online and paper survey based on purposive and convenient sampling. Next, the data obtained from the survey were analysed using statistical applications, such as Statistics Package for Social Sciences (SPSS) and Analysis of Moment Structures (AMOS). SPSS was used to obtain descriptive statistics and inferential statistics (e.g. mean, standard deviation, exploratory factor analysis, measure common method bias, assessment of multivariate assumptions). Structural equation modeling (AMOS) was used to test the measurement and structural model, to determine reliability and validity, to confirm the hypotheses and the research model. Phase 3 involved the interpretation of data analysis result and confirmation on the findings. The results were then concluded and the research model was confirmed.

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┌─────────────────────┐   ┌─────────────────────┐   ┌─────────────────────┐
│  In-depth literature│   │       Survey        │   │                     │
│  review (Theoretical│   └─────────────────────┘   │                     │
│   foundations)      │              │              │                     │
└─────────────────────┘              ▼              │                     │
          │              ┌─────────────────────┐   │                     │
          ▼              │ Descriptive statistic,│  │                     │
┌─────────────────────┐  │    reliability,      │   │                     │
│  Development of     │  │ exploratory factor   │   │                     │
│  research model     │  │     analysis         │   │    Final result/    │
└─────────────────────┘  └─────────────────────┘   │     Conclusion      │
          │                         │              │                     │
          ▼                         ▼              │                     │
┌─────────────────────┐  ┌─────────────────────┐   │                     │
│  Development of     │  │ Statistical analysis │   │                     │
│  measures           │  │ (structural equation │   └─────────────────────┘
└─────────────────────┘  │     modeling)        │
          │              └─────────────────────┘
          ▼                         │
┌─────────────────────┐             ▼
│  Pre-test and pilot │  ┌─────────────────────┐
│  testing of measures│  │  Measurement model   │
└─────────────────────┘  └─────────────────────┘
                                    │
                                    ▼
                         ┌─────────────────────┐
                         │   Structural model   │
                         └─────────────────────┘
                                    │
                                    ▼
                         ┌─────────────────────┐
                         │   Statistical result │
                         └─────────────────────┘

     Phase 1                   Phase 2                  Phase 3
 Research model and       Field study: survey &         Result
 measure development           analysis
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Figure 4.1:The Research Process

4.3. DEVELOPMENT AND OPERATIONALIZATION OF MEASURES

4.3.1 Measures Development

The development of measures and constructs was guided by literature outlined in Chapter Two. In total, there are seven constructs in this research, namely social ties, Facebook use, social interaction, healthy eating knowledge, healthy eating attitude, healthy eating behaviour and work productivity. This research adapted validated scales from previous research related to social media and health. Some items were rephrased and modified to

fit the research context better. All constructs were measured using multi item measures because it can better specify the construct domain, average out the uniqueness of individual items and increase reliability (Malhotra & Grover, 1998). Measurement items for social ties, Facebook use and social interaction were adapted from internet and social media literatures (e.g. Chang, 2015; Kwahk & Park, 2016; Li et al., 2015; Smock et al., 2011). Other constructs such as healthy eating attitude, healthy eating knowledge, healthy eating behavior, work productivity were adapted from health literatures (e.g. Kearney et al., 2001; Moorman & Matulich, 1993; Pieniak et al., 2010; Roininen et al., 1999; Wattles & Harris, 2003). All items were measured using a 7-point Likert scales ranging from (1) strongly disagree to (7) strongly agree with exception of Facebook use. The measurement items for Facebook use were measured with a 7-point Likert scales, representing the frequency of use, ranging from (1) never, to (7) always. Table 4.1 presented the list of constructs, construct definitions, and relevant literature sources.

Table 4.1: Measurement of Construct

Constructs	Definition	Sources
Social ties	Degree to which individual connects to other users on Facebook	Kwahk and Park (2016)
Facebook use	Degree to which individual uses various Facebook features, such as Like, Comment, Share, Page, Group etc. for healthy eating	Smock et al. (2011), Li et al. (2015), Chang (2015).
Social interaction	Degree to which individual interacts with others on Facebook for healthy eating	Barrera, Glasgow, McKay, Boles and Feil (2002), Lagoe and Atkin (2015), Wang et al. (2012), Chu and Sung (2015), Lueg and Finney (2007), Chung et al. (2016), Cho, Park and Kim (2015), Asghar (2015)
Healthy eating attitude	Degree to which perceives the attitude that he/she has toward healthy eating in the context of the use of Facebook for social interaction.	Kearney et al. (2001), Roininen et al. (1999)

Constructs	Definition	Sources
Healthy eating knowledge	Degree to which individual perceives the knowledge that he/ she has pertaining to healthy eating in the context of the use of Facebook for social interaction	Pieniak et al. (2010)
Healthy eating behaviour	Degree to which individual perceives the healthy eating habits that he/she has in the context of the influence of healthy eating attitude and knowledge following the use of Facebook for social interaction	Moorman and Matulich (1993)
Work productivity	Degree to which individual perceives his/her productivity and ability to perform task at work in the context of the influence of healthy eating behaviour following the use of Facebook	Wattles and Harris (2003)

4.3.2 Measures Operationalization

4.3.2.1 Social Ties

Social ties is the degree to which individual connects to other users on Facebook. In this research, social tie was measured using 4 items adapted from Kwahk and Park (2016). The seven point Likert scale ranging from (1) strongly disagree to (7) strongly agree was employed to measure the items (refer Table 4.2).

Table 4.2: Scale Items for Social Ties

Item	Social Ties	*Strongly Disagree* *Neither Disagree nor Agree* *Strongly Agree*
ST1	I maintain close social relationships with people through Facebook.	1------2------3------4-----5------6-----7
ST2	I spend a lot of time interacting with other people through Facebook.	1------2------3------4-----5------6-----7
ST3	I personally know some of the people who actively use Facebook.	1------2------3------4-----5------6-----7
ST4	I frequently communicate with people through Facebook.	1------2------3------4-----5------6-----7

4.3.2.2 Facebook Use

Facebook use refers to the degree to which individual uses various Facebook features, such as Like, Comment, Share, Page, Group etc. for healthy eating. A total of 11 items were used to measure Facebook use. Two items were adapted from Smock et al. (2011), 4 items from Li et al. (2015) and 5 items from Chang (2015). The seven point Likert scale ranging from (1) never (7) always was used to measure the items (refer Table 4.3).

Table 4.3: Scale Items for Facebook Use

Item	Facebook Use	*Never Occasionally Always*
USE1	I upload photos about healthy eating on Facebook.	1-----2-----3-----4-----5-----6----7
USE2	I share web links pertaining to healthy eating on Facebook.	1-----2-----3-----4-----5-----6----7
USE3	I browse others' posts on healthy eating on Facebook.	1-----2-----3-----4-----5-----6----7
USE4	I 'comment' on others' posts which are related to healthy eating on Facebook.	1-----2-----3-----4-----5-----6----7
USE5	I 'like' others' posts which are related to healthy eating on Facebook.	1-----2-----3-----4-----5-----6----7
USE6	I browse information on others' walls for healthy eating on Facebook.	1-----2-----3-----4-----5-----6----7
USE7	I 'comment' on information pertaining to healthy eating on others' walls on Facebook.	1-----2-----3-----4-----5-----6----7
USE8	I read all the healthy eating related posts in the Facebook Groups.	1-----2-----3-----4-----5-----6----7
USE9	I comment on all the healthy eating related posts in the Facebook Groups.	1-----2-----3-----4-----5-----6----7
USE10	I 'like' Facebook pages of organizations related to healthy eating.	1-----2-----3-----4-----5-----6----7
USE11	I 'share' the information from a non-Facebook website pertaining to healthy eating on Facebook.	1-----2-----3-----4-----5-----6----7

4.3.2.3 Social Interaction

Social interaction refers to the degree to which individual interacts with others on Facebook for healthy eating. In this research, social interaction is regarded as how individuals interact with each other via communication, information exchange and social support for healthy eating purposes. Social interaction was measured using 14 items where 6 were adapted from Barrera, Glasgow, McKay, Boles and Feil (2002), 2 from Lagoe and Atkin (2015) and 1 from Wang et al. (2012), Chu and Sung (2015), Lueg and Finney (2007), Chung et al. (2016), Cho, Park and Kim (2015), Asghar (2015) respectively. The seven point Likert scale ranging from (1) strongly disagree to (7) strongly agree was employed to measure the items (refer Table 4.4).

Table 4.4: Scale Items for Social Interaction

Item	Social Interaction	*Strongly Disagree Neither Disagree nor Agree Strongly Agree*
SI1	Facebook users (e.g. friends, group members or others) encourage me to buy healthy food.	1-----2-----3-----4-----5-----6----7
SI2	We, Facebook users inform each other how to live with healthy eating practices.	1-----2-----3-----4-----5-----6----7
SI3	Facebook users encourage me to practice healthy eating.	1-----2-----3-----4-----5-----6----7
SI4	I frequently post my healthy eating practices on Facebook.	1-----2-----3-----4-----5-----6----7
SI5	I share information about healthy eating that interest me on Facebook.	1-----2-----3-----4-----5-----6----7
SI6	I post questions of healthy eating on Facebook because its users provide me with better information than an Internet search.	1-----2-----3-----4-----5-----6----7
SI7	I seek out healthy eating information on Facebook.	1-----2-----3-----4-----5-----6----7
SI8	I pay close attention to healthy eating information on Facebook.	1-----2-----3-----4-----5-----6----7
SI9	On Facebook, I can communicate with people who can give me good advice about healthy eating.	1-----2-----3-----4-----5-----6----7

Item	Social Interaction	Strongly Disagree		Neither nor Agree	Disagree	Strongly Agree
SI10	When I need advice from someone who has been eating healthily, I can communicate this with someone on Facebook.	1-----2-----3-----4-----5-----6----7				
SI11	I have access to other people who have current information about healthy eating practices on Facebook.	1-----2-----3-----4-----5-----6----7				
SI12	I find it easy to communicate with people who can give me the facts about healthy eating on Facebook.	1-----2-----3-----4-----5-----6----7				
SI13	On Facebook, I can contact people who are interested in my healthy eating plan.	1-----2-----3-----4-----5-----6----7				
SI14	Seeing the success of others engaging in healthy eating habits on Facebook encourages me to stay on my healthy eating plan.	1-----2-----3-----4-----5-----6----7				

4.3.2.4 Healthy Eating Attitude

Healthy eating attitude is referred as the degree to which individual perceives the attitude that he/she has toward healthy eating in the context of the use of Facebook for social interaction. In this research, healthy eating attitude was measured using five items where three were adapted from Kearney et al. (2001) and two from Roininen et al. (1999). The seven point Likert scale ranging from (1) strongly disagree to (7) strongly agree was used to measure the items (refer Table 4.5).

Table 4.5: Scale Items for Healthy Eating Attitude

Item	Healthy Eating Attitude	Strongly Disagree		Neither nor Agree	Disagree	Strongly Agree
A1	Following the use of Facebook, I make a conscious effort to consume a healthy diet.	1-----2-----3-----4-----5-----6----7				
A2	Following the use of Facebook, I confirm that my current diet is healthy.	1-----2-----3-----4-----5-----6----7				
A3	Following the use of Facebook, I have become very particular about healthy eating.	1-----2-----3-----4-----5-----6----7				

Item	Healthy Eating Attitude	*Strongly Disagree*	*Neither Disagree nor Agree*	*Strongly Agree*
A4	Following the use of Facebook, I know it is important for my daily diet to contain a lot of vitamins and minerals.	1-----2-----3-----4-----5-----6----7		
A5	From the information I have gathered on Facebook, I consume a healthy amount of fat in my diet.	1-----2-----3-----4-----5-----6----7		

4.3.2.5 Healthy Eating Knowledge

Healthy eating knowledge refers to the degree to which individual perceives the knowledge that he/ she has pertaining to healthy eating in the context of the use of Facebook for social interaction. In this research, healthy eating knowledge was measured using 3 items adapted from Pieniak et al. (2010). The seven point Likert scale ranging from (1) strongly disagree to (7) strongly agree was employed to measure the items (refer Table 4.6).

Table 4.6: Scale Items for Healthy Eating Knowledge

Item	Healthy Eating Knowledge	*Strongly Disagree*	*Neither Disagree nor Agree*	*Strongly Agree*
KN1	Following the use of Facebook, compared with an average person, I know a lot about healthy eating.	1-----2-----3-----4-----5-----6----7		
KN2	Following the use of Facebook, I know a lot about how to evaluate the quality of healthy food.	1-----2-----3-----4-----5-----6----7		
KN3	Following the use of Facebook, people who know me consider me to be an expert in the field of healthy eating.	1-----2-----3-----4-----5-----6----7		

4.3.2.6 Healthy Eating Behaviour

Healthy eating behaviour is regarded as the degree to which individual perceives the healthy eating habits that he/she has in the context of the influence of healthy eating attitude and knowledge. In this research, healthy eating behaviour was measured using 7 items adapted from Moorman and Matulich (1993). The seven point Likert scale ranging from (1) strongly disagree to (7) strongly agree is employed to measure the items (refer Table 4.7).

Table 4.7: Scale Items for Healthy Eating Behaviour

Item	Healthy Eating Behaviour	*Strongly Disagree* *Neither Disagree nor Agree* *Strongly Agree*
HEB1	Following the use of Facebook, I eat a lot of fresh fruits.	1-----2-----3-----4-----5-----6----7
HEB2	Following the use of Facebook, I eat a lot of fresh vegetables.	1-----2-----3-----4-----5-----6----7
HEB3	Following the use of Facebook, I watch the amount of fat I consume.	1-----2-----3-----4-----5-----6----7
HEB4	Following the use of Facebook, I consume only a moderate amount of sugar.	1-----2-----3-----4-----5-----6----7
HEB5	Following the use of Facebook, I have reduced my sodium or salt intake in my diet.	1-----2-----3-----4-----5-----6----7
HEB6	Following the use of Facebook, I have become moderate in my red meat consumption.	1-----2-----3-----4-----5-----6----7
HEB7	Following the use of Facebook, I eat a more well-balanced diet.	1-----2-----3-----4-----5-----6----7

4.3.2.7 Work Productivity

Work productivity is referred as the degree to which individual perceives his/her productivity and ability to perform task at work in the context of the influence of healthy eating behaviour. In this research, work productivity was measured using 5 items adapted

from Wattles and Harris (2003). The seven point Likert scale ranging from (1) strongly disagree to (7) strongly agree was employed to measure the items (refer Table 4.8).

Table 4.8: Scale Items for Work Productivity

Item	Work Productivity	*Strongly Disagree*	*Neither Disagree nor Agree*	*Strongly Agree*
WP1	Healthy eating helps me to be more productive at work.	1-----2-----3-----4-----5-----6----7		
WP2	Healthy eating helps me to concentrate on work tasks.	1-----2-----3-----4-----5-----6----7		
WP3	Healthy eating helps me to enjoy my work better.	1-----2-----3-----4-----5-----6----7		
WP4	Healthy eating helps me to relate better to my co-workers.	1-----2-----3-----4-----5-----6----7		
WP5	Healthy eating helps me to think more clearly about work-related problems.	1-----2-----3-----4-----5-----6----7		

4.3.2.8 Demographic Profile

Demographic and work related profile of the respondents were measured. Personal details such as gender, age, education level, country of origin, employment status were elucidated. Information pertaining to respondents' employment such as organization sector and industry category, current role in the industry were also obtained. In addition, Facebook related profile such as platform accessing Facebook, daily average number of minutes spent actively using Facebook, daily average number of minutes spent actively using Facebook for healthy eating, number of "friend" on Facebook were also included in this measure.

4.3.3 Pre-testing The Measures

Generally, there are limitations to the use of survey questionnaire for data collection. Questionnaires are prone to several validity issues such as internal consistency and reliability, construct validity and threat of mono-method bias. In order to mitigate these issues, pre-tests were conducted to ensure the validity and reliability of the measurements. Pre-testing is a method to check if the measurement items are asking the intended questions that are understood by the individuals who are likely to respond to them (Hilton, 2017). It is designed to ensure the measurement are consistent, complete and valid for its intended purposes. The pre-test needs to be conducted to ensure that the responses of the measurements are adequate and the presentation of the question is clear and unambiguous in the wordings. This is an important step towards ensuring content validity. In this research, the pre-test was performed via evaluation by a panel of academics and practitioners. The validity process for the measures is illustrated in Figure 4.2.
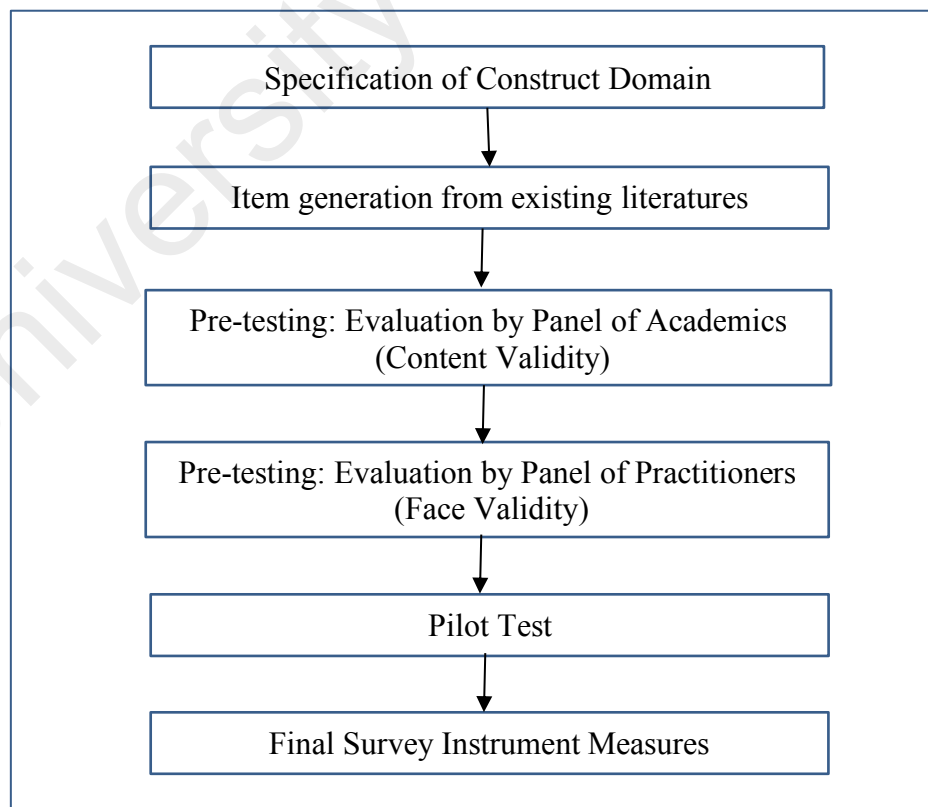
Figure 4.2: Framework for Development of Measures
(Adapted from Malhotra and Grover, 1998)

Both content validity and face validity were assessed using pre-test measurements. Content validity is essential to ensure the measurement items are adequate and representative for the required concepts and content. First, content validity was achieved through literature review and adoption of theory-based validated measurements from previous studies. Second, content validity was evaluated by panel of experts and academicians. Subsequently, face validity was assessed through the evaluation by working individuals who use Facebook. Face validity was conducted to ensure the measurement items are clear to the subject and understandable (Cavana, Delahaye, & Sekaran, 2001).

4.3.3.1 Evaluation by Panel of Academics

A total of ten academicians from relevant backgrounds were invited for content validation. These academicians were selected based on their expertise and knowledge in the research area and constructs. Evaluation forms which consist of the construct name, definition and measurement items were sent to ten experts from social media and health discipline. They were asked to evaluate the measurement and whether or not they think the items are representative of the concepts. In the response form, they were asked about their opinions on how well the items capture the concept of the construct based on the 5-point Likert scale of (1) very weak estimate to (5) very strong estimate. They were asked to provide additional comments for improvement. The results of the responses are presented in Table 4.9. Based on the responses from these experts, a total of seven items were deleted; one item from Facebook use, two items from social interaction, one item from healthy eating attitude, two items from healthy eating behavior and one item from work productivity. Items deleted are presented in Table 4.10. Some items were re-worded and rephrased based on the feedback provided.

Table 4.9: Result of Pre-Test by Panel of Academicians

Construct	Result of Pre-Test Rate (Content Validity)
Social Ties	5
Facebook Use	4.6
Social Interaction	4.6
Healthy Eating Attitude	4.1
Healthy Eating Knowledge	4.2
Healthy Eating Behaviour	4.5
Work Productivity	4.3

Table 4.10: Item Deleted Based on Feedback from the Panel of Academicians

Construct	Item	Item Deleted
Facebook Use	USE11	I share the information from a non-Facebook website pertaining to healthy eating on Facebook.
Social Interaction	SI13	On Facebook, I can contact people who are interested in my healthy eating plan.
	SI14	Seeing the success of others engaging in healthy eating habits on Facebook encourages me to stay on my healthy eating plan.
Healthy Eating Attitude	A5	From the information I have gathered on Facebook, I consume a healthy amount of fat in my diet.
Healthy Eating Behaviour	HEB6	Following the use of Facebook, I have become moderate in my red meat consumption.
	HEB7	Following the use of Facebook, I eat a more well-balanced diet.
Work Productivity	WP5	Healthy eating helps me to think more clearly about work-related problems.

4.3.3.2 Evaluation by Panel of Practitioners

After deletion and changes to the measurement items, pre-test was conducted among 20 MBA students who are working fulltime and full-time employees from a private healthcare organization to evaluate the face validity of the measurements. Evaluation forms which consist of the construct name, definition and measurement items were sent for them to evaluate the measurements. They were asked to rate the ease of answerability of the measurement items. In the response form, they were asked about their opinions on

how easy the question can be understood and they were required to answer based on the 5-point Likert scale of (1) very difficult to complete to (5) very easy to complete. They were asked for comments on how the questionnaire can be simplified and feedbacks on necessary changes for the measurement items. Their responses are tabulated in Table 4.11.

Table 4.11: Result of Pre-Test by Panel of Practitioners

Construct	Result of Pre-Test Rate (Face Validity)
Social Ties	4.6
Facebook Use	4.4
Social Interaction	3.9
Healthy Eating Attitude	3.9
Healthy Eating Knowledge	4.2
Healthy Eating Behaviour	4.5
Work Productivity	3.9

4.4. SURVEY INSTRUMENT DEVELOPMENT

4.4.1 Pilot Testing of Questionnaire

Once the questionnaire design completed, a pilot test was conducted to pre-test the survey instrument. Pilot test was conducted to check on the design layout of the questionnaire in the context of its sequences. A pilot test is important to ensure that the questions are worded appropriately and understood by the respondents. By pre-testing the questionnaires on small number of respondents, it increases understanding on how the respondents comprehend the questionnaires. This rectifies any inadequacy prior to the survey.

For pilot testing, questionnaires were distributed among 60 employees of two organization in Kuala Lumpur. As this research is related to health and in effort to get

better feedback to the questionnaire, the two chosen organizations were: one healthcare (hospital) and the other one from non-healthcare (Bank) were selected. The chosen organization were reputable multinational firms with an average staff of almost 1000 and over. The samples were randomly selected but were subjected to be Facebook users prior to the selection. The samples that was chosen for pilot study was omitted in the final research participants. The questionnaires were distributed randomly to the staff at staff cafeteria during their lunch break. All respondents returned the completed questionnaires, which took them 20 to 25 minutes. No significant comment was made about the difficulty in completing the questionnaire, thus, no changes were made on its format, layout and structure.

4.4.2 Finalizing of Questionnaire

The final research questionnaire consists of eight sections which include the measurement for social ties (Section A), Facebook use (Section B), social interaction (Section C), healthy eating attitude (Section D), healthy eating knowledge (Section E), healthy eating behaviour (Section F), work productivity (Section G), demographic profile (Section H) (refer Appendix 1 for final version of survey questionnaire). On the first page of the questionnaire, the pre-requisite criterion was clearly specified (i.e. Facebook user and currently working). The estimated time to complete the questionnaire was approximately 20 minutes.

4.5. ADMINISTRATION OF SURVEY

4.5.1 Sampling

As the objective of this research is to examine the influence of Facebook social interaction on healthy eating behaviour and work productivity, therefore the population of interest in this research is working individuals who use Facebook. Facebook has over 1.28 billion active users worldwide, however there is no data available on the working population who uses Facebook. As such, it was not practical to assign probability to the population. The unavailability of an accurate sampling frame led to the use of nonprobability sampling techniques, namely purposive sampling and convenience sampling. Past research showed that the use of snowball sampling on Facebook makes it possible to reach the designated respondents (Baltar, & Brunet, 2012). Snow ball sampling was also adopted in this research, whereby Facebook users were encouraged to share the online survey link with their friends on Facebook, which allowed the survey to reach more people. Therefore, this research was based on purposive, convenience and snow ball sampling. It was also important to ensure the target population was Facebook users who are working, thus 2 screening questions were included at the beginning of the online survey questionnaire to filter out the responses from non-Facebook users and those who were Facebook users but not working.

As recommended by Malhotra (2010), the required sample size in a research depends on the proposed data analysis techniques. The recommendation of sample size for the proposed data analysis techniques in this research namely factor analysis and structural equation modelling (SEM) were taken into consideration. Factor analysis is sensitive to sample size and less steady when estimate from small sample, the "comfortable" number required is higher than 300 cases (Tabachnick & Fidell, 2007). A sample should be preferably more than 100 for factor analysis to proceed. As general rule, a minimum of 5

cases per number of variables is required for factor analysis and a more acceptable sample size would have a ratio of 10:1 (Hair et al., 2010). A total of 42 measurement items were included in this research, therefore, the number of cases required was 420. As for SEM, the number of sample size required for a particular model depends on how complex the model is and its communalities in each factor (Hair et al., 2010). The minimum sample size is 100 if the model contains five or fewer construct, each with more than three items (with high item communalities at 0.6 or higher); 150 if the model contains seven or fewer construct and with modest communalities at 0.5; 300 if the model contains seven or fewer construct with low communalities at 0.45, and/or multiple under identified constructs (fewer than three items); and 500 if the model contains a large number of constructs, some with low communalities, and/or having fewer than three items (Hair et al., 2010). By taking into consideration of the recommendation for both factor analysis and SEM, a total number of 500 responses was targeted in this research.

4.5.2 Data Collection Process

In terms of the nature of this research, the best way to reach the target population and ensure an accurate representation of Facebook users was using an online survey. Generally, online data collection result in better data quality due to the validation checks being incorporated with prompts to alert the respondents for their incomplete answer especially in the case of forced-choice formats (van Gelder, Bretveld & Roeleveld, 2010). The online survey approach provides numerous advantages such as wide reach out at low cost; flexible with the availability of survey URL that can be shared with different formats such as email, website etc.; time efficient as it minimises collection time; ease of data entry and analysis for the responses are automatically captured and stored in a data base ready for analysis; diversity in question format, where researchers can pre-set the required

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format (e.g. dichotomous questions, multiple-choice questions, scales, single-response and multiple-response questions, open-ended questions) (Evans & Mathur, 2005).

A structured questionnaire survey form was created online using Google Forms and the online link to the survey form was created (https://docs.google.com/forms/d/e/1FAIpQLSfeQRhXebap1UA7YMowZPDzFTRRrfLgurjTLxGFlyQEn13ZLw/viewform?c=0&w=1). This link was posted on researcher's Facebook wall to invite Facebook users to participate in the survey and share it with their Facebook friends. Facebook message invitation with a link to the online survey were sent out to close and open Facebook group related to food and healthy eating (E.g. Healthy Food Healthy You, Healthy Eating Support Group, Healthy Eating Non GMO, Healthy Food, Healthy Food My Way etc.) to reach out to more Facebook users.

It is widely acknowledged that online survey is less likely to achieve response rate as high as its paper counterpart (Evans & Mathur, 2005; Nulty, 2008). In order to encourage the people to take part in the online survey, the respondents were also offered a lucky draw of RM50 shopping voucher for five winners. Additional personalized email and WhatsApp invitation with survey link attached were sent to potential respondents in order to increase the response rate. Also, paper survey questionnaires were distributed to 500 working adults in five organisations in Kuala Lumpur and Selangor to obtain more responses.

Both online and offline based surveys were conducted from February 2017 till September 2017. In total, 770 responses were received; 458 responses from online survey while 312 responses from paper survey (with 63, 55, 65, 60 and 69 respective responses collected from 5 organisations). In terms of the response rate, it is hard to calculate for the online survey since the survey link was posted and shared online. However, in the case of paper survey, the response rate was determined to be 62.4%. This relatively high response rate

of paper survey could be due to the paper survey questionnaires handed out in face-to-face environments by the representatives from the organisations who volunteered to help.

4.6. ASSESSMENT OF MEASURES

In order to ensure the research measurements developed were good, it was necessary to establish both reliability and validity of the measures. Generally, reliability tests how consistent a measuring instrument measures the concept it is measuring, while validity tests how well an instrument developed measures a particular concept that it intends to measure (Sekaran, 2003). Prior to the assessments of reliability and validity, preliminary data analysis was conducted in preparation for further data analysis.

4.6.1 Preliminary Data Analysis

In preparation for the main data analysis, preliminary data analysis which include the detection of missing values and outliers were conducted. Next was the test for multivariate assumptions which include the assessment of normality, linearity, homoscedasticity and multicollinearity.

4.6.1.1 Missing Data

In dealing with missing data, it is important to observe the pattern and determine whether it is randomly missing. Missing data can be dealt with via deletion of variable, mean substitution, expected maximization, multiple imputation; the choice of which depends

on pattern(s) of missing data, the proportion of missing value, the significance of the variable (Tabachnick & Fidell, 2007).

4.6.1.2 Outlier

An outlier is a case with an extreme value on one variable (a univariate outlier) or combination of scores on two or more variables (multivariate outlier) that distorts statistics (Tabachnick & Fidell, 2007). Outliers can be identified from a univariate, bivariate or multivariate perspective based of the number of variables considered (Hair et al., 2010). The bivariate method was selected in this research to detect the outlier by using scatterplots.

4.6.1.3 Test for Multivariate Assumption

The final step in preliminary data analysis involves the testing for the assumptions of multivariate analysis which include the assessment of normality, linearity, multicollinearity (Hair et al., 2010). Further exploration of the analyses will be discussed in Chapter 5.

Normality refers to the shape of the data distribution for an individual metric variable, which can be determined by two measures namely skewness and kurtosis (Hair et al., 2010). Skewness describes the symmetry of the distribution while kurtosis describes the peakedness of the distribution (Tabachnick & Fidell, 2007). A threshold of $\pm$ 1.0 is suggested to determine the violation of normality (George & Mallery, 2003; Morgan, Griego, & Gloeckner, 2001).

The assumption of linearity is confirmed based on the straight-line relationship between dependent and independent variables (Tabachnicrk & Fidell, 2007). Linearity can be

assessed by the inspection of scatterplot, normal probability plots and also residual plots (Meyers, Gamst, & Guarino, 2013; Pallant, 2007; Tabachnick & Fidell, 2007).

Multicollinearity occurs when the variables are highly correlated and this may result in the inaccuracy in the estimation of regression coefficient (Tabachnick & Fidell, 2007). Multicollinearity can be identified by tolerance and Variance Inflation Factor (VIF) values. Tolerance provides the measurement value on how much of the variability of the specified independent variable is not explained by other independent variables in the model. VIF is the inverse of Tolerance value (1 / Tolerance value). Tolerance value of less than 0.1 and VIF value of above 10 suggest the possibility of multicollinearity (Belsley, Kuh, & Welsch, 1980).

4.6.2   Exploratory Factor Analysis

Factor analysis is an interdependence technique with primary purpose to define the underlying structure among the variables in the analysis (Hair et al., 2010). In this research, exploratory factor analysis (EFA) was conducted with the aim to check for factor structure and to establish initial validity. Since all the items have been adopted, adapted and modified from prior studies, it is crucial to make sure that they are properly connected to their variables and to determine the new combination of items that form the construct.

EFA was performed on each construct to check for the dimensionality of the items where there may be changed from past studies. Several scholars have emphasized that EFA should be done for each construct due to the different conditions between present and the past and also the characteristics of population from the past (Awang, 2014, 2015; Shkeer

& Awang, 2019; Yahaya, Idris, Suandi, & Ismail, 2018). As such, this allowed for the measurement instrument to be refined. SPSS version 23 was used for EFA in this research.

In this research, PCA is selected as the factor extraction method with the aim of summarizing the variables into a smaller number of components. PCA is more appropriately used as a data reduction technique to reduce a larger set of measures to a smaller or more manageable number of composite variables (Brown, 2006). PCA reduces the number of items while retaining as much of the original item variance as possible.

There are two types of rotation method, namely orthogonal (Varimax, Quartmax, Equamax) and oblique rotation. In orthogonal rotation, the factors are assumed to be uncorrelated; on the other hand, the factors may be correlated in oblique rotation (Tabachni & Fidell, 2007). Fabrigar et al. (1999) stated that oblique rotation is preferred over orthogonal rotation as many of the research constructs are correlated with one another. Oblique rotation is able to provide a more accurate and realistic representation of how these constructs are likely to be related. Pallant (2007) recommended to begin the factor analysis with oblique rotation method (direct oblimin) and then check on the degree of correlation between the factors. The analysis result will resemble as orthogonal rotation if the factors are uncorrelated. It is suggested that oblique rotation should be selected if the factors are more strongly corrected with factor correlations exceed 0.32 (Tabachnick & Fidell, 2007). In accordance to the experts' suggestions, oblimin rotation was employed and the decision of remain or to change to orthogonal rotation was made based on correlation matrix.

According to Worthington and Whittaker (2006), the factorability of a data set also has been related to the sizes of correlations in the matrix. The Kaiser-Meyer-Olkin (KMO) measure of sampling adequacy is useful for factorability evaluation and the values of 0.60 and higher are required for good factor analysis (Tabachnick & Fidell, 2007). In addition,

the factorability of the correlation matrix can be determined with Barlett's Test of Sphericity. When the Bartlett's Test of Sphericity is found to be significant ($p<.05$), the matrix is factorable (Pett, Lackey, & Sullivan, 2003). Measures of Sampling Adequacy (MSA) is another indicator to suggest that the correlation matrix is factorable. MSA indicates the correlations among the items and the cutoff point of > 0.5 suggests that correlations among the items are strong enough to suggest that the correlation matrix is factorable (Hair et al., 2010; Pett, Lackey & Sullivan, 2003)

The number of factors in the data set can be determined with various approaches such as eigenvalues, scree plot and minimum proportion of variance accounted for by factor. Eigenvalues summarize variance in a given correlation or variance/ covariance matrix and represent the variance in the indicators explained by the factors (Brown, 2006). Eigenvalue > 1 is used as the basis in determining the number of factors (Tabachnick & Fidell, 2007). Cliff (1988) pointed out that this rule can underestimate the number of factors by arguing that an Eigenvalue > 1 to represent the reliability of the component is erroneous and further explained that the component reliability depends on the reliability of the observed measures, not the eigenvalue. Also, the number of factors can be determined via scree plot. This method involves the identification of the distinct breaks between the steep slopes of the larger eigenvalues and the trailing off of the smaller ones in the graph plotted (Pett, Lackey, & Sullivan, 2003). The factor emerge before distinct breaks is counted as factor(s). However, Gorsuch (1983) pointed out that factors having eigenvalues considerable less than 1.0 may be retained when using the scree test. When two or more factors are near the cutoff point, it is useful to examine the interpretability of alternative factor solutions with differing numbers of factors. It is noted that the practical criterion for retaining factors should focus on the number of variables that have significant factor loadings on the factor (Floyd & Widman, 1995). According to Worthington and

Whittaker (2006), conceptual interpretability is the definitive factor-retention criterion where a factor is retained if it can be interpreted in a meaningful way. Also, the total variance explained was suggested to be greater than 60% as a practical significant for the derived factors (Hair et al., 2010).

The decision on retaining or deleting the items in the factors are typically based on factor loading, cross loading and communality. Factor loadings are the correlation of each variable and the factor which indicate the degree of correspondence between the variables and the factor. According to Hair et al. (2010), factor loading at 0.5 or greater is considered practically significant. Variable with factor loading lesser than 0.5 and cross loaded in two or more factors (have more than one significant loading) will be deleted. It is important to ensure the loading factors are separated by 0.15 (Worthington & Whittaker, 2006; Tabachnick & Fidell, 2007). Communality reflects the proportion of item variance accounted for by the factors (Tabachnick & Fidell, 2007) and can be a useful guide for item deletion. Items with low communality (< 0.4) are not highly correlated with one another (Worthington & Whittaker, 2006). According to Hair et al. (2010), variables should have communality of greater than 0.5 to be retained in the analysis. The summary of the cut off points for EFA is presented in Table 4.12.

Table 4.12: Cut Off Points for EFA

Cut-off point	Source
Rotation method (correlation matrix > 0.32 – Oblique rotation)	Tabachnick and Fidell (2007)
Kaiser-Meyer-Olkin (KMO) > 0.60	Tabachnick and Fidell (2007)
Barlett's Test of Sphericity p <0.05	Hair et al. (2010)
Measure of sampling adequacy (MSA) >0.5	Hair et al. (2010)
Eigenvalue > 1	Tabachnick and Fidell (2007)
Total variance > 60%	Hair et al. (2010)
Factor loading > 0.50	Hair et al. (2010)
Communality > 0.50	Hair et al. (2010)

4.6.3 Assessment of Common Method Variance

As this research adopted self-administered questionnaire for the measurement of all constructs, the measurement is susceptible to common method variance. Acknowledging the importance of controlling common method variance, this research has taken step to ensure this is addressed. As per recommendation by Podsakoff et al. (2003), extra caution has been paid on the format or wording of the measurement scale where the questions were kept specific, simple, concise and avoided any double barreled and complicated syntax. In additional, measures were taken to protect respondent anonymity and to reduce evaluation apprehension by allowing the respondents' answers to be anonymous and giving assurance to respondents that there are no right or wrong answers for them answer the questions as honestly as possible.

To determine the presence of common method variance, a Harman single factor test was performed following the approach outlined by previous researchers (Mattila & Enz, 2002; Podsakoff et al., 2003). The result revealed that the variance of the first factor is 34.73% which is below the cut off point of 50% as suggested by Matilla and Enz (2002). This indicated that a single factor did not count for the majority of the covariance, thus indicated that the common method variance issue has been addressed. However, Podsako et al. (2003) argued that Harman single factor test is insensitive and commented that the claim regarding common method variance through this test is incomplete. Therefore, another test was conducted in AMOS where common latent factor method was selected to determine the presence of common method variance. Common latent marker technique (zero constraint test) or confirmatory factor analysis technique was used with the inclusion of one common latent factor where all the factor loadings loaded were first unconstrained and then constrained to zero (Podsakoff, MacKenzie, & Podsakoff, 2012). Comparison of unconstrained common latent factor (with X^2= 1540.047, df= 691) and

fully constrained (zero constrained) common latent factor (with X^2= 1766.637, df= 932) was conducted to determine if the chi-square difference (delta X^2=226.59, df=241) test between the two is significant. The p-value was 0.739 which is more than 0.05, indicating that the amount of shared variance across all items was not significantly different from zero. As to conclude, common method variance issue has been addressed

4.6.4 Assessment of Reliability

Reliability is an assessment of the degree of consistency between multiple measurements of a variable (Hair et al., 2010). In this research, internal consistency was used to measure reliability through Cronbach's alpha value. According to Nunnally and Bernstein (1994), the acceptable values of alpha ranges from 0.70 to 0.95. Similarly, Hair et al. (2010) suggested that Cronbach's alpha should exceed a threshold of 0.7. If the Cronbach's alpha is less than the recommended threshold, item deletion is required based on Cronbach's Alpha if Item Deleted. Subsequently, the alpha value was re-calculated using the items left after deletion. In addition to this, both corrected item-to-total correlations and item's inter-item correlations were reassessed. This process continues until the acceptable Cronbach's alpha was achieved. The cut off points for criteria used in the assessment of reliability is presented in Table 4.13.

Table 4.13: Cut Off Points for Assessment of Reliability

Cut-off point	Source
Cronbach's Alpha > 0.70	Hair et al. (2010)
Corrected Item-Total Correlation > 0.50	Hair et al. (2010)
Inter-item Correlations > 0.30	Hair et al. (2010)

4.6.5 Assessment of Validity

Validity refers to the extent to which a measurement measures what it intended to measure. Both content validity and construct validity were assessed in this research. Content validity is the assessment of the correspondence of the measures to be included in a scale and its conceptual definition (Hair et al., 2010). Content validity was established by the panel of academicians at measures development stage. Construct validity is the extent to which a set of measured items actually reflects the theoretical latent construct of those items are designed to measure (Hair et al., 2010). In this research, it was determined during the assessment of measurement model and this was conducted via confirmatory factor analysis.

4.7. STRUCTURAL EQUATION MODELLING APPROACH

Structural equation modeling (SEM) seeks to explain the inter-related dependence relationships among multiple variables through multivariate technique that combines aspects of factor analysis and multiple regressions (Byrne, 2010; Hair et al., 2010). As compared to other multivariate techniques, SEM is preferred because its ability to estimate a series of separate, but interdependent, multi regression equation simultaneously by specifying the model (Hair et al., 2010). It is a confirmatory technique in contrast to EFA (Tabachnick & Fidell, 2007). SEM takes the confirmatory approach to the analysis of structural theory that represents the causal process that generate observation on multiple variables (Bryne, 2009). Specifically, the causal process is represented by a series of structural equations which enable a clearer conceptualization of the theory under study.

There are several stages in SEM. Firstly, SEM is applied to assess the contribution of each indicator variable in representing its associated construct and measure how well the combined set of indicator variables represents the construct (Hair et al., 2010). The extent to which the indicator variables are generated by the underlying latent constructs and the strengths of the regression paths from the factor and observed variables are then determined (Bryne, 2009). Next, the dependence relationship between these indicator variables and their associated constructs are specified in a measurement model. The measurement model is then assessed for its validity through the establishment of goodness of fit and construct validity. Subsequently, the structural model is specified by assigning hypothesized dependence relationships among the constructs. Lastly, model validity and its corresponding hypothesized theoretical relationships are determined (Hair et al., 2010).

This research used SEM approach for the assessment of measurement model and structural model. With SEM, both observed variables (manifest) and unobserved variables (latent) are incorporated into measurement model and structural model. In the assessment of measurement model, SEM is used to examine 1st and 2nd order measurement model designed to test the multidimensionality of constructs (Byrne, 2010). Specifically, it is used to define the constructs, examine the dependence relationship between measured variables and constructs and determine the construct validity. In the assessment of structural model, SEM is used to examine the hypothesized theoretical relationships (Hair et al., 2010).

In this research, AMOS, a type of SEM application was used as the statistical analysis tool for the assessment of both measurement and structural model. It was used to purify the measurement items, confirm the construct specified from EFA, establish model fit of the measurement model and test the hypothesized relationships in the structural model.

Compared with other multivariate approaches, SEM is in some way more sensitive to sample size (Hair et al., 2010). Researchers have proposed the minimum number of sample of 100 – 200 (Kline, 2005) and 400 - 500 (Anderson & Gerbing, 1988) for SEM. According to Bentler and Chou (1987), the sample size required is based on 1:5 ratio. In this research, there was a total of 42 measurement items, thus the minimum sample size of 210 was required. Hair et al. (2010) suggested that the minimum sample size is based on the model complexity and basic measurement model characteristics. Accordingly, when the SEM models containing more than six constructs, some of which have fewer than three measured items and multiple low communalities are present, sample size requirement may exceed 500. There was a total of 755 responses, thus the sample size was adequate for analysis.

4.8. ASSESSMENT OF MEASUREMENT MODEL

Following the specification of the measurement items and constructs through EFA, confirmatory factor analysis (CFA) was conducted to assess the measurement model (Anderson & Gerbing, 1988). The adequacy of measurement model is established through the assessment of goodness of fit and evaluation on model for misspecification. In addition, construct reliability and validity of the model were established.

In this research, both first order and second order measurement model are assessed. In first order measurement model, the factors are presumed to be inter-related with the nature of these relationship unanalyzed. In contrast, higher order measurement model such as second order measurement model take a theory-based account for the pattern of the relationships among the first order factors (Brown, 2006). As recommended by Byrne (2010), it is essential establish the correlation of the dimensions of the construct and

ensure there is structural relationship between the dimensions of the construct for second order measurement model.

4.8.1 Confirmatory factor analysis

Confirmatory factor analysis (CFA) is used to evaluate the appropriateness of the factor structure (Byrne, 2010). CFA seeks to validate and confirm the theorized factor structures with empirical data distinct from the data used in the exploratory analysis (Hair et al., 2010). This involves the comparison of the preceding factor structures and assessment of the theorized factors with intent being to establish confidence in the proposed scales. As such, CFA is performed to test or confirm whether a theoretical measurement model is valid.

There are two common ways in evaluating and validating the measurement model: (1) testing each construct separately; (2) testing all constructs together on one measurement model (Cheng, 2001; Woo, Trail, Kwon, & Anderson, 2009). Testing all constructs together on one measurement model is preferred for its ability to take into account of the relationship between the different constructs and discriminant validity is statistically tested (Woo et al., 2009). As such this research takes the second approach by testing all constructs in one measurement model.

Hair et al. (2010) recommended to include 4 indicators per construct for analysis whenever possible. In addition, it was suggested that three indicators per construct is acceptable, particularly when other constructs have more than three. Construct with fewer than three indicators should be avoided. In this research, all constructs consist of 4 indicators and above except for healthy eating knowledge which consists of 3 indicators.

In CFA, assessment of model fit and evaluation of model are important steps to confirm the measurement model specified is valid for subsequent analysis. If problems exist, the measurement model is required to be re-specified.

Model Fit

Model fit is determined by the correspondence between the observed covariance matrix and an estimated covariance matrix that results from the proposed model. If the proposed model properly estimates all of the substantive relationships between constructs and the measurement model adequately defines the construct, then it should be possible to estimate a covariance matrix between measured variables that closely matches the observed covariance matrix. This means that model fit compares the theory to reality by assessing the similarity of the estimated covariance matrix (theory) to reality (the observed covariance matrix) (Hair et al., 2010). In order to determine how well the hypothesized model "fits" or adequately describes the sample data, adequate goodness of fit is required (Byrne, 2010). Goodness of fit (GOF) indicates how well the specified model reproduces the observed variance among the indicator items (Hair et al., 2010).

Fit indices are utilized for the assessment of the CFA model (Brown, 2006; Kline, 2013). There are three categories of measure to assess the model fit namely (1) absolute, (2) incremental, and (3) parsimony indices. Absolute fit indices are direct measures of how well the model specified reproduces the observed data (Hair et al., 2010); meaning how well the theory can be fit with the sample data. Chi-Squared statistic, Goodness of Fit Index (GFI), Adjusted Goodness of Fit (AGFI), Root Mean Square Error of Approximation (RMSEA), Root Mean Square Residual (RMR) and Standardized Root Mean Square Residual (SRMR) are types of absolute fit indices (Hooper et al., 2008).

Chi-Squared value is typically used for the evaluation of overall model fit where a good model fit would provide an insignificant result at 0.05 threshold (Barrett, 2007; Hu & Bentler, 1999); however Chi-square is not recommend as an indicator as it is affected by large sample size (Byrne, 2010; Hu & Bentler, 1999). Alternatively, normed chi-square ($\chi2/df$) is recommended for large sample size (Hooper et al., 2008), with the value of 2.0, 3.0 or even higher as 5.0 have been recommended as indicating reasonable fit (Bollen, 1989; Wheaton, Muthen, Alwin, & Summers, 1977). Incremental fit indices assess how well the estimated model fits relative to some alternative baseline model i.e. null model. Incremental fit measures include Normed-fit index (NFI), Tucker Lewis Index (TLI), Comparative fit index (CFI) and Relative Noncentrality Index (RNI) (Hair et al., 2010). Parsimony fit indices provides information about which model among a set of competing models is best which include Adjusted Goodness of Fit Index (AGFI), Parsimony Normed Fit Index (PNFI) (Hair et al., 2010).

Several researchers have given their recommendation on the adoption of fit indices for determination of model fit. According to Hair et al. (2010), multiple fit indices should be reported to help in understanding how well the model truly fit and typically use three to four fit indices to provide adequate evidence of model fit. Brown (2006) suggested to use at least one index from each group of fit indices. In addition to this, Hair et al. (2010) suggested to include χ^2 goodness-of- fit, degrees of freedom and one badness-of-fit indicator such as SRMR or RMSEA. According to Kline (2005), the minimal set of fit indices shall be reported include model chi-square, RMSEA, CFI and SRMR.

In this research, the model fit was determined by using multiple fit indices which include normed chi-square, GFI, RMSEA, AGFI, CFI and TLI (Ahire & Devaraj, 2001; Garver & Mantzer, 1999; Hair et al., 2006; Hair et al., 2010; Hooper et al., 2008). Hoelter's critical N was also examined to determine the adequacy of sample size (Byrne, 2010).

Hoelter (1983) proposed that a value in excess of 200 indicate that a model is adequately represents the sample data.

The recommended benchmark for model fit indices adopted in this research is presented in Table 4.14.

Table 4 14: Summary of Goodness of fit (GOF)

GOF indices	Acceptable value	Fit Measure Indicators
Chi-Square ($\chi^{2)}$	P > 0.05	A P value greater than 0.05 indicates an acceptable fit
Normed chi-square CMIN/DF (χ^2/df)	$2.0 \leq \chi2/df \leq 5.0$ (Wheaton et al., 1977; Bentler, 1989; Kline, 2005)	Lower limit is 2.0, upper limit is 3.0 or as high as 5.0. A value close to one and not exceeding 3 indicates a good fit
Goodness-of-Fit Index (GFI)	GFI $\geq$ 0.9 means good fit (Hair et al., 2010; Kline 2005) GFI >0.9 is an acceptable fit (Marsh & Grayson, 1995; Schumacker & Lomax, 1996) GFI >0.8 is a reasonable fit (Baumgartner & Homburg, 1996; Doll, Xia & Torkzadeh, 1994)	A value between 0 and 1. Value close to 0 indicates a poor fit while value close to 1 indicates a perfect fit.
Adjusted Goodness of Fit Index (AGFI)	AGFI > 0.80 (Henry & Stone, 1994)	A value is bounded above by 1 and is not bounded by 0 and 1 indicated perfect fit
Root Mean Square Error of Approximation (RMESA)	RMSEA < 0.06 (Hu & Bentler, 1999) RMSEA <0.08 is acceptable (Browne & Cudeck 1993; Kline 2005; Hair et al., 2010)	Values of less than 0.05 are generally considered 'good' fit. Values between 0.05 and 0.08 are considered 'adequate' fit.
Normed Fit Index (NFI)	NFI $\geq$ 0.9 (Kline, 2005)	A value between 0 and 1, 1 indicates a perfect fit
Comparative Fit Index (CFI)	CFI $\geq$ 0.9 (Hu & Bentler, 1999; Kline, 2005; Hair et al., 2010)	A value between 0 and 1, a value close to 1 indicate very good fit
Tucker Lewis Index (TLI)	TLI > 0.95 (Hu & Bentler, 1999)	A value close to 1.00 indicating a very good fit
P Close	P Close > 0.05	A value above 0.05

Source: Wheaton et al. (1977), Browne and Cudeck (1993), Marsh and Grayson (1995), Schumacker and Lomax (1996), Hu & Bentler (1999), Arbuckle (2003), Byrne (2010), Kline (2005); Latin, Carroll and Green (2003), Hair et al. (2010)

Model Evaluation

In addition to evaluate the GOF of the model, it is recommended to evaluate if there is any misspecification in the measurement model. In this research, the model is evaluated through 3 steps. First, the measurement relationships between indicators and constructs are determined through the path estimates that link constructs. The size of the path estimates or factor loadings should be at least 0.5 and ideally 0.7 (Hair et al., 2010). Loadings of this size or larger confirmed that the indicators are strongly related to the associated constructs. Secondly, standardized residual is examined to identify if any problem with the measures. Typically, standardized residuals value less than 2.5 does not suggest a problem. Standardized residuals value greater than 4.0 raises a red flag and suggests a potential unacceptable degree of error (Hair et al., 2010). Lastly, modification indices are referred as a guideline for model improvement. Modification indices of approximately 4.0 or greater suggest that the model fit could be improved.

It is noted that Hair et al. (2010) emphasized on the re-specification of the model shall be conducted on the basis of relevant theory. This is due to the modification on the model based on model fit indices capitalizes on the chance occurrences within the samples in which the model is being tested (Whittaker, 2012).

4.8.2 Unidimensionality

Unidimensionality refers to the extent of the measurable variables that can be explained by only one underlying construct (Hair et al., 2010). Unidimensionality is achieved when each of the measured variable is hypothesized to relate with only a single construct and no cross loading of these measures is observed on multiple constructs. Unidimensionality in measurement model is important for the achievement of construct validity (Anderson

& Gerbing, 1988). In general, unidimensionality can be assessed through GOF (Garver & Mentzer, 1999) and direction of path and the significant level of each variable (Byrne, 2010; Garver & Mentzer, 1999).

4.8.3   Construct Reliability

Reliability is a measure of degree to which a set of indicators of the latent construct is internally consistent based on how highly interrelated the indicators are with each other (Hair et al., 2010). Typically, Cronbach alpha is used to assess scale reliability (Hair et al., 2010), however, composite reliability (CR) which is drawn on the standardized loadings and measurement error for each item is regarded as better option for determining construct reliability (Fornell & Larcker, 1981). The value of composite reliability above 0.70 or higher suggests good reliability while composite reliability between 0.6 and 0.7 mat be acceptable (Hair et al., 2010)

4.8.4   Construct Validity

Construct validity is the extent to which a set of measured items actually reflects the theoretical latent construct those items are designed to measure, thus representing the accuracy of the measurement (Hair et al., 2010). It verifies how well the results obtained from the use of the measure fit the theories around which the test is designed (Sekaran, 2003). To assess the construct validity, convergent validity, discriminant validity and nomological validity are examined (Hair et al., 2010)

4.8.4.1 Convergent validity

According to Hair et al. (2010), the items that are indicators of a specific construct should converge or share a high proportion of variance in common. Convergent validity assesses the degree to which the measures of the same concept are correlated. High correlations indicated that the scale is measuring the intended concept. In other words, convergent validity is the extent of the measures correlate with other measures in the same construct. Convergent validity is achieved when standardized regression weights (factor loadings) are significant ($\rho<0.001$) and ideally above 0.7 (Byrne, 2010; Hair et al., 2010). However, a lower standardized regression weight (> 0.5) is acceptable to be used to determine convergent validity. In addition, the adequacy of convergence is indicated if the average variance extracted (AVE) is at 0.5 or greater (Fornell & Larcker, 1981; Hair et al., 2010). AVE is calculated as the mean variance extracted for the items loading on a construct (Hair et al., 2010). It is noted that reliability is also an indicator for convergent validity, thus convergent validity is established if CR of each construct is at 0.7 or greater (Hair et al., 2010). In this research, convergent validity is determined through the assessment on standardized regression weights (>0.7), AVE (≥0.5) and CR (≥0.7).

4.8.4.2 Discriminant validity

Discriminant validity is the extent to which a construct is truly distinct from other construct (Hair et al., 2010). High discriminant validity provide evidence that a construct is unique and captures some phenomena other measures do not. Discriminant validity is determined by comparing the square root of AVE with the correlation shared between two constructs. Discriminant validity is established if the square root of AVE are higher

than the squared inter-construct correlation estimates (squared correlation) (Hair et al., 2010).

4.9. ASSESSMENT OF STRUCTURAL MODEL

The assessment of the second order measurement model has established the correlation of the dimensions of the construct and posit that there is structural relationship between the dimensions of the construct, therefore, the second order measurement model is forwarded for subsequent structural model assessment. This research used SEM approach for the assessment of structural model. The structural model is specified by assigning the relationship among the constructs based on the proposed theoretical model. Each of the hypotheses developed in Chapter 3 are specified in the structural model. Next, the validity of the structural model is established by determining the model fit, using fit indices as discussed earlier in assessment of measurement model. Once the model fit is established, individual parameter estimates that represent each specific hypothesis is examined (Hair et al., 2010). The parameter estimates are interpreted as standardized beta weights in the model run in AMOS and represent the direct effects of exogenous constructs on the endogenous constructs. In addition, the R^2 values, which represent the amount of variance explained by the independent variables are also determined.

CHAPTER SUMMARY

In summary, this chapter provides the detail about the research method of this research. It presents on the process of the development and operationalization of measurement in detail and how pilot test was performed to finalize the survey instrument. Further, the

sampling and data collection process for the administration of the survey is explained. The overall process of preliminary data analysis for data preparation such as examination of outlier and test for multivariate assumptions are discussed. Next, EFA and method to assess common method variance are presented. This is followed by the description of assessment of reliability and validity. This chapter also describes the SEM approach which is employed for testing the research model and hypotheses. Finally, the application of AMOS for assessment of measurement model and structural model are presented.

CHAPTER 5

DATA ANALYSIS AND RESULTS

5.1   INTRODUCTION

This chapter details the data analysis and results of the hypotheses testing. It begins with data cleaning and tests for multivariate assumptions for data preparation. Next, the descriptive statistics on the demographic profile and constructs are identified. The exploratory factor analysis is then conducted, followed by reliability test for the confirmed factors. Following this, the confirmatory factor analysis is performed to assess measurement model and confirm the construct reliability and validity. Subsequently, structural model is assessed and hypotheses tested. A short summary is available at the end of the chapter.

5.2   DATA PREPARATION FOR ANALYSIS

5.2.1   Data cleaning

Data collected from 770 respondents were used for data analysis. Frequency test was carried for each of the variables to detect errors in the data set. These errors were labelled as "system missing", which means missing data in each data category. Based on the result of frequency test conducted, data with out of range value and undefined by the data entry coding scheme were also identified and treated as missing values.

There is a total of 15 cases with missing values ranging from 2.4 to 69.0% (refer Table 5:1). Six cases with the highest percentage of missing values were deleted as the missing data were concentrated in a small subset of variables. All other 9 cases showed a random pattern in their missing values, thus they were remained for subsequent data cleaning process. None of the variables was deleted since the percentages of missing data among the cases were low.

Table 5.1: Summary Statistic of Cases with Missing Variables

No	Case ID	Missing Variables	
		Quantity	Percentage (%)
1	666	29	69.0
2	123	21	50.0
3	346	14	33.3
4	662	12	28.6
5	232	10	15.7
6	456	8	19.0
7	763	3	7.1
8	554	3	7.1
9	378	2	4.8
10	156	1	2.4
11	496	1	2.4
12	355	1	2.4
13	226	1	2.4
14	101	1	2.4
15	580	1	2.4

With the deletion of 6 cases, the data were examined again for missing data. There were 8 variables with missing data ranging from 1 to 3 (refer Table 5.2). In order to proceed with further analysis, the missing data was then imputed. Imputation techniques for missing data include imputation using only valid data and replacement values (Hair et al., 2010). The later technique was adopted to treat the missing data as it enables the observations available for analysis once the replacement values are substituted. There are two approaches for replacement value imputation namely imputation using known replacement values and calculating replacement values. Imputation by calculating

replacement values approach was selected as there is no additional cases available to provide replacement values. Imputation by calculating replacement values can be conducted via mean substitution and regression imputation. Mean substitution approach was utilized to treat the 14 missing values in this research since there is relatively low levels of missing data.

Table 5.2: Summary Statistic of Missing Data After Deletion of 6 Cases

No	Variable	Number of cases	Mean	Standard Deviation	Missing data	
					Quantity	Percent (%)
1	USE8	769	3.82	1.338	1	0.13
2	USE9	768	3.00	1.151	2	0.26
3	USE10	768	4.32	1.321	2	0.26
4	SI10	769	4.23	1.333	1	0.13
5	SI11	769	4.45	1.253	1	0.13
6	SI12	767	4.13	1.254	3	0.39
7	HEB5	768	4.17	1.307	2	0.26
8	WP4	768	3.39	1.207	2	0.26

The presence of outliers was identified by residual scatter plot and boxplot. As outliers are observations with a unique combination of characteristics identifiable as distinctly different from other observation, they contain an unusually high or low value on a variable or across several variables (Hair et al., 2010). Cases with standardized residuals (z score) in excess of + / - 3.29 (p<.01, two-tailed test) are considered as potential outliers (Tabachnick & Fidell, 2007). There were 6 cases with z score above the cut off limit. These cases were identified as outliers and were deleted to avoid the potential alteration in the statistic results. Next, by referring to boxplots, 3 cases were identified as outliers and were deleted. A total of 15 cases were deleted at the end of data cleaning process, remaining 755 cases for further analysis.

5.2.2 Tests for Multivariate Assumptions

Normality

Normality refers to the shape of the data distribution for an individual metric variable and is determined by two measures namely skewness and kurtosis (Hair et al., 2010). Skewness describes the symmetry of the distribution while kurtosis describes the peakedness of the distribution (Tabachnick & Fidell, 2007). A threshold of ± 1.0 is suggested to determine the violation of normality (George & Mallery, 2003; Morgan et al., 2001). The result in Table 5.3 shows that all skewness and kurtosis are more than -1.0 and less than 1.0; this indicates that the data are normally distributed. Negative values of skewness indicate that there is pileup of cases to the right, imply a higher value of scores. As for kurtosis, the negative values indicate that the distribution is rather flat.

Table 5.3: Skewness and Kurtosis Statistic

Construct	Item	Skewness	Kurtosis
Social Ties	ST1	-.556	-.330
	ST2	-.193	-.811
	ST3	-.627	.004
	ST4	-.327	-.641
Facebook Use	USE1	.599	.232
	USE2	.085	-.045
	USE3	.077	-.262
	USE4	.315	-.031
	USE5	.101	-.137
	USE6	-.022	-.393
	USE7	.438	-.099
	USE8	.434	-.322
	USE9	.515	.113
	USE10	.100	-.164
Social Interaction	SI1	-.170	-.622
	SI2	-.376	-.456
	SI3	-.325	-.386
	SI4	.057	-.725
	SI5	-.401	-.551
	SI6	.012	-.756
	SI7	-.342	-.319
	SI8	-.296	-.499
	SI9	-.387	-.445
	SI10	-.299	-.682
	SI11	-.432	-.371

Construct	Item	Skewness	Kurtosis
	SI12	-.341	-.350
Healthy Eating Attitude	A1	-.419	-.240
	A2	-.220	-.616
	A3	-.251	-.450
	A4	-.398	-.320
Healthy Eating Knowledge	KN1	-.320	-.375
	KN2	-.396	-.237
	KN3	-.152	-.551
Healthy Eating Behaviour	HEB1	-.341	-.361
	HEB2	-.389	-.321
	HEB3	-.472	-.533
	HEB4	-.360	-.529
	HEB5	-.251	-.523
Work Productivity	WP1	-.285	-.711
	WP2	-.451	-.357
	WP3	.049	-.898
	WP4	.238	-.499

Linearity

Since linearity is assumed between the endogenous and exogenuous variables in SEM, the linear relationship between work productivity, healthy eating behaviour, healthy eating attitude, healthy eating knowledge, social interaction, Facebook use and social ties was examined through normal probability plots. The assumption of linearity is confirmed based on the straight line relationship between dependent and independent variables (Tabachnicrk & Fidell, 2007). As shown in Figure 5.1 to 5.7, there were no indications of non-linearity (dots are not far away from the straight line). These imply that there were linear relationships between the independent and dependent variables.
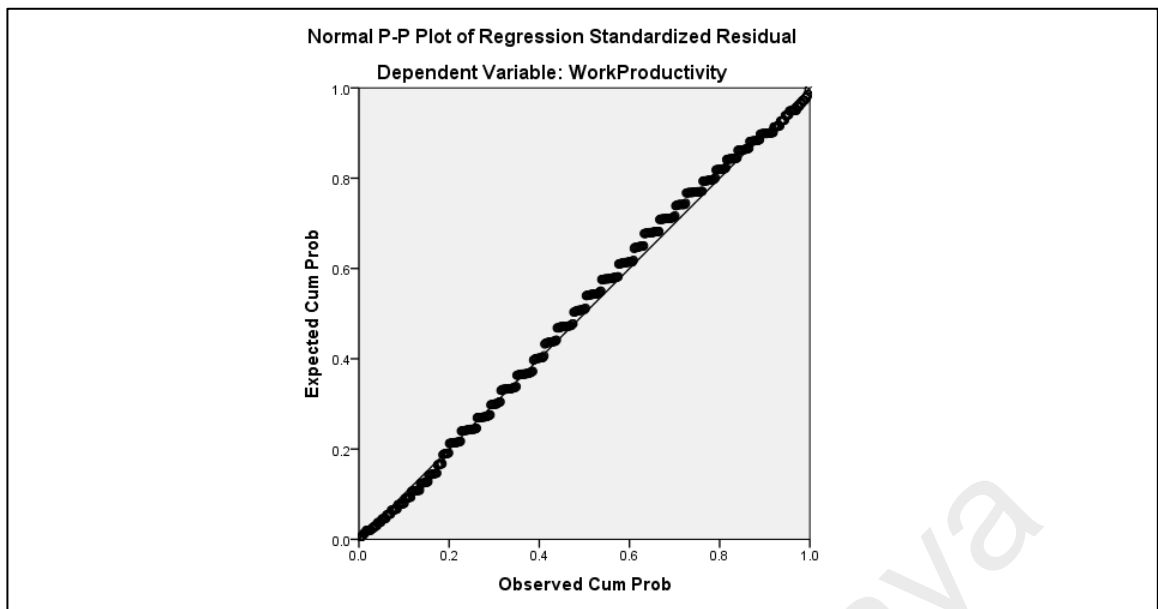
Figure 5.1: Linearity Between Healthy Eating Behaviour and Work Productivity Variable
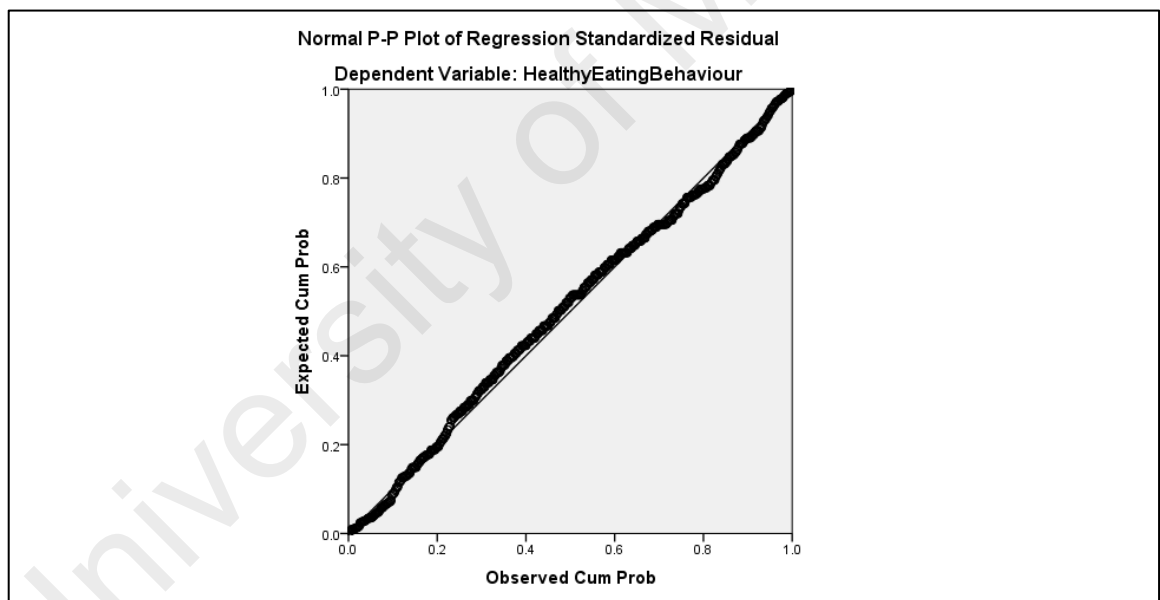
Figure 5.2: Linearity Healthy Eating Attitude and Healthy Eating Behaviour Variable
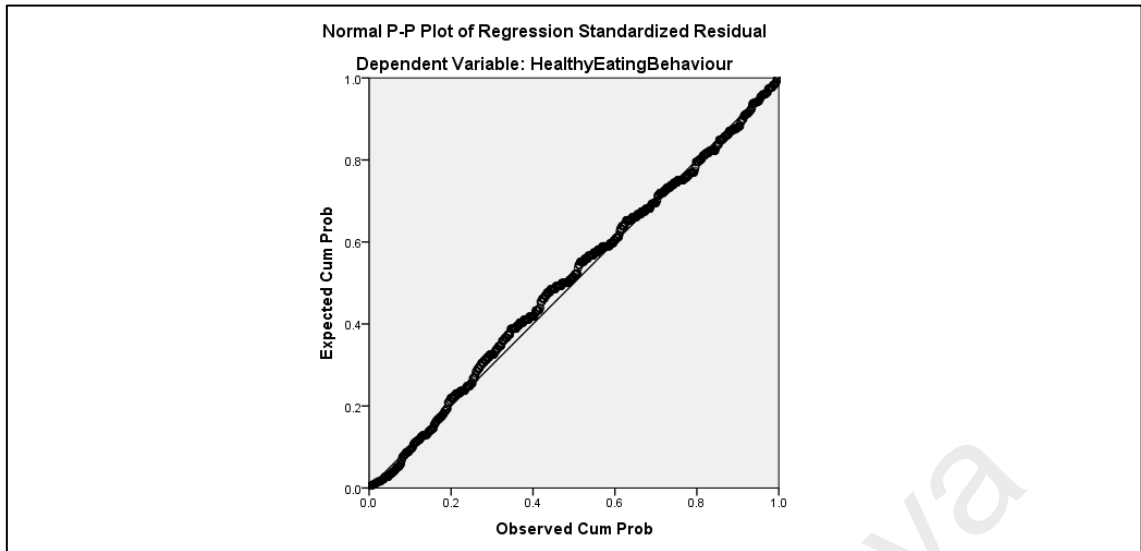
Figure 5.3: Linearity Between Healthy Eating Knowledge and Healthy Eating Behaviour Variable
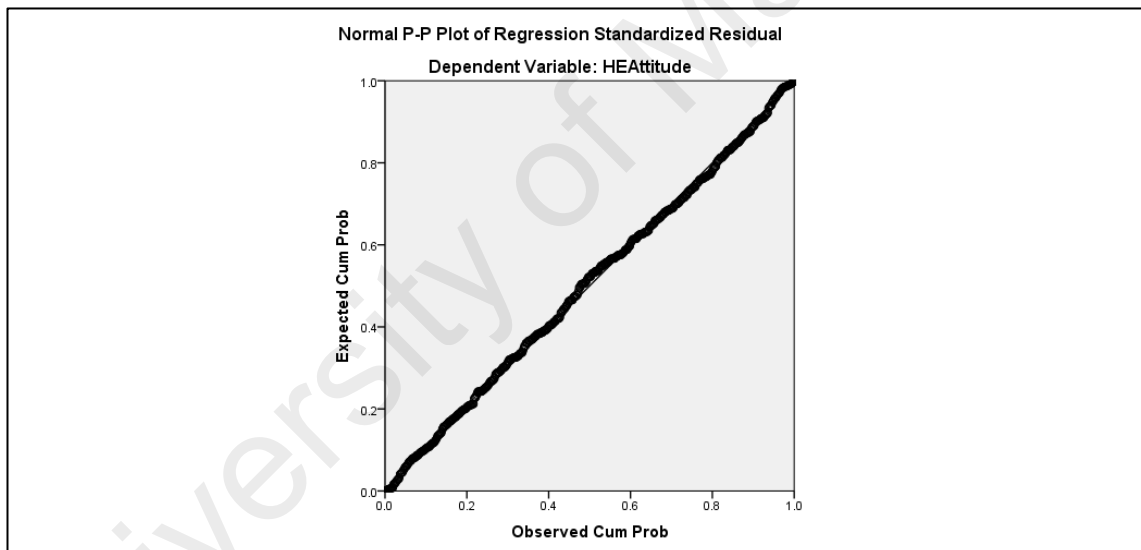
Figure 5.4: Linearity Between Social Interaction and Healthy Eating Attitude Variable
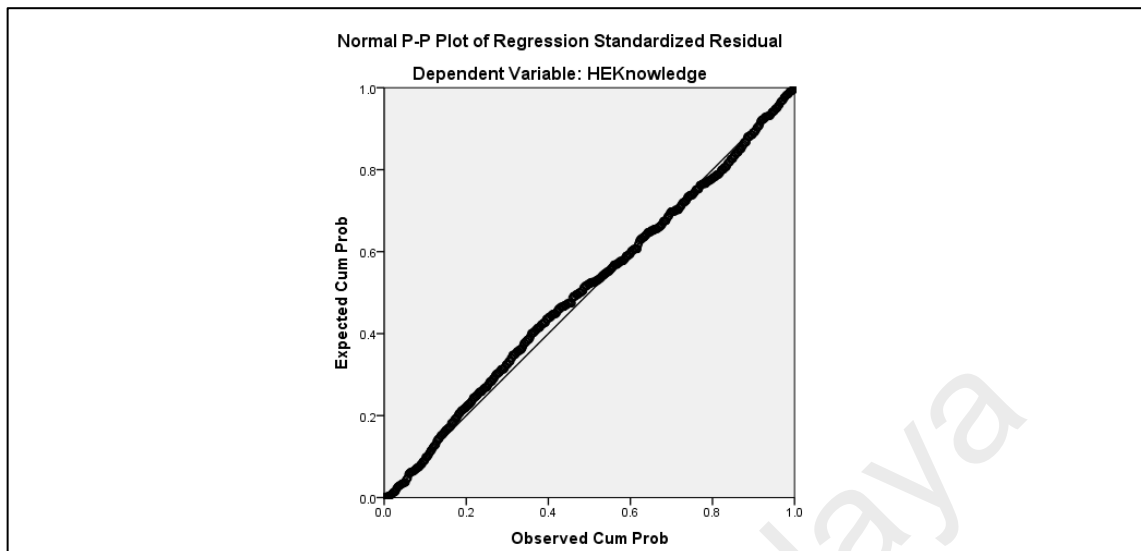
Figure 5.5: Linearity Between Social Interaction and Healthy Eating Knowledge
Variable
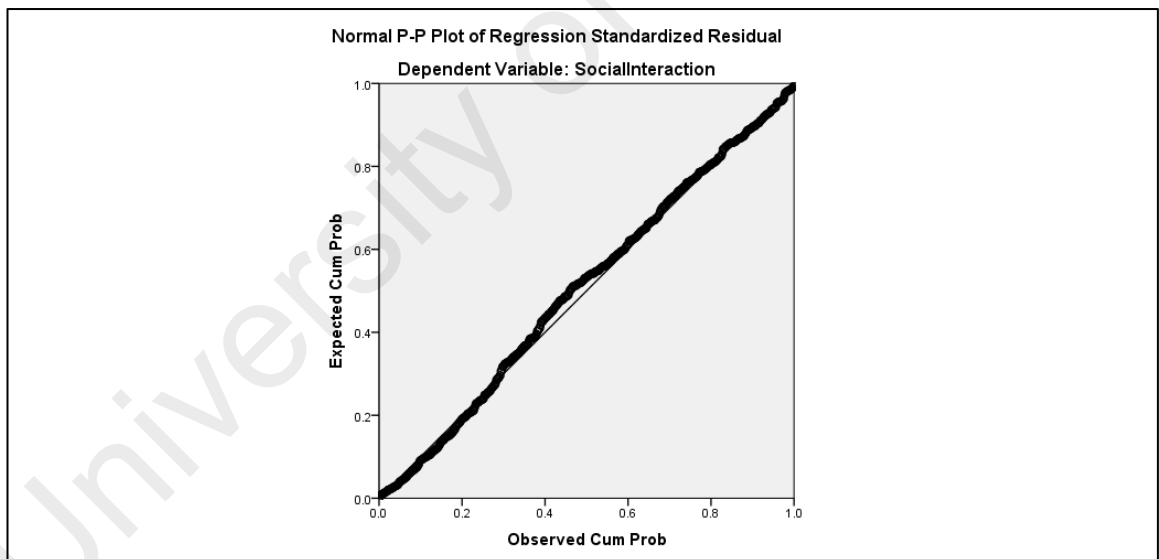
Figure 5.6: Linearity Between Facebook Use and Social Interaction Variable
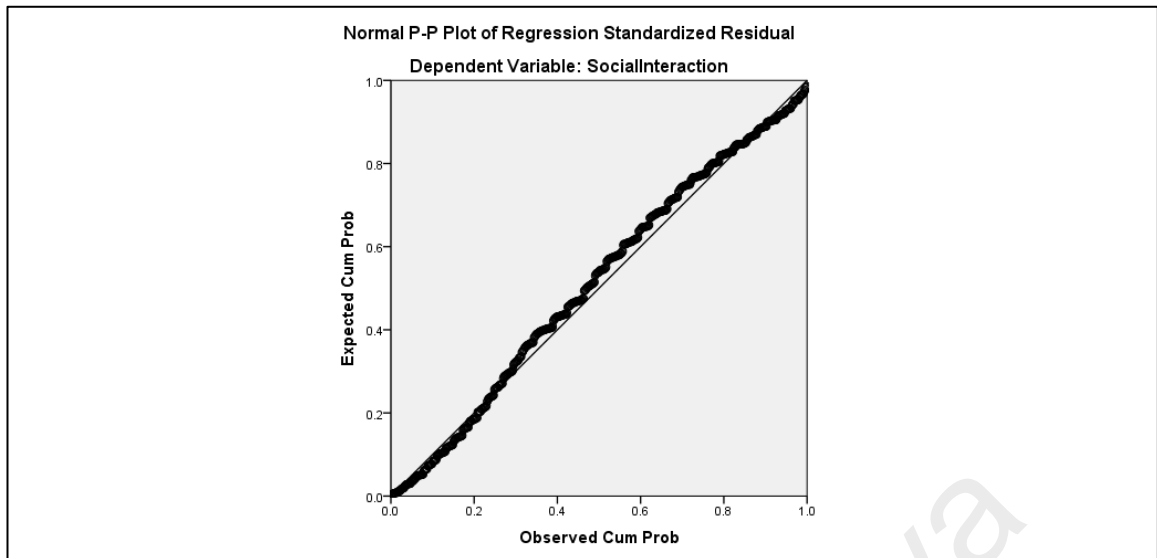
Figure 5.7: Linearity Between Social Ties and Social Interaction Variable

Multicollinearity

Multicollinearity occur when the variables are highly correlated and this may result in the inaccuracy in the estimation of regression coefficient (Tabachnick & Fidell, 2007). Multicollinearity can be identified by tolerance and VIF values. Tolerance provides the measurement value on how much of the variability of the specified independent variable is not explained by other independent variables in the model. VIF is the inverse of Tolerance value (1 / Tolerance value). Tolerance value of less than 0.1 and VIF value of above 10 suggest the possibility of multicollinearity (Belsley et al., 1980). As shown in Table 5.4, all Tolerance and VIF values are above the cut of values, indicating that there is no multicollinearity issue with the constructs in this research.

Table 5.4: Collinearity Statistics

Construct	Collinearity Statistics	
	Tolerance	**VIF**
Social Ties	.821	1.217
Facebook Use	.590	1.694
Social Interaction	.398	2.512
Healthy Eating Attitude	.432	2.314
Healthy Eating Knowledge	.506	1.977
Healthy Eating Behaviour	.493	2.030

5.2.3 Correlation

As to measure the relation among the constructs, Pearson correlation was employed. The correlation value of 0.10 to 0.30 indicates relatively weak relationship among constructs while 0.50 to 0.70 indicates moderate relationship among constructs and correlation value greater than 0.70 indicates strong relationships among the constructs (Pallant, 2005). Correction is also one of the indications for the existence of multicollinearity when two constructs are being highly correlated (Dohoo, Ducrot, Fourichon, Donald, & Hurnik, 1997). Different scholars have suggested different satisfactory value. For instance, Dohoo et al. (1997) suggested that a correlation value of more than 0.90 is considered highly problematic and indicate multicollinearity occur. Reisinger and Turner (1999) use correlation values cut off of 0.8 while Pallant (2010) recommends the cut off at 0.7 for multicollinearity. As shown in table 5.5, there are significant positive correlation among the constructs with the highest correction value of 0.656 between healthy eating attitude and social interaction. Hence, this result reveals that no multicollinearity issue should be of concerned among constructs.

Table 5.5: Pearson Correlation

	SoTie	Facebook Use	SoInter action	HEA	HEKnow	HE Beh	Work Product
FacebookUse	.312**						
SoInteraction	.351**	.598**					
HEA	.361**	.498**	.656**				
HEKnow	.324**	.513**	.605**	.635**			
HE Beh	.209**	.487**	.648**	.621**	.544**		
WorkProduct	.144**	.200**	.320**	.361**	.294**	.428**	

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

5.3   DESCRIPTIVE STATISTICS FOR DEMOGRAPHIC PROFILE

The demographic profile of the respondents which include gender, age, education, ethnicity and country of origin is presented in Table 5.6. The result indicated that there were more female respondents (73.2%) as compared to male respondents (26.8%). In term of age, more than half of them belonged to younger age group with 21.2% from 20-24 years old age group and 34.2% from 25-29 years old age group. This is followed by 30-34 years old (19.1%), 35-39 years old (12.1%), 40-44 years old (5.0%), 45-49 years old (2.9%), 50-54 years old (3.3%), 55-59 years old (1.1%) and 60-64 years old (1.2%). It can be summarized that half of the respondents (55.4%) were from younger adults aged between 20-29 years old. As for education level, nearly half of the respondents hold Bachelor Degree (47.0%), forming the largest group. This is followed by 28.9% diploma holder, 16.4% with secondary level education and 7.7% with postgraduate qualifications (Master/PhD). Almost all of the respondents were from Malaysia (98.9%) and thus the ethnicities were mostly from Malay (41.1%), Chinese (37.6%) and Indian (19.1%).

Table 5.6: Demographic profile

Demographic Profile	Frequency	Percentage (%)
Gender		
Male	202	26.8
Female	553	73.2
Age		
20-24	160	21.2
25-29	258	34.2
30-34	144	19.1
35-39	91	12.1
40-44	38	5.0
45-49	22	2.9
50-54	25	3.3
55-59	8	1.1
60-64	9	1.2
Education		
Degree	355	47.0
Diploma	218	28.9
High School	124	16.4
Master	53	7.0
PhD	5	0.7

Ethnicity		
Malay	310	41.1
Chinese	284	37.6
Indian	144	19.1
Local Native	13	1.7
Arabian	2	0.3
Korean	1	0.1
Iranian	1	0.1
Country of Origin		
Malaysia	747	98.9
Korea	2	0.3
India	2	0.3
Iran	1	0.1
Germany	1	0.1
Jordan	1	0.1
Yemen	1	0.1

The work profile of the respondents which include employment status, year of working, work sector, industry and role in the industry is presented in Table 5.7. The data shows that majority of the respondents were working full time (93.4%). In terms of working experience, half of the respondents (57.9%) were with 5 years or less working experience, this is followed by 19.5% of them with 6-10 years and 10.3% of them with 11-15 years of working experience. Majority of them were working at private sector (89.7%) with only 9.3% working at public sector and 1.1% working at not-for-profit sector. They were from 18 different industries, top three were from healthcare (16.4%), account/finance (13.5%) and education (10.2%). With regards to their role at work, 30.1% were administrative staff, 17.1% were support staff, 13.9% were trained professional and others include managerial staff, skilled laborer and consultant.

Table 5.7: Work Profile

Work Profile	Frequency	Percentage (%)
Employment Status		
Employed Full Time	705	93.4
Employed Part Time	25	3.3
Self Employed	25	3.3
Years of Working		
1 - 2 years	238	31.5
3 - 5 years	199	26.4
6 - 10 years	147	19.5
11 - 15 years	78	10.3
16 - 20 years	42	5.6
21 - 25 years	19	2.5
26 - 30 years	20	2.6
31 - 35 years	8	1.1
36 - 40 years	4	0.5
Sector		
Private Sector	677	89.7
Public Sector	70	9.3
Not-for-profit Sector	8	1.1
Industry		
Healthcare	124	16.4
Account/finance	102	13.5
Education	77	10.2
Sales/marketing	69	9.1
Computer/information technology	54	7.2
Manufacturing	52	6.9
Building/construction	48	6.4
Hotel and food service	45	6.0
Real estate, rental, leasing	23	3.0
Publishing	22	2.9
Transportation	22	2.9
Legal services	22	2.9
Retail trade	20	2.6
Scientific or technical service	18	2.4
Broadcasting	17	2.3
Government and public administration	15	2.0
Art, entertainment, recreation	15	2.0
Agriculture, forestry, fishing	10	1.3
Role		
Administrative staff	227	30.1
Support staff	129	17.1
Trained professional	105	13.9
Junior management	100	13.2
Middle management	93	12.3
Skilled laborer	33	4.4
Upper management	30	4.0
Temporary employee	22	2.9
Consultant	16	2.1

Table 5.8 illustrates the Facebook usage profile about their access platform to Facebook, average time spent actively using Facebook in general and for healthy eating purposes, number of friends on Facebook. Among the access platform, majority of the respondents (89.7%) access Facebook via mobile phone and followed by computer (9.0%) and very few of them access via IPad (0.7%) and tablet (0.7%). In term of the average time spent actively using Facebook, about 34.6% of the respondents claimed they spent less than 30 minutes a day. About 23.2% of them spent 30 min – 1 hour daily, followed by 16.7% spent 1 – 2 hours daily and only a small minority group spent more than 4 hours daily (5.8%). Almost half of the respondents (55.2%) reported to have less than 15 min for the time spent actively using Facebook for healthy eating purposes and followed by 26.5% reported to spend 15 – 29 minutes, only 6.3% of them reported to spend more than 1 hour for this purpose. In terms of the number of friends on Facebook, 26.1% of them reported to have 751 and more Facebook friends, 13.6% of them reported to have 376 - 500 Facebook friends and 12.8% reported to have 251 – 375 Facebook friends.

Table 5.8: Facebook Related Profile

Facebook Usage Profile	Frequency	Percentage (%)
Access Platform		
Mobile phone	677	89.7
Computer	68	9.0
IPad	5	0.7
Tablet	5	0.7
Average time spent actively using Facebook (per day)		
Less than 15 min	126	16.7
15 – 29 min	135	17.9
30 min – 1 hour	175	23.2
1 – 2 hours	126	16.7
2 – 3 hours	88	11.7
3 – 4 hours	61	8.1
More than 4 hours	44	5.8
Average time spent actively using Facebook for healthy eating purposes (per day)		
Less than 15 min	417	55.2
15 – 29 min	200	26.5
30 min – 1 hour	91	12.1
1 – 2 hours	33	4.4
2 – 3 hours	9	1.2
3 – 4 hours	3	0.4
More than 4 hours	2	0.3
Number of "friend" on Facebook		
0	7	0.9
1 – 50	37	4.9
51 – 100	59	7.8
101 – 175	74	9.8
176 - 250	94	12.5
251 – 375	97	12.8
376 - 500	103	13.6
501 – 750	87	11.5
751 or more	196	26.1

5.4   DESCRIPTIVE STATISTICS FOR CONSTRUCTS

The result of descriptive analysis for the 7 constructs namely social ties, Facebook use, social interaction, healthy eating attitude, healthy eating knowledge, healthy eating behaviour and work productivity are tabulated in Table 5.9.

The result indicated that the respondents have the tendency to agree with the measurement items of social ties with mean score ranges from 4.07 to 5.20. Among the items, ST3 reports the highest value (M=5.20, SD=1.215) followed by ST1 (M=4.70, SD=1.254) and ST4 (M=4.46, SD=1.327). Respondents' agreement on item ST3 "I personally know some of the people who actively use Facebook." was higher compared to other items. The lowest mean value (M=4.07, SD=1.415) was reported from ST2 which is "I spend a lot of time interacting with other people through Facebook".

As indicated in Table 5.9, the mean score of Facebook use ranges from 2.99 to 4.82 indicating that the agreement on Facebook use were mixed. USE3 "I browse others' posts on healthy eating on Facebook." scored the highest mean value (M=4.82, SD=1.145) while USE1 "I upload photos about healthy eating on Facebook." scored the lowest mean score (M=2.99, SD=1.215).

Generally, the agreement on social interaction for healthy eating on Facebook were mixed with mean values ranged from 3.36 to 4.45. All items reported mean value above 4 with exception of the SI4 and SI6. SI11 "I have access to other people who have current information about healthy eating practices on Facebook." scored the highest mean value (M=4.45, SD=1.253) while SI4 "I frequently post my healthy eating practices on Facebook" recorded the lowest mean (M=3.36, SD=1.397).

The mean score of healthy eating attitude ranged from 4.14 to 4.98 confirming that the respondents were slightly agreeable with all the measurement items. Item A4 "Following the use of Facebook, I know it is important for my daily diet to contain a lot of vitamins and minerals" scored the highest mean value (M=4.98, SD=1.187). There were only slight differences in the respondents' agreement on healthy eating attitude.

Generally, the respondents tend to agree on the level of perceived healthy eating knowledge possess following the use of Facebook for social interaction. Only slight differences were observed in the respondents' agreement on the perceived level of healthy eating knowledge. Item KN2 "Following the use of Facebook, I know a lot about how to evaluate the quality of healthy food" scored the highest mean value (M=4.73, SD=1.162).

Overall, the respondents tend to agree on the healthy eating behaviour described following the use of Facebook. All items were reported to have mean value above 4 which ranged from 4.17 to 4.86. Item HEB4 "Following the use of Facebook, I consume only a moderate amount of sugar" scored the highest mean value (M=4.86, SD=1.310).

The mean score of work productivity ranging from 3.39 to 5.06 implies that the respondents agreed that there is an influence of healthy eating behavior on work productivity following the use of Facebook were mixed. Item WP2 "Healthy eating helps me to concentrate on work tasks" scored the highest mean value (M=5.06, SD=1.120) while item WP4 "Healthy eating helps me to relate better to my co-workers" scored the lowest mean value (M=3.39, SD=1.207).

Table 5.9: Descriptive Analysis of Constructs

Construct	Item	Mean	SD
Social Ties	ST1	4.70	1.254
	ST2	4.07	1.415
	ST3	5.20	1.215
	ST4	4.46	1.327
Facebook Use	USE1	2.99	1.215
	USE2	4.14	1.234
	USE3	4.82	1.145
	USE4	3.33	1.163
	USE5	4.48	1.207
	USE6	4.26	1.243
	USE7	3.04	1.116
	USE8	3.82	1.338
	USE9	3.00	1.151
	USE10	4.32	1.321

Social Interaction	SI1	4.04	1.356
	SI2	4.43	1.205
	SI3	4.29	1.203
	SI4	3.36	1.397
	SI5	4.32	1.487
	SI6	3.44	1.384
	SI7	4.17	1.397
	SI8	4.20	1.384
	SI9	4.23	1.329
	SI10	4.23	1.333
	SI11	4.45	1.253
	SI12	4.13	1.254
Healthy Eating Attitude	A1	4.74	1.172
	A2	4.14	1.188
	A3	4.29	1.242
	A4	4.98	1.187
Healthy Eating Knowledge	KN1	4.53	1.101
	KN2	4.73	1.162
	KN3	3.69	1.309
Healthy Eating Behaviour	HEB1	4.73	1.343
	HEB2	4.55	1.306
	HEB3	4.82	1.409
	HEB4	4.86	1.310
	HEB5	4.17	1.307
Work Productivity	WP1	4.94	1.208
	WP2	5.06	1.120
	WP3	4.24	1.204
	WP4	3.39	1.207

5.5   EXPLORATORY FACTOR ANALYSIS

In this research, all measurement items were adapted from validated scales from past research. EFA was used to summarize the variables into a smaller number of components. The result of EFA is presented according to the constructs in this research based on the criteria discusses and the cut off points presented in Table 4.11 in Chapter 4.

5.5.1 Social Ties

Social ties is a single factor construct as revealed on the scree plot (refer Figure 5.8) and eigenvalue of 2.698 (refer Table 5.10). The Kaiser-Myer-Olkin (KMO) was 0.800 which is far greater than 0.60 and Bartlett's test of Sphericity was significant. The MSA values were all above acceptable level of 0.5, ranged from 0.757 to 0.876. The communality (COM) of the items exceeded 0.50. All factor loadings were above 0.50, ranged from 0.732 to 0.865, indicated that all items were retained for further analysis.

Table 5.10: EFA Social Ties Component Matrix

	Component	COM	MSA
	1		
ST1	0.836	.700	.808
ST2	0.865	.749	.757
ST3	0.732	.536	.876
ST4	0.844	.713	.793
Eigen-value	2.698		
Variance (%)	67.44		
Total variance: 67.44% KMO = .800 Bartlett test of Sphericity Chi-square = 1212.111 Df = 6 Sig = .000			
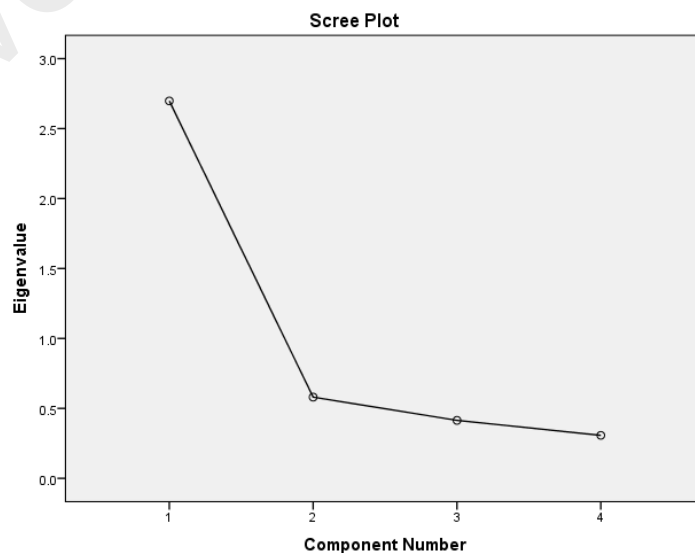
Figure 5.8: Social Ties Scree Plot

5.5.2 Facebook Use

As presented in Table 5.11, the correlation was > 0.32, thus oblique rotation was remained and there was no change in the rotation method.

Table 5.11: Component Correlation Matrix of Facebook Use

Component	1	2
1	1.000	.596
2	.596	1.000

The EFA was run with 10 items and two factors with eigenvalue > 1.0 were extracted. The scree plot was also examined to confirm the number of factors extracted (Figure 5.9). The total variance was 62.71%, which is greater than 60% as recommended by Hair et al. (2010). The first factor's eigenvalue was 5.083 with higher variance (50.83%) while the second factor's eigenvalue was 1.188 with much lower variance of 11.88%. All items were loaded properly into these factors with factor loadings > 0.5, ranged from 0.623 to 0.900 and no cross loading was found. The KMO was 0.890 which was far greater than 0.60 and Bartlett's test of Sphericity was significant. The MSA values were all above acceptable level of 0.5, ranged from 0.866 to 0.928. The communality of the items exceeded 0.50, thus no item was deleted.

The first factor consisted of seven items (USE2, USE3, USE5, USE6, USE8 and USE10) was termed as Passive Activity. The second factor which consisted of four items (USE1, USE4, USE7, USE9) was termed as Active Activity.

Table 5.12: EFA Facebook Use Component Matrix

	Component		COM	MSA
	1	2		
USE1	0.106	**0.652**	.519	.903
USE2	**0.749**	0.036	.594	.893
USE3	**0.900**	-0.133	.685	.870
USE4	0.009	**0.824**	.688	.882
USE5	**0.733**	-0.009	.530	.928
USE6	**0.713**	0.073	.576	.892
USE7	-0.009	**0.879**	.763	.866
USE8	**0.623**	0.14	.511	.902
USE9	-0.045	**0.875**	.722	.877
USE10	**0.816**	0.017	.682	.898
Eigen-value	5.083	1.188		
Variance (%)	50.83	11.88		
Total variance: 62.71% KMO = .890 Bartlett test of Sphericity Chi-square = 3588.966 Df = 45 Sig = .000				
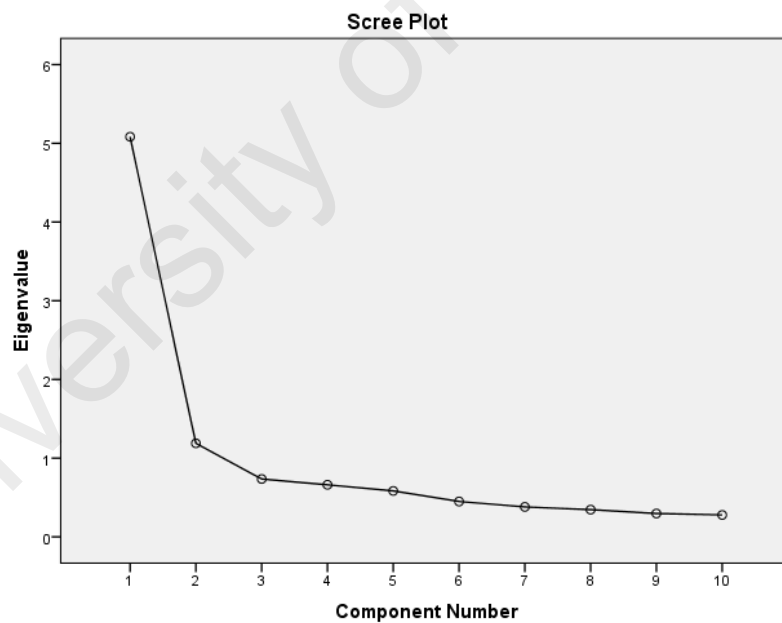
Figure 5.9: Facebook Use Scree Plot

5.5.3 Social Interaction

As all measurement items were adopted from previous studies and total factors for social interaction construct was made to known consist of 3 factors. EFA was conducted with extraction based on 3 factors for data reduction. As presented in Table 5.13, the correlations were > 0.32, thus oblique rotation was remained and there was no change in the rotation method.

Table 5.13: Component Correlation Matrix of Social Interaction

Component	1	2	3
1	1.000	.556	.578
2	.556	1.000	.578
3	.578	.578	1.000

The appropriateness of data for factor analysis was confirmed with KMO value of 0.925 and p value = 0.000 for Bartlett test of Sphericity. The communalities of the items were all above 0.5, ranged from 0.621 to 0.821, thus no item was deleted. In addition, the MSA values of the items were above acceptable level of 0.5, ranged from 0.903 to 0.956.

There were five items loaded on factor one (SI4, SI5, SI6, SI7, SI8) with eigenvalue of 6.431 (53.59%). Factor two was loaded with five items (SI9, SI10, SI11, SI12) with eigenvalue of 1.192 (9.93%). SI1, SI2 and SI3 were loaded on factor three with eigenvalue of 0.941 (7.84%). It was noted that the eigenvalue for factor three was lesser that 1.0. Nevertheless, eigenvalue may not be an appropriate indicator on the retention of factor based on the argument by Cliff (1988). It was highlighted by Gorsuch (1983) that factors having eigenvalues considerable less than 1.0 may be retained when using the scree test. Based on the scree plot (refer Figure 5.10), the distinct breaks between the steep slopes of the larger eigenvalues and the trailing off of the smaller ones in the graph plotted was found at the 4th component, meaning 3 factors were observed. In addition, conceptual interpretability is applied to retain the factor (Worthington &Whittaker, 2006). As all the measurement items were adapted from past studies and have been validated,

hence it is justified for retention. Further, the total variance explained was 71.36% (> 60%), indicated that it was a practical significant for the derived factors (Hair et al., 2010). The first factor was termed as Information Exchange while factor two was termed as Social Support. Factor three was termed as Communication.

Table 5.14: EFA Social Interaction Component Matrix

	Component			COM	MSA
	1	2	3		
SI1	-.032	.021	**.936**	.821	.903
SI2	.118	-.024	**.776**	.747	.936
SI3	-.011	-.076	**.835**	.765	.928
SI4	**.784**	.120	.111	.621	.905
SI5	**.803**	-.038	-.020	.660	.952
SI6	**.823**	.045	.027	.664	.916
SI7	**.813**	-.147	-.083	.731	.909
SI8	**.664**	-.142	.082	.649	.913
SI9	.250	**-.680**	-.024	.689	.956
SI10	-.065	**-.845**	.058	.712	.932
SI11	.009	**-.853**	.003	.738	.929
SI12	-.015	**-.845**	.065	.767	916
Eigen-value	6.431	1.192	0.941		
Variance (%)	53.59	9.93	7.84		
Total variance: 71.36% KMO = .925 Bartlett test of Sphericity Chi-square = 5288.212 Df = 66 Sig = .000					
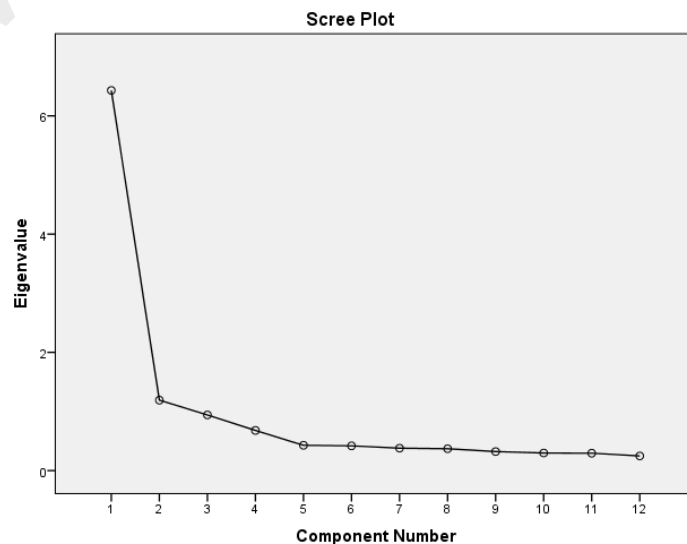
Figure 5.10: Social Interaction Scree Plot

5.5.4 Healthy Eating Attitude

Healthy eating is a single factor construct as revealed on the scree plot (refer Figure 5.11) and eigenvalue of 2.885 (refer Table 5.15). Total variance explained was 72.14%. The KMO is 0.824 and Bartlett's test of Sphericity was significant. The MSA values were all above acceptable level of 0.5, ranged from 0.787 to 0.868. The communality of the items exceeded 0.50 and all factor loadings were above 0.50, thus no item was deleted. All items were remained for further analysis.

Table 5.15: EFA Healthy Eating Attitude Component Matrix

	Component 1	COM	MSA
A1	0.863	.744	.828
A2	0.843	.711	.826
A3	0.887	.787	.787
A4	0.802	.644	.868
Eigen-value	2.885		
Variance (%)	72.14		
Total variance: 72.14% KMO = .824 Bartlett test of Sphericity Chi-square = 1488.776 Df = 6 Sig = .000			
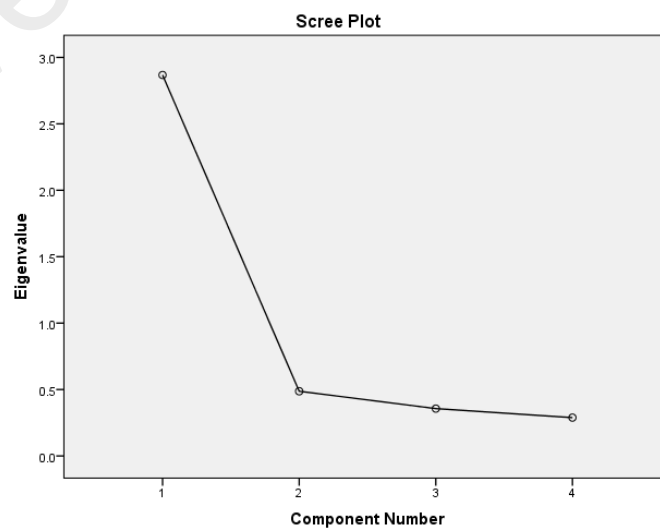
Figure 5.11: Healthy Eating Attitude Scree Plot

5.5.5 Healthy Eating Knowledge

There was only one factor extracted for healthy eating knowledge as revealed on the scree plot (refer Figure 5.12) and eigenvalue of 2.313 (refer Table 5.16). Total variance explained was 77.12%. The KMO is 0.732 and Bartlett's Test of Sphericity was found to be significant (p<.05) and MSA value of all items were above 0.5, ranged from 0.717 to 0.743. The communality of the items exceeded 0.50 and all factor loadings were above 0.50, thus no item was deleted. All items were remained for further analysis.

Table 5.16: EFA Healthy Eating Knowledge Component Matrix

	Component	COM	MSA
	1		
KN1	0.886	.784	.717
KN2	0.876	.767	.737
KN3	0.873	.762	.743
Eigen-value	2.313		
Variance (%)	77.12		
Total variance: 77.12% KMO = .732 Bartlett test of Sphericity Chi-square = 979.627 Df = 3 Sig = .000			
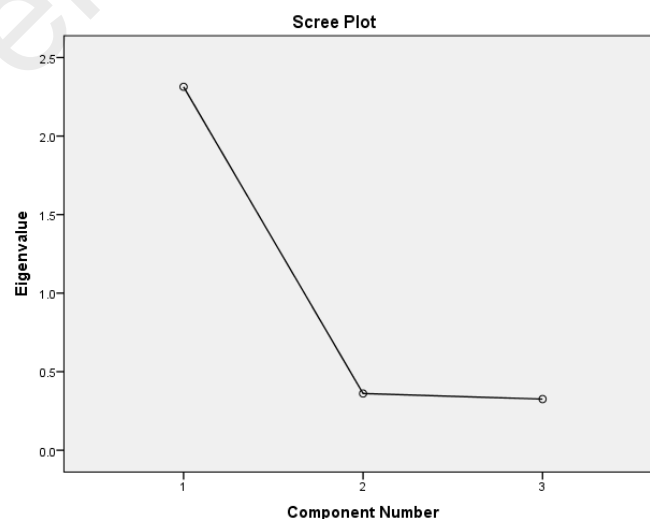
Figure 5.12: Healthy Eating Knowledge Scree Plot

5.5.6 Healthy Eating Behaviour

There was only one factor extracted for healthy eating behaviour as revealed on the scree plot (refer Figure 5.13) and eigenvalue of 3.121 (refer Table 5.17). Total variance explained was 62.43%. The KMO is 0.810, above 0.6 and the Bartlett's Test of Sphericity was significant. The MSA value of all items were above 0.5, ranged from 0.781 to 0.840. The communality of the items exceeded 0.50 and all factor loadings were above 0.50, thus no item was deleted. All items were remained for further analysis.

Table 5.17: EFA Healthy Eating Behaviour Component Matrix

	Component	COM	MSA
	1		
HEB1	0.797	.634	.781
HEB2	0.806	.650	.796
HEB3	0.803	.645	.837
HEB4	0.791	.625	.805
HEB5	0.753	.567	.840
Eigen-value	3.121		
Variance (%)	62.43		
Total variance: 62.43% KMO = .810 Bartlett test of Sphericity Chi-square = 1568.487 Df = 10 Sig = .000			
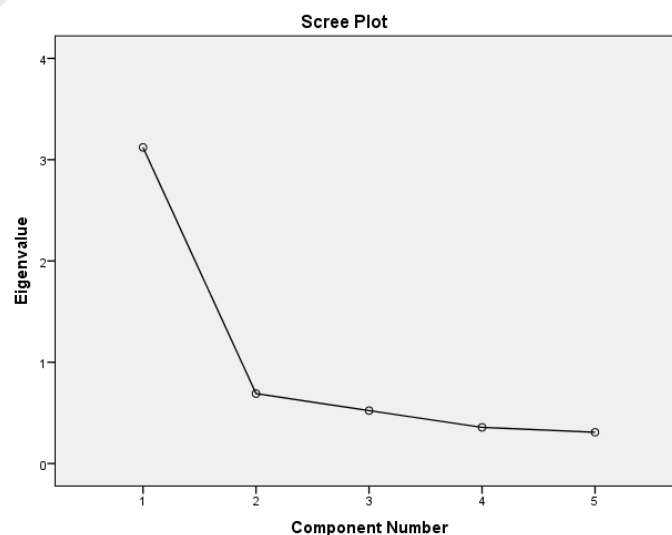
Figure 5.13:Healthy Eating Knowledge Scree Plot

5.5.7 Work Productivity

Work productivity is a single factor construct as revealed on the scree plot (refer Figure 5.14) and eigenvalue of 3.002 (refer Table 5.18). Total variance explained was 75.06%. The KMO is 0.802 and Bartlett's test of Sphericity was significant. The MSA values were all above acceptable level of 0.5, ranged from 0.773 to 0.842. The communality of the items exceeded 0.50 and all factor loadings were above 0.50, thus no item was deleted. All items were remained for further analysis.

Table 5.18: EFA Component Matrix for Work Productivity

	Component 1	COM	MSA
WP1	0.886	.785	.817
WP2	0.811	.658	.842
WP3	0.897	.804	.773
WP4	0.870	.756	.788
Eigen-value	3.002		
Variance (%)	75.06		
Total variance: 75.06% KMO = .802 Bartlett test of Sphericity Chi-square = 1802.129 Df = 6 Sig = .000			
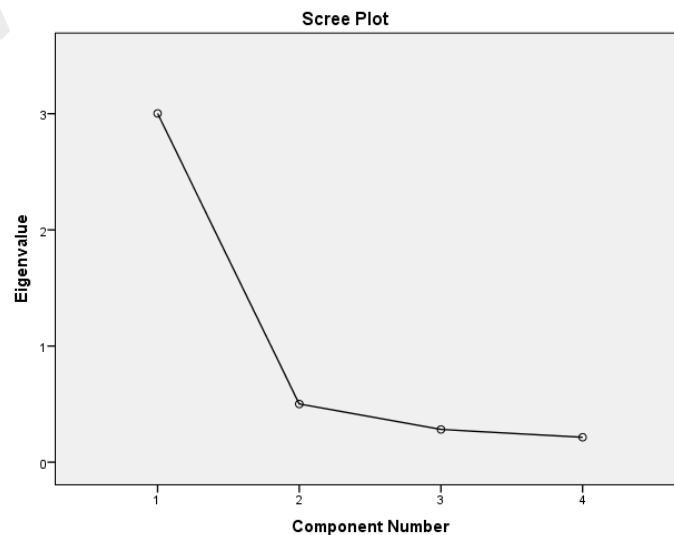
Figure 5.14: Work Productivity Scree Plot

5.6   RELIABILITY

In this research, internal consistency is used to measure reliability through Cronbach's alpha value. In addition to this, both corrected item-to-total correlations and item's inter-item correlations are assessed for item deletion in order to achieve the reliability.

5.6.1   Social Ties

By using Cronbach's Alpha, the internal consistency of the factor was examined. The Cronbach's Alpha value was 0.838 (refer Table 5.19) and was deemed acceptable. It is noted that the removal of ST3 item would increase the Cronbach's Alpha from 0.838 to 0.841, however, this item was retained as more than three items per construct is recommended for further analysis and furthermore the reliability of the factor was high. As presented in Table 5.19 and Table 5.20, the corrected item-total correlation of all items were all above 0.5 and the inter-item correlation of the items were all above 0.3. All items were remained for further analysis.

Table 5.19: Reliability Statistic for Social Ties

Construct	Cronbach's Alpha	Average Corrected Item-Total Correlation	Item	Corrected Item-Total Correlation	Cronbach's Alpha if Item Deleted
Social Ties	0.838	0.563	ST1	0.693	0.787
			ST2	0.734	0.767
			ST3	0.560	0.841
			ST4	0.704	0.780

Table 5.20: Inter-item Correlation Matrix of Social Ties

	ST1	ST2	ST3	ST4
ST1	1.000			
ST2	0.654	1.000		
ST3	0.490	0.484	1.000	
ST4	0.587	0.674	0.491	1.000

5.6.2 Facebook Use

Cronbach's Alpha value of both factors for Facebook use were above 0.7 with reported value of 0.835 to 0.861 respectively (refer Table 5.21). For Active Activity, the removal of USE1 item would increase the Cronbach's Alpha from 0.835 to 0.836, however, this item was retained as more than three items per construct is recommended for further analysis and furthermore the reliability of the factor was high. The corrected item-total correlations were > 0.50 (refer Table 5.21) and inter-item correlation were > 0.30 for both two factors (refer Table 5.22 and 5.23).

Table 5.21: Reliability Statistic for Facebook Use

Construct	Factor	Cronbach's Alpha	Average Corrected Item-Total Correlation	Item	Corrected Item-Total Correlation	Cronbach's Alpha if Item Deleted
Facebook Use	Active Activity	0.835	0.562	USE1	0.569	0.836
				USE4	0.685	0.783
				USE7	0.731	0.764
				USE9	0.687	0.783
	Passive Activity	0.861	0.510	USE2	0.643	0.839
				USE3	0.696	0.831
				USE5	0.601	0.847
				USE6	0.639	0.840
				USE8	0.607	0.847
				USE10	0.736	0.822

Table 5.22: Inter-Item Correlation Matrix of Active Activity

	USE1	USE4	USE7	USE9
USE1	1.000			
USE4	0.498	1.000		
USE7	0.479	0.670	1.000	
USE9	0.505	0.557	0.665	1.000

Table 5.23: Inter-Item Correlation Matrix of Passive Activity

	USE2	USE3	USE5	USE6	USE8	USE10
USE2	1.000					
USE3	0.570	1.000				
USE5	0.454	0.505	1.000			
USE6	0.457	0.633	0.425	1.000		
USE8	0.439	0.448	0.462	0.442	1.000	
USE9	0.604	0.539	0.523	0.551	0.592	1.000

5.6.3 Social Interaction

Table 5.23 presented the Cronbach's Alpha values for three factors of social interaction with all values were above 0.7. All corrected item-total correlations were > 0.50 for communication, information exchange and social support (refer Table 5.24). All inter-item correlations were >0.3. Items in Communication factor had inter-item correlations ranged from 0.635 to 0.679 (refer Table 5.25). The inter-item correlations for Information Exchange varied from 0.449 to 0.726 (refer Table 5.26) and for Social Support from 0.598 to 0.691 (refer Table 5.27).

Table 5.24: Reliability Statistic for Social Interaction

Construct	Factor	Cronbach's Alpha	Average Corrected Item-Total Correlation	Item	Corrected Item-Total Correlation	Cronbach's Alpha if Item Deleted
Social Interaction	Communication	0.845	0.664	SI1	0.750	0.776
				SI2	0.717	0.806
				SI3	0.718	0.804
	Information Exchange	0.870	0.572	SI4	0.641	0.855
				SI5	0.693	0.843
				SI6	0.687	0.844
				SI7	0.753	0.828
				SI8	0.699	0.841
	Social Support	0.870	0.628	SI9	0.699	0.844
				SI10	0.707	0.841
				SI11	0.726	0.833
				SI12	0.764	0.818

Table 5.25: Inter-Item Correlation Matrix of Communication

	SI1	SI2	SI3
SI1	1.000		
SI2	0.678	1.000	
SI3	0.679	0.635	1.000

Table 5.26: Inter-Item Correlation Matrix of Information Exchange

	SI4	SI5	SI6	SI7	SI8
SI4	1.000				
SI5	0.522	1.000			
SI6	0.650	0.531	1.000		
SI7	0.523	0.623	0.576	1.000	
SI8	0.449	0.609	0.515	0.726	1.000

Table 5.27: Inter-Item Correlation Matrix of Social Support

	SI9	SI10	SI11	SI12
SI9	1.000			
SI10	0.603	1.000		
SI11	0.601	0.598	1.000	
SI12	0.627	0.648	0.691	1.000

5.6.4   Healthy Eating Attitude

Cronbach's Alpha of healthy eating attitude was 0.871 (refer Table 5.28). As shown in

Table 5.29 the corrected item-total correlations were > 0.50, ranged from to 0.660 to 0.781.

The inter-item correlations were > 0.30 as shown in Table 5.28.

Table 5.28: Reliability Statistic for Healthy Eating Attitude

Construct	Cronbach's Alpha	Average Corrected Item-Total Correlation	Item	Corrected Item-Total Correlation	Cronbach's Alpha if Item Deleted
Healthy Eating Attitude	0.871	0.627	A1	0.744	0.827
			A2	0.714	0.839
			A3	0.781	0.811
			A4	0.660	0.860

Table 5.29: Inter-Item Correlation Matrix of Healthy Eating Attitude

	A1	A2	A3	A4
A1	1.000			
A2	0.629	1.000		
A3	0.690	0.696	1.000	
A4	0.603	0.535	0.611	1.000

5.6.5   Healthy Eating Knowledge

As shown in Table 5.30, Cronbach's Alpha of healthy eating knowledge was 0.848 (> 0.7) which indicated high internal consistency. The corrected item-total correlations were > 0.50, ranged from to 0.712 to 0.734 (refer Table 5.30). The inter-item correlations were > 0.30 as shown in Table 5.31.

Table 5.30: Reliability Statistic for Healthy Eating Knowledge

Construct	Cronbach's Alpha	Average Corrected Item-Total Correlation	Item	Corrected Item-Total Correlation	Cronbach's Alpha if Item Deleted
Healthy Eating Knowledge	0.848	0.657	KN1	0.734	0.777
			KN2	0.716	0.789
			KN3	0.712	0.801

Table 5.31: Inter-Item Correlation Matrix of Healthy Eating Knowledge

	KN1	KN2	KN3
KN1	1.000		
KN2	0.669	1.000	
KN3	0.662	0.640	1.000

5.6.6   Healthy Eating Behaviour

As presented in Table 5.32, Cronbach's Alpha of healthy eating behaviour was 0.849 and was deemed acceptable based on Hair et al. (2010)'s guideline where Cronbach's Alpha should be more than 0.70. The corrected item-total correlations were > 0.50, ranged from

to 0.613 to 0.679 (refer Table 5.32). The inter-item correlations were > 0.30 (refer Table 5.33).

Table 5.32: Reliability Statistic for Healthy Eating Behaviour

Construct	Cronbach's Alpha	Average Corrected Item-Total Correlation	Item	Corrected Item-Total Correlation	Cronbach's Alpha if Item Deleted
Healthy Eating Behaviour	0.849	0.530	HEB1	0.665	0.817
			HEB2	0.679	0.813
			HEB3	0.675	0.814
			HEB4	0.662	0.817
			HEB5	0.613	0.830

Table 5.33: Inter-Item Correlation Matrix of Healthy Eating Knowledge

	HEB1	HEB2	HEB3	HEB4	HEB5
HEB1	1.000				
HEB2	0.672	1.000			
HEB3	0.569	0.517	1.000		
HEB4	0.462	0.482	0.599	1.000	
HEB5	0.434	0.503	0.478	0.584	1.000

5.6.7   Work Productivity

The Cronbach's Alpha value for work productivity was 0.889 (refer Table 5.34) and was deemed acceptable. The corrected item-total correlations were > 0.50, varied from 0.679 to 0.804 (refer Table 5.34). As shown in Table 5.35, the inter-item correlations were all above 0.3.

Table 5.34: Reliability Statistic for Work Productivity

Construct	Cronbach's Alpha	Average Corrected Item-Total Correlation	Item	Corrected Item-Total Correlation	Cronbach's Alpha if Item Deleted
Work Productivity	0.889	0.666	WP1	0.786	0.846
			WP2	0.679	0.885
			WP3	0.804	0.839
			WP4	0.760	0.856

Table 5.35: Inter-Item Correlation Matrix of Work Productivity

	WP1	WP2	WP3	WP4
WP1	1.000			
WP2	0.683	1.000		
WP3	0.712	0.600	1.000	
WP4	0.669	0.553	0.780	1.000

In sum, Cronbach's Alpha of all constructs were above 0.7 which indicated high internal consistency. The reliability value ranged from 0.835 to 0.889. The corrected item-total correlations and inter-item correlations for all items achieved satisfactory level. Hence, no item was removed during the assessment of reliability. All items in the respective constructs were forwarded for confirmatory factor analysis.

5.7   CONFIRMATORY FACTOR ANALYSIS

Following the specification of the measurement items and constructs through EFA, CFA is conducted to assess the measurement model. CFA is conducted by testing all constructs together on one measurement model due to its ability to take into account of the relationship between the different constructs and discriminant validity is statistically tested.

5.7.1   FIRST ORDER MEASUREMENT MODEL

All the constructs derived from EFA were used in the assessment of the measurement model. The adequacy of measurement model is established through the assessment of goodness of fit and evaluation for misspecification. Re-specification of the model is conducted to achieve the desired goodness of fit. Once goodness of fit has been

established for the model, the assessments of construct reliability and validity are conducted.

5.7.1.1 Assessment of Goodness of Fit

As shown in Table 5.36, the measurement model achieved acceptable goodness of fit after 4 iterations. In the first iteration, the fit indices which were within the acceptable level include AGFI = 0.845, CFI = 0.923, RMSEA = 0.050 and CMIN/DF = 2.869. The poor fit indices were GFI = 0.867, NFI = 0.887 and TLI = 0.914, indicated that the model re-specification procedure is required to generate a measurement model that achieves a better fit of data (Byrne, 2010).

With regards to the modification index (MI) assessment, a large MI of 54.600 was observed and suggested that the model should be specified by correlating the error terms e5 (USE3) and e9 (USE6). Hence, e5 and e9 were correlated. After the modification, there was a slight improvement in the model fit with the second iteration with GFI = 0.869, NFI = 0.890 and TLI = 0.918. The acceptable fit indices remained as AGFI = 0.847, CFI = 0.926, RMSEA = 0.049 and CMIN/DF = 2.795.

Assessment of MI was conducted again to re-specify the model. A large modification MI of 55.040 suggested that the model should be specified by correlating the error terms e43 (WP1) and e44 (WP2). After correlated e43 and e44, the second iteration presented a better model fit with CMIN/DF = 2.710, GFI = 0.873, AGFI = 0.851, NFI = 0.894, TLI = 0.922, CFI = 0.930, RMSEA =0.048. Hoelter's critical N' for 0.5 and 0.1 level was more than 200.

Model re-specification procedure was then continued based on the assessment on standardized residual covariance (SRC) value. SI4 was deleted as SRC was more than 2.5. The model fit of the third iteration was further improved with CMIN/DF = 2.550, GFI = 0.886, AGFI = 0.866, NFI = 0.902, TLI = 0.930, CFI = 0.938, RMSEA =0.045. Hoelter's critical N' for 0.5 and 0.1 level was more than 200 indicating the adequacy of the sample.

As shown in the Table 5.36, the final iteration presented the desired GOD indices. Due to the large sample size, the P value was significant. As such, these results reflected that the model fit was established. The final 1st order measurement model after 4 iterations is presented in Figure 5.15.

Table 5.36: GOF Measures of 1st Order Measurement Model

	Iteration 1	Iteration 2	Iteration 3	Iteration 4
Fit Indices	Value(s)	CO e5 & e9	CO e43 & e44	DEL SI4
P-value	0.000	0.000	.000	.000
CMIN/DF	2.869	2.795	2.710	2.550
GFI	.867	.869	.873	.886
AGFI	.845	.847	.851	.866
NFI	.887	.890	.894	.902
TLI	.914	.918	.922	.930
CFI	.923	.926	.930	.938
PRATIO	.899	.898	.897	.893
P Close	.553	.791	.944	.999
RMSEA	.050	.049	.048	.045
HOELTER 0.05	286	293	302	322
HOELTER 0.01	295	303	313	333
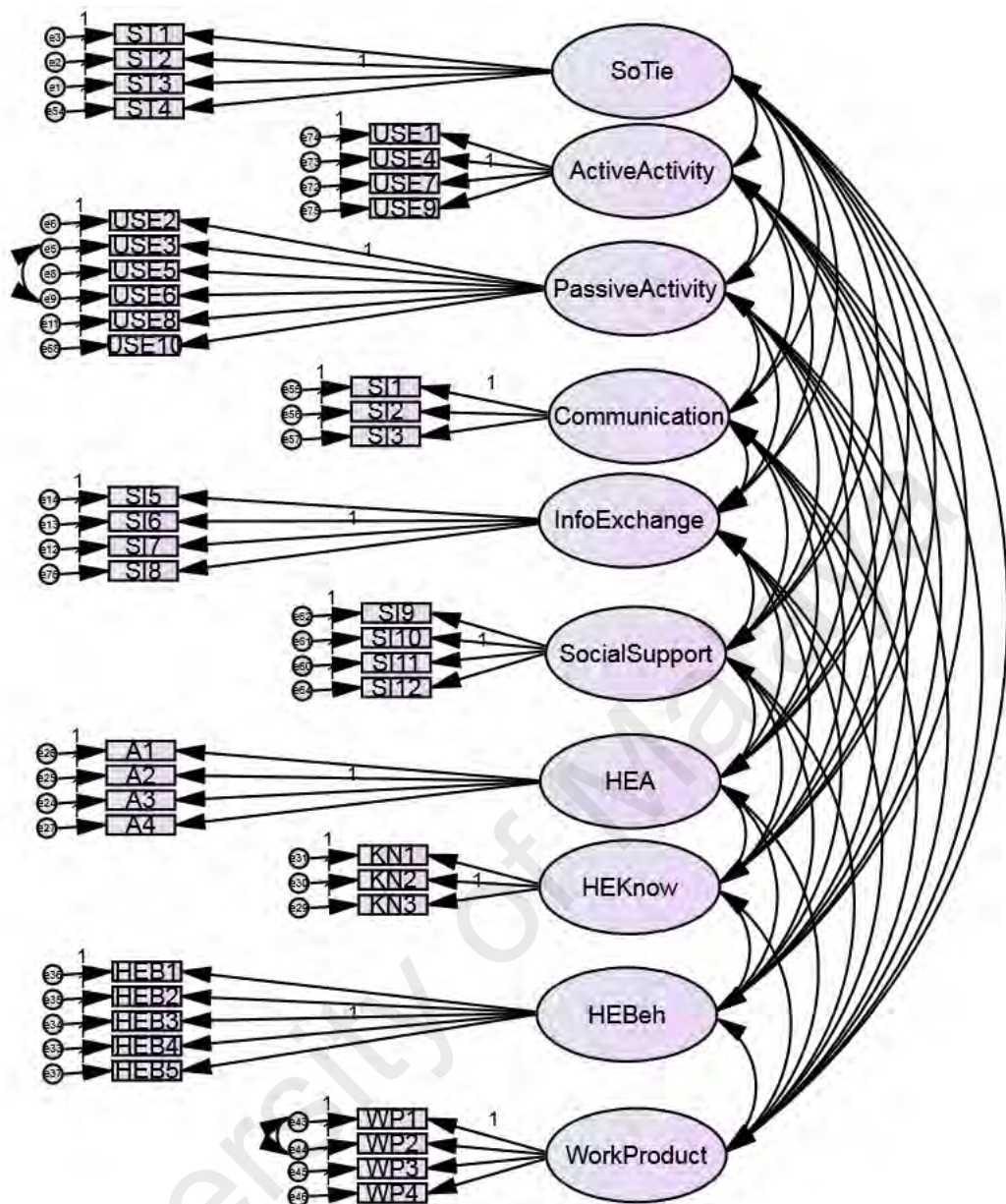
Figure 5.15: First Order Measurement Model After 4 Iterations

5.7.1.2 Unidimensionality

As shown in Figure 5.15, each of the measurement item is related with only a single construct and there is no cross loading of these measures are observed on multiple constructs, hence, these indicate unidimensionality. In addition, all items were positive with significant path directions at 0.001 alpha, confirming the unidimensionality of this model (refer Table 5.37).

Table 5.37: 1st Order Measurement Model Regression Weights

			Estimate	S.E.	C.R.	P	SRW	SMC
ST1	<---	SoTie	1.335	0.083	16.079	***	0.781	0.609
ST2	<---	SoTie	1.615	0.097	16.657	***	0.836	0.699
ST3	<---	SoTie	1				0.603	0.364
ST4	<---	SoTie	1.424	0.088	16.15	***	0.787	0.619
USE1	<---	ActiveActivity	0.817	0.046	17.821	***	0.63	0.397
USE4	<---	ActiveActivity	0.95	0.042	22.602	***	0.766	0.587
USE7	<---	ActiveActivity	1				0.84	0.706
USE9	<---	ActiveActivity	0.952	0.042	22.924	***	0.775	0.601
USE2	<---	PassiveActivity	1.145	0.063	18.108	***	0.736	0.542
USE3	<---	PassiveActivity	1				0.693	0.48
USE5	<---	PassiveActivity	0.975	0.061	15.961	***	0.641	0.411
USE6	<---	PassiveActivity	1.052	0.052	20.281	***	0.672	0.451
USE8	<---	PassiveActivity	1.15	0.068	16.896	***	0.682	0.465
USE10	<---	PassiveActivity	1.358	0.069	19.741	***	0.815	0.665
SI1	<---	Communication	1				0.818	0.668
SI2	<---	Communication	0.884	0.036	24.405	***	0.814	0.662
SI3	<---	Communication	0.883	0.036	24.408	***	0.814	0.662
SI5	<---	InfoExchange	0.941	0.041	23.083	***	0.748	0.559
SI6	<---	InfoExchange	0.778	0.039	19.71	***	0.664	0.441
SI7	<---	InfoExchange	1				0.846	0.715
SI8	<---	InfoExchange	0.981	0.036	27.018	***	0.838	0.702
SI9	<---	SocialSupport	1.037	0.046	22.719	***	0.779	0.606
SI10	<---	SocialSupport	1.023	0.046	22.269	***	0.766	0.587
SI11	<---	SocialSupport	1				0.796	0.634
SI12	<---	SocialSupport	1.046	0.042	24.618	***	0.833	0.693
A1	<---	HEA	0.908	0.035	26.272	***	0.814	0.663
A2	<---	HEA	0.908	0.035	25.765	***	0.803	0.645
A3	<---	HEA	1				0.846	0.716
A4	<---	HEA	0.802	0.037	21.668	***	0.71	0.504
KN1	<---	HEKnow	0.9	0.038	23.618	***	0.84	0.706
KN2	<---	HEKnow	0.91	0.04	22.655	***	0.805	0.648
KN3	<---	HEKnow	1				0.785	0.616
HEB1	<---	HEBeh	1.11	0.06	18.451	***	0.749	0.561
HEB2	<---	HEBeh	1.13	0.059	19.212	***	0.784	0.615
HEB3	<---	HEBeh	1.15	0.063	18.242	***	0.739	0.547
HEB4	<---	HEBeh	1				0.692	0.478
HEB5	<---	HEBeh	0.965	0.058	16.65	***	0.669	0.447
WP1	<---	WorkProduct	1				0.787	0.62
WP2	<---	WorkProduct	0.783	0.034	22.903	***	0.665	0.442
WP3	<---	WorkProduct	1.14	0.043	26.206	***	0.901	0.811
WP4	<---	WorkProduct	1.093	0.043	25.446	***	0.862	0.742

SRW = Standardized Regression Weight

SMC = Squared Multiple Correlation

5.7.1.3 Construct Reliability

As illustrated in Table 5.38, CR for all constructs were above 0.70, demonstrating high level of consistency and good reliability.

Table 5.38: Composite Reliability of 1st Order Measurement Model

	CR
SoTie	0.841
ActiveActivity	0.841
PassiveActivity	0.857
Communication	0.856
InfoExchange	0.858
SocialSupport	0.872
HEA	0.872
HEKnow	0.851
HEBeh	0.849
WorkProduct	0.882

5.7.1.4 Construct Validity

To assess the construct validity, convergent validity and discriminant validity are examined.

Convergent validity

In this research, the standardized regression weights were above 0.5, ranged from 0.603 to 0.901 at a significant level (p<0.001) (refer Table 5.39). All the AVE values for all variables were above 0.5, indicating adequate convergence. All CR values were above 0.7, indicated good reliability.

In sum, the convergent validity is confirmed for this measuremnt model through the assessment on standardized regression weights (> 0.5), AVE (≥ 0.5) and CR (≥ 0.7).

Table 5.39: Standardized Regression Weights, CR and AVE

	P	SRW	SMC	CR	AVE
SoTie				0.841	0.573
ST1	***	0.781	0.609		
ST2	***	0.836	0.699		
ST3		0.603	0.364		
ST4	***	0.787	0.619		
ActiveActivity				0.841	0.572
USE1	***	0.63	0.397		
USE4	***	0.766	0.587		
USE7		0.84	0.706		
USE9	***	0.775	0.601		
PassiveActivity				0.857	0.502
USE2	***	0.736	0.542		
USE3		0.693	0.48		
USE5	***	0.641	0.411		
USE6	***	0.672	0.451		
USE8	***	0.682	0.465		
USE10	***	0.815	0.665		
Communication				0.856	0.665
SI1		0.818	0.668		
SI2	***	0.814	0.662		
SI3	***	0.814	0.662		
InfoExchange				0.858	0.605
SI5	***	0.748	0.559		
SI6	***	0.664	0.441		
SI7		0.846	0.715		
SI8	***	0.838	0.702		
SocialSupport				0.872	0.630
SI9	***	0.779	0.606		
SI10	***	0.766	0.587		
SI11		0.796	0.634		
SI12	***	0.833	0.693		
HEA				0.872	0.632
A1	***	0.814	0.663		
A2	***	0.803	0.645		
A3		0.846	0.716		
A4	***	0.71	0.504		
HEKnow				0.851	0.657
KN1	***	0.84	0.706		
KN2	***	0.805	0.648		
KN3		0.785	0.616		
HEBeh				0.849	0.530
HEB1	***	0.749	0.561		
HEB2	***	0.784	0.615		
HEB3	***	0.739	0.547		
HEB4		0.692	0.478		
HEB5	***	0.669	0.447		
WorkProduct				0.882	0.654

WP1		0.787	0.62	
WP2	***	0.665	0.442	
WP3	***	0.901	0.811	
WP4	***	0.862	0.742	

Discriminant validity

Table 5.40 demonstrated the square root of AVE scores of all the variables were higher than the correlation shared between two variables and this showed that all the dimensions were strong in discriminating each of its items from other constructs. As such, this assessment result supported the adequacy of discriminant validity of the measurement model.

Table 5.40: Square Root of AVE Scores and Correlation Shared Between Variables

	Communication	SoTie	Passive Activity	InfoExchange	Social Support	HEA	HE Know	HE Beh	Work Product	Active Activity
Communication	**0.815**									
SoTie	0.405	**0.757**								
PassiveActivity	0.566	0.346	**0.709**							
InfoExchange	0.707	0.281	0.662	**0.778**						
SocialSupport	0.730	0.404	0.493	0.713	**0.794**					
HEA	0.708	0.415	0.561	0.646	0.617	**0.795**				
HEKnow	0.644	0.397	0.580	0.624	0.563	0.743	**0.810**			
HEBeh	0.680	0.267	0.540	0.658	0.653	0.727	0.639	**0.728**		
WorkProduct	0.307	0.152	0.172	0.262	0.273	0.367	0.307	0.472	**0.809**	
ActiveActivity	0.526	0.332	0.705	0.521	0.422	0.473	0.501	0.482	0.199	**0.757**

Note: Values for the diagonal elements are those for the square root of the average variance extracted (AVE). Values below the diagonal are correlations

In summary, this measurement model has established acceptable model fit, unidimensionality, construct reliability and construct validity.

5.7.1.5 Measurement Invariance

Measurement invariance is regarded as operations yielding measures of the same attribute under different conditions which include stability of measurement across population, different medium of measurement administration (e.g. web based survey verses paper survey administration) (Horn & McArdle, 1992). In other words, measurement invariance assesses the equivalence of the construct across groups or across time. Horn and McArdle (1992) suggested configural and metric invariance are two important forms of measurement invariance, thus both these invariances are assessed. The test of configural invariance determines if the constructs have the same pattern of free and fixed loadings across the groups while the test of metric invariance determine if each item contributes to the latent construct to a similar degree across groups (Putnick & Bornstein, 2016).

Since this research has adopted different method of data collection namely online and paper survey which distributed to 5 different organization, the issue of systematic variation in data need to be accounted for. In addition, the sample data collected was found to be differ considerably for gender and age group. The respondents were mainly from female and younger age group as shown Table 5.5. As such there is a need to investigate whether the measurement model is equal across the gender, age and data collection method group. In this research, measurement invariance is tested in SEM framework using confirmatory factor analysis. Analysis of multigroup invariance was conducted to determine the extent to which the factor structure was comparable across the gender, age and data collection method group. This analysis was performed according to the measurement invariance procedures outlined by Brown (2014). Both analysis for configural and metric invariance were performed in AMOS. For configural invariance, the model is assessed with respective groups which are estimated freely and the model fit is determined by multiple fit indices as presented in Table 4.14. As for metric invariance,

chi-square difference test is conducted. Metric invariance is met if the result indicates no significant difference in variance exists between the models.

Data Collection Method

After data cleaning, there were 451 responses collected from online survey (59.7%) and 304 responses (40.3%) from paper survey (with 60, 54, 64, 59, 67 responses from 5 organizations). For configural invariance, the model was first assessed with 2 groups namely online and paper survey group. Fit indices of configural invariance ($\chi 2$/Df =1.935, GFI=0.843, AGFI= 0.815, TLI=0.917, CFI= 0.926, RMSEA=0.035, P Close=1.000) showed acceptable fit. This result offered the evidence for configural invariance which suggest the structure of the measurement model is equivalent across the 2 data collection method group. Also, chi-square difference test was conducted to determine metric invariance. The result showed that there is no significant difference in variance exists between these two models (refer Table 5.41). Therefore, metric invariance is met.

Table 5.41: Chi-square Difference Test Between 2 Data Collection Method Group

	Chi-square	df	p
Overall Model			
Unconstrained	2832.476	1464	
Fully constrained	2869.817	1505	
Number of groups		2	
Difference	37.341	41	0.634

The model was then assessed with 6 groups which consisted on online survey and 5 paper survey group representing 5 organisations. Fit indices of configural invariance ($\chi 2$/Df =1.936, GFI=0.842, AGFI= 0.812, TLI=0.916, CFI= 0.924, RMSEA=0.035, P Close=1.000) showed acceptable fit. This offered the evidence for configural invariance which suggest the structure of the measurement model is equivalent across the 6 data

collection method group. Also, the result of chi-square difference test showed that there is no significant difference in variance exists between these two models (refer Table 5.42). Therefore, metric invariance is met.

Table 5.42: Chi-square Difference Test Between 6 Data Collection Method Group

	Chi-square	df	p
Overall Model			
Unconstrained	7707.454	4392	
Fully constrained	7907.983	4597	
Number of groups		6	
Difference	200.529	205	0.575

Gender

For configural invariance, the model was assessed with 2 gender groups which were estimated freely. Fit indices of configural invariance ($\chi2/Df$ =1.951, GFI=0.842, AGFI= 0.814, TLI=0.917, CFI= 0.925, RMSEA=0.036, P Close=1.000) showed acceptable fit. This result offered the evidence for configural invariance which suggest the structure of the measurement model is equivalent across the gender group. Also, chi-square difference test was conducted to determine metric invariance. The result showed that there is no significant difference in variance exists between these two models (refer Table 5.43). Therefore, metric invariance is met.

Table 5.43: Chi-square Difference Test Between Gender Group

	Chi-square	df	p
Overall Model			
Unconstrained	2855.595	1464	
Fully constrained	2886.081	1505	
Number of groups		2	
Difference	30.486	41	0.886

Age

Most of the data collected for this research came from respondents at younger age group where more than 50% of respondents aged below 30 years old. Analysis of multigroup invariance was conducted based on 2 group namely young adult (15 – 34 years old) and middle aged & older adult (35 - 64 years old). There were more young adults (74.4%) as compared to middle aged & older adults (25.6%).

The analysis was performed according to the measurement invariance procedures outlined by Brown (2014). Analysis was performed in AMOS for both configural and metric invariance. For configural invariance, the model was assessed with 2 age groups which were estimated freely. Fit indices of configural invariance ($\chi2$/Df =1.932, GFI=0.842, AGFI= 0.814, TLI=0.917, CFI= 0.926, RMSEA=0.035, P Close=1.000) showed acceptable fit. This result offered the evidence for configural invariance which suggest the structure of the measurement model is equivalent across the age group. In addition, chi-square difference test was conducted to determine metric invariance. The result showed that there is no significant difference in variance exists between these two models (refer Table 5.44). Therefore, metric invariance is met.

Table 5.44: Chi-square Difference Test Between Age Group

	Chi-square	df	p
Overall Model			
Unconstrained	2827.87	1464	
Fully constrained	2879.399	1505	
Number of groups		2	
Difference	51.529	41	0.125

In sum, both configural and metric invariance were met for data collection method, gender and age group. There is no issue of systematic variation in data for data collection method adopted. Measurement   These add important support for the validity of this measurement model.

5.7.2   SECOND ORDER MEASUREMENT MODEL

Facebook use and social interaction examined in this research are second order constructs comprising two and three dimensions respectively based on the literature review (theoretical). Facebook use is conceptualized into active and passive activity (Bender et al., 2011; Burke & Kraut, 2014; Burke et al. 2010; Strutton, 2016; Taylor & Strutton, 2016; Wise et al., 2010). Researchers reported that social interaction consists of the component of communication, information exchange and social support (Ahuja & Galvin, 2003; Li, Chen, & Popiel, 2015; Wang et al., 2012). These dimensions were established through EFA based on factor loading, in which each are discriminatory. As recommended by Byrne (2010), it is essential establish the correlation of the dimensions of the construct and ensure there is structural relationship between the dimensions of the construct for second order measurement model. Both reliability and correlation between the dimensions were confirmed for both Facebook use and social interaction (refer section 5.6). In addition, as all these dimensions were taken as individual latent factor during assessment first order measurement and the result sowed strong evidence of reliability, convergent validity and discriminant validity of the latent constructs, therefore, all these dimensions are determined as the second order constructs and included accordingly in the second order measurement model.

As presented in Table 5.45, the goodness of fit of first order measurement model was slightly better than the second order measurement model. The second order measurement model showed reasonable model fit with fit indices: CMIN/DF = 2.589, significant p at 0.05 level, GFI = 0.881, AGFI = 0.864, NFI = 0.898, TLI = 0.929, CFI = 0.935, RMSEA = 0.046. Hoelter's critical N' for 0.5 and 0.1 level was above 200, indicating that the sample was adequate. Table 5.42 presented the CFA result for second order measurement

model conceptualization. The second order measurement model is presented in Figure

5.15.

Table 5.45: Comparative Fit Statistics for 1st and 2nd Order Measurement Model

Fit Indices	First-order	Second-order
P-value	.000	.000
CMIN/DF	2.550	2.589
GFI	.886	.881
AGFI	.866	.864
NFI	.902	.898
TLI	.930	.929
CFI	.938	.935
PRATIO	.893	.916
P Close	.999	.996
RMSEA	.045	.046
HOELTER 0.05	322	317
HOELTER 0.01	333	328

Table 5.46: CFA Result for Second Order Conceptualization

			Estimate	S.E.	C.R.	P	SRW	SMC
ST1	<---	SoTie	1.335	0.083	16.086	***	0.781	0.61
ST2	<---	SoTie	1.612	0.097	16.648	***	0.836	0.699
ST3	<---	SoTie	1				0.604	0.364
ST4	<---	SoTie	1.422	0.088	16.146	***	0.786	0.618
USE1	<---	ActiveActivity	0.815	0.046	17.743	***	0.628	0.395
USE4	<---	ActiveActivity	0.952	0.042	22.64	***	0.768	0.589
USE7	<---	ActiveActivity	1				0.84	0.706
USE9	<---	ActiveActivity	0.952	0.042	22.897	***	0.775	0.6
USE2	<---	PassiveActivity	1				0.73	0.533
USE3	<---	PassiveActivity	0.878	0.049	17.854	***	0.69	0.476
USE5	<---	PassiveActivity	0.864	0.052	16.737	***	0.645	0.416
USE6	<---	PassiveActivity	0.93	0.053	17.411	***	0.674	0.454
USE8	<---	PassiveActivity	1.017	0.057	17.767	***	0.684	0.468
USE10	<---	PassiveActivity	1.2	0.057	21.118	***	0.817	0.668
SI1	<---	Communication	1				0.816	0.666
SI2	<---	Communication	0.888	0.036	24.383	***	0.816	0.665
SI3	<---	Communication	0.883	0.036	24.264	***	0.812	0.66
SI5	<---	InfoExchange	1.184	0.066	17.981	***	0.742	0.551
SI6	<---	InfoExchange	1				0.674	0.454
SI7	<---	InfoExchange	1.265	0.063	19.957	***	0.844	0.712
SI8	<---	InfoExchange	1.245	0.063	19.863	***	0.838	0.703
SI9	<---	SocialSupport	1.015	0.047	21.527	***	0.777	0.603
SI10	<---	SocialSupport	1				0.763	0.582

|								
SI11	<---	SocialSupport	0.984	0.044	22.205	***	0.799	0.638
SI12	<---	SocialSupport	1.028	0.044	23.25	***	0.834	0.696
A1	<---	HEA	0.905	0.034	26.28	***	0.813	0.661
A2	<---	HEA	0.906	0.035	25.807	***	0.803	0.645
A3	<---	HEA	1				0.848	0.719
A4	<---	HEA	0.8	0.037	21.678	***	0.709	0.503
KN1	<---	HEKnow	0.898	0.038	23.598	***	0.839	0.704
KN2	<---	HEKnow	0.91	0.04	22.69	***	0.806	0.649
KN3	<---	HEKnow	1				0.786	0.617
HEB1	<---	HEBeh	1.108	0.06	18.439	***	0.748	0.559
HEB2	<---	HEBeh	1.129	0.059	19.21	***	0.784	0.614
HEB3	<---	HEBeh	1.15	0.063	18.26	***	0.74	0.547
HEB4	<---	HEBeh	1				0.692	0.479
HEB5	<---	HEBeh	0.966	0.058	16.681	***	0.67	0.448
WP1	<---	WorkProduct	1				0.787	0.62
WP2	<---	WorkProduct	0.783	0.034	22.91	***	0.665	0.442
WP3	<---	WorkProduct	1.14	0.043	26.208	***	0.901	0.811
WP4	<---	WorkProduct	1.093	0.043	25.443	***	0.861	0.742
Active Activity	<---	FacebookUse	1				0.78	0.608
Passive Activity	<---	FacebookUse	1.114	0.078	14.313	***	0.904	0.818
Communication	<---	SoInteraction	1				0.871	0.759
InfoExchange	<---	SoInteraction	0.818	0.052	15.718	***	0.846	0.716
Social Support	<---	SoInteraction	0.865	0.051	16.975	***	0.82	0.672
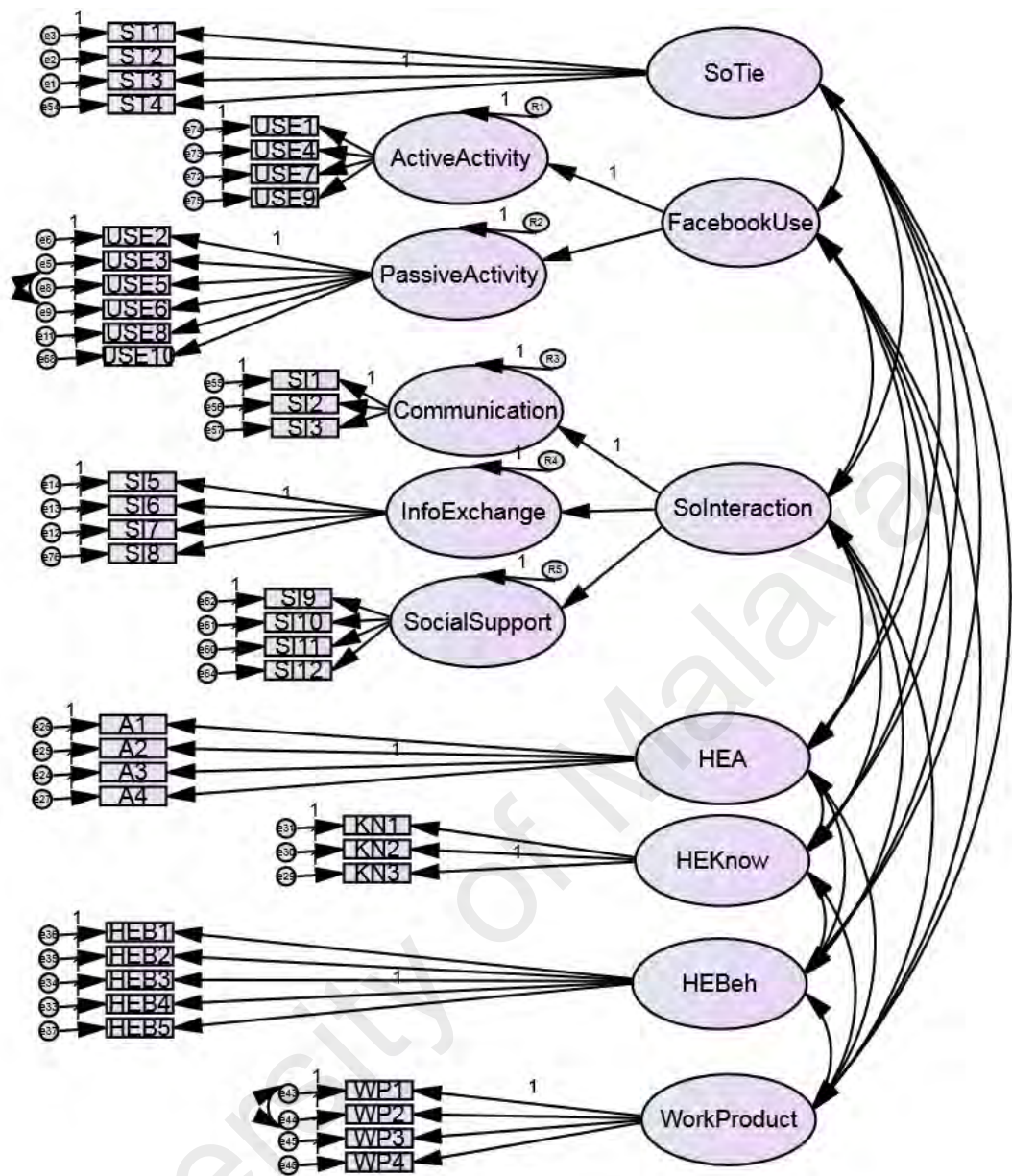
Figure 5.16: Second Order Measurement Model

5.8   ASSESSMENT OF STRUCTURAL MODEL

As presented in Table 5.47, the structural model showed reasonable model fit with CMIN/DF = 2.720, GFI = 0.874, AGFI = 0.858, NFI = 0.891, TLI = 0.923, CFI = 0.928, RMSEA = 0.048. Hoelter's critical N' for 0.5 and 0.1 level were above 200. The structural model is presented in Figure 5.17. Since the structural model has established the model fit, it was forwarded for testing of the hypothesized relationships.

Table 5.47: GOF Measures of Structural Model

Fit Indices	GOF
P-value	.000
CMIN/DF	2.720
GFI	.874
AGFI	.858
NFI	.891
TLI	.923
CFI	.928
PRATIO	.932
P Close	.931
RMSEA	.048
HOELTER 0.05	301
HOELTER 0.01	312
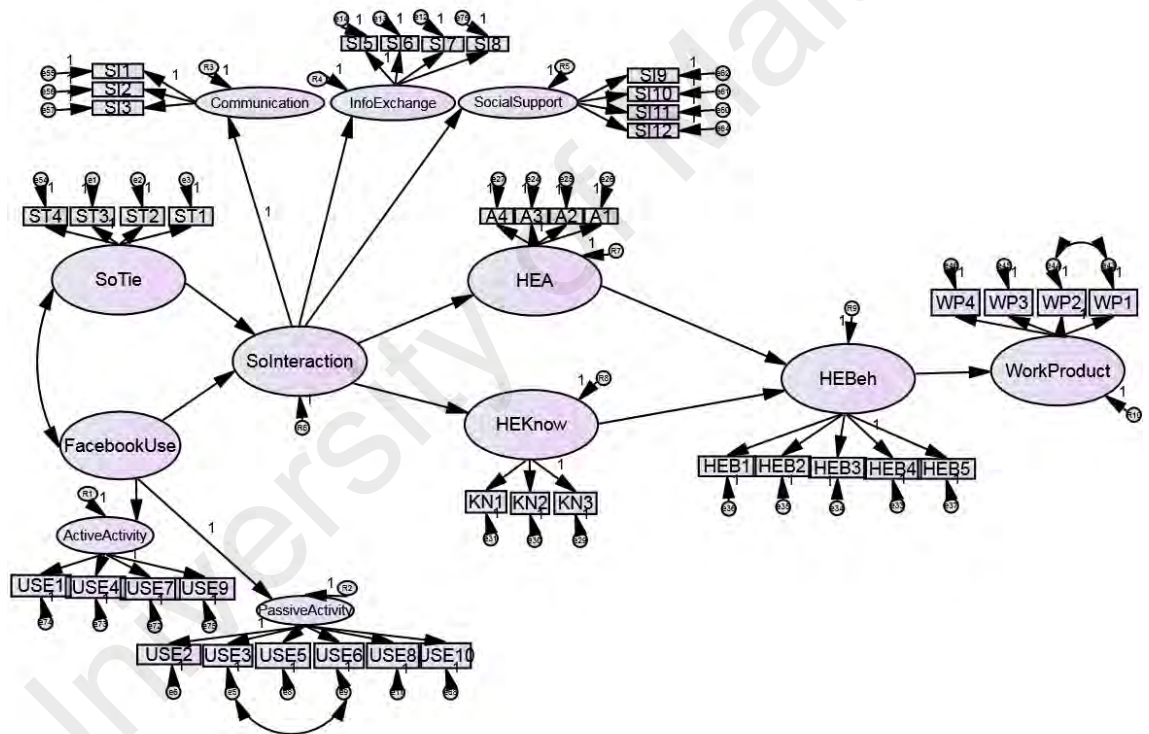
Figure 5.17: Structural Model

5.8.1 Hypotheses Testing

In total, there were seven hypotheses tested (H1, H2, H3, H4, H5, H6 and H7). As presented in Table 5.48, all structural paths are found to be statistically significant, indicating that all hypotheses are supported. The output in Figure 5.18 indicated that 22.3% of the work productivity could be estimated by healthy eating behaviour, healthy eating attitude, healthy eating knowledge, social interaction, Facebook use and social ties. 59.4% of the healthy eating behaviour could be measured by using healthy eating attitude, healthy eating knowledge, social interaction, Facebook use and social ties. Facebook use, social ties and social interaction can predict 70.7% of variance for healthy eating attitude and 63.2% of variance for healthy eating knowledge. The contribution of Facebook use and social ties in estimating social interaction is 62.0%.

Table 5.48: Hypotheses Testing Results

| Path	Hypotheses	β	P	S.E	C.R	Support
Social Ties – Social Interaction	H1	0.179	***	0.05	4.655	Yes
Facebook Use – Social Interaction	H2	0.699	***	0.08	11.711	Yes
Social Interaction – Healthy Eating Attitude	H3	0.841	***	0.049	18.621	Yes
Social Interaction – Healthy Eating Knowledge	H4	0.795	***	0.051	16.808	Yes
Healthy Eating Attitude – Healthy Eating Behaviour	H5	0.581	***	0.046	11.013	Yes
Healthy Eating Knowledge – Healthy Eating Behaviour	H6	0.249	***	0.042	5.192	Yes
Healthy Eating Behaviour – Work Productivity	H7	0.472	***	0.046	10.785	Yes
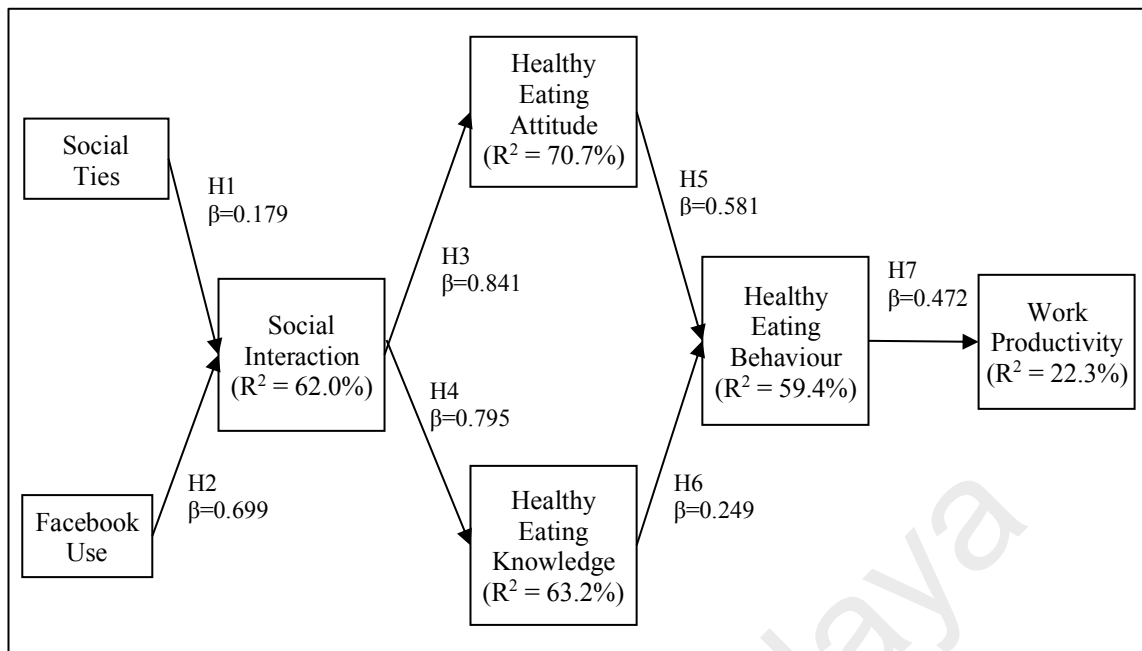
Figure 5 18: Path Model and R^2 Value

H1: Social tie has a positive influence on social interaction

The path that connects social tie and social interaction yielded a coefficient value of 0.179 which is significant at 0.001 alpha (SE=0.05; C.R=4.655). This implied that social tie is significantly correlated with social interaction. Thus, hypothesis H1 is supported.

H2: Facebook use has a positive influence on social interaction

The path coefficient value at 0.699 (significant at 0.001 alpha; SE=0.08; C.R=11.711) indicates that there is a positive relationship between Facebook use and social interaction. This implies that hypothesis H2 is supported.

H3: Social interaction has a positive effect on healthy eating attitude

Significant positive relationship is established between social interaction and healthy eating attitude by coefficient value of 0.841. This value was significant at 0.001 alpha (SE=0.049; C.R=18.621). Hence, hypothesis H3 is supported.

H4: Social interaction has a positive effect on healthy eating knowledge

The path coefficient that produced between social interaction and healthy eating knowledge was 0.795. This value was significant at 0.001 alpha (SE=0.051; C.R=16.808), confirming that hypothesis H4 is supported.

H5: Healthy eating attitude has a positive effect on healthy eating behaviour

The relationship between healthy eating attitude and healthy eating behaviour was found to be positive with a path coefficient value at 0.581. This value was also significant at 0.001 alpha (SE=0.046; C.R=11.013). Thus, hypothesis H5 is supported.

H6: Healthy eating knowledge has a positive effect on healthy eating behaviour

The path coefficient value of 0.249 between healthy eating knowledge and healthy eating behaviour was significant at 0.001 (SE=0.042; C.R=5.192). This means that healthy eating knowledge has significant positive relationship with healthy eating behaviour. Hence, hypothesis H6 is supported.

H7: Healthy eating behaviour has a positive effect on work productivity

The coefficient value for healthy eating behaviour to work productivity was 0.472 and this was significant at 0.001 alpha (SE=0.046; C.R=10.785). This indicated a positive relationship between healthy eating behaviour and work productivity, thus hypothesis H7 is supported.

Essentially, all hypotheses in this research are supported. Among the proposed relationships, social interaction to healthy eating attitude path was the strongest (β=0. 0.841), followed by social interaction to healthy eating knowledge path (β=0.795). The weakest relationship was found on the social tie to social interaction path (β=0.179). Table 5.49 presents the summary of the research questions, research objective and hypotheses.

Table 5.49: Summary of Research Questions, Research Objective and Hypotheses

Research Questions (RQ)	Research Objectives (RO)	Hypothesis (H)	Accepted ($\sqrt{}$) / Rejected (X)
RQ1: Do social tie and Facebook use influence the social interaction on Facebook?	RO1: To determine the effect of social tie on social interaction	H1	$\sqrt{}$
	RO2: To identify the effect of Facebook use on social interaction	H2	$\sqrt{}$
RQ2: Does social interaction influence Facebook users' healthy eating attitude and healthy eating knowledge?	RO3: To explore on the effect of social interaction on healthy eating attitude	H3	$\sqrt{}$
	RO4: To investigate the effect of social interaction on healthy eating knowledge	H4	$\sqrt{}$

RQ3: Do healthy eating attitude and healthy eating knowledge lead to healthy eating behaviour?	RO5: To examine the effect of healthy eating attitude on healthy eating behaviour	H5	√
	RO6: To determine the effect of healthy eating knowledge on healthy eating behaviour	H6	√
RQ4: What is the effect of healthy eating behaviour on work productivity?	RO7: To investigate the effect of healthy eating behaviour on work productivity	H7	√

CHAPTER SUMMARY

This chapter presents the data analysis process which include the data cleaning and preparation, descriptive statistics, exploratory factor analysis, reliability test, confirmatory factor analysis. The assessment of measurement model and the confirmation of the construct reliability and validity have put forward the model as structural model. The structural model consists of seven constructs namely social tie, Facebook use, social interaction, healthy eating attitude, healthy eating knowledge, healthy eating behaviour and work productivity. Finally, the hypothesised relationships between the variables were tested using structural equation modeling. The hypotheses test results confirmed that all seven hypotheses proposed in this research were supported.

CHAPTER 6

DISCUSSION OF RESULTS AND CONCLUSION

6.1 INTRODUCTION

This chapter discusses the research findings in detail. The first section details the respondents' profile, which includes the demographic, work and Facebook related profile. Section two discusses the seven constructs examined in this research. This is followed by discussions based on research questions, focusing on explaining the relationships between the constructs. Next, the contribution of this research is discussed relative to its theoretical, managerial and marketing implications. The limitation of the research is outlined, followed by the suggestion for future works. The chapter is concluded in the final section.

6.2 DISCUSSION BASED ON RESPODENT PROFILE

The respondents in this research were mainly female (73.2%) with more than half of them were from younger age group aged between 20-29 years old (55.4%). In terms of education level, nearly half of the respondents hold a Bachelor Degree (47.0%), forming the largest group. This is followed by 28.9% of them holding a diploma, 16.4% has secondary level education and 7.7% with postgraduate qualifications (Master/PhD). All of the respondents were from Malaysia, with the ethnicities being mostly Malay (41.1%), Chinese (37.6%) and Indian (19.1%). This could due to the sampling and distribution of the survey questionnaire method. As snowball sampling was adopted in this research, the respondents were encouraged to share the online survey link to their friends on Facebook. This means that the circle of friends among the respondents were mostly from Malaysia

and this is consistent with Backstrom (2011) who posited that social networks on Facebook are very locally clustered, with 84% of friend connections from the same country. Also, 40.5% of the responses were collected via paper survey distributed in Kuala Lumpur and Selangor, Malaysia. Therefore, the result of this research can be generalized to represent the population of Malaysia.

In terms of working experience, half of the respondents (57.9%) reported 5 years or less working experience. This is expected as majority of the respondents were from younger age group. The majority of the respondents work in the private sector (89.7%) of multiple industries with one third from healthcare, account/finance and education. In terms of their roles at work, 30.1% were administrative staff, 17.1% were support staff, 13.9% were trained professional and others are a mix of managerial staff, skilled laborer and consultant.

Similar as result from Statista (2017), mobile phone is the main platform to access Facebook for the majority of the respondents (89.7%). This indicated that the respondents fully utilized their smartphone for Facebook. Nearly half of the respondents spent 1 hour or less for active use Facebook (42.3%). This is consistent with the statistic reported by Mark Zuckerberg, the chief executive officer of Facebook, where the average person spent 50 minutes a day on Facebook (Stewart, 2016). Half of the respondents (55.2%) reported spending less than 15 minutes on Facebook for healthy eating purposes. According to Lampe et al. (2012), low Facebook information seeker spent average of 21.48 minutes per day for information seeking. This implies that half the respondents in this research do not deem Facebook as the platform for sourcing information related to healthy eating. It is interesting to note that 86.3% of the respondents reported to have more than 100 friends on Facebook, higher than Backstrom (2011), who reported that only 50% have over 100 friends.

6.3   DISCUSSION BASED ON CONTRUCTS

6.3.1   SOCIAL TIES

The descriptive statistic demonstrates that social ties is a first order construct that focus on the measurement on the relationship closeness, time spent in interacting and frequency of the communication. In line with the findings of Ellison et al. (2007) where Facebook is used to maintain contact with the persons they know personally, the respondents had the highest agreement on item ST3 "I personally know some of the people who actively use Facebook". This may imply that Facebook is used to supplement conventional communication method (e.g. face-to-face, telephone) to maintain relationships with the friends that they have known in person, as per Young (2011). Specifically, Facebook is used to keep in touch with friends who people might not see very often, those they lost contact with and those they intend to keep in touch with (Joinson, 2008).

The respondents expressed lower agreement on item ST2 (I spend a lot of time interacting with other people through Facebook) and item ST4 (I frequently communicate with people through Facebook), indicating that the respondents were not active in communicating and interacting with other via Facebook. This may be related to the degree of relationship the respondents share with their Facebook friends. As pointed out by Manago, Taylor and Greenfield (2012), individuals who are in close relationship communicate more frequently with one another on Facebook. The respondents might be loosely associated with others, which translates into lower frequency of communication and time spent for interaction on Facebook.

6.3.2 FACEBOOK USE

The variable Facebook use in this research represents the usage of Facebook features for healthy eating. The respondents indicated that they would frequently browse others' posts on healthy eating on Facebook and rarely upload photos about healthy eating on Facebook. While improving the model fit, modification indices suggested a positive error covariance to be added between item USE3 and USE6. Item USE3 and USE6 refer to browsing others' posts and walls for healthy eating information, implicating the act of casual looking or reading about healthy eating on Facebook, both are the act of obtaining information.

As presented in Chapter 2, the Facebook use has been conceptualised as active and passive activities (Bender et al., 2011; Burke et al., 2010; Burke & Kraut, 2014; Taylor & Strutton, 2016; Wise et al., 2010). Two dimensions measuring Facebook use namely Passive Activity and Active Activity were derived from EFA. Passive Activity includes the activity of using Facebook features such as share web links pertaining to healthy eating, browse and like others' posts on healthy eating, browse information pertaining to healthy eating on others' walls, read healthy eating related posts in the Facebook Groups and like Facebook pages of organizations related to healthy eating. This corresponds with Wise et al. (2010) who described the use of Facebook features such as liking a wall or post of a page, browsing on newsfeed as passive actions for information acquisition. Passive Activity is related to passive content consumption as conceptualized by Burke and Kraut (2014) where it is comprised of viewing and reading on the broadcasted content. On the other hand, Active Activity includes the activity of using Facebook features such as upload photos about healthy eating, comment on others' posts and information pertaining to healthy eating on others' walls, comment on healthy eating related posts in the Facebook Groups. This is similar to Taylor and Strutton (2016) who categorized Facebook use such as comment on page as an active activity. Active Activity is related to

content contribution which include the activities such as uploading photo, comment on wall (Bender et al., 2011; Burke et al., 2010). The findings confirmed that the respondents are more likely to engage with Passive Activity (ß=0.904) than Active Activity (ß=0.780). This may be due to the limitation of the respondents in providing information related to healthy eating and the fact that they choose to consume the information passively.

6.3.3 SOCIAL INTERACTION

During CFA, item SI4 was deleted to achieve good model fit. SI4 was related to frequently post own healthy eating practices on Facebook. This implies that the respondents in this research were less likely to share own healthy eating practice with others on Facebook.

The respondents had the highest agreement on item SI11 "I have access to other people who have current information about healthy eating practices on Facebook". This implies that the respondents perceived that they have access to informational support for healthy eating.

The findings of this research reveal that the nature of social interaction on Facebook involve communication, information exchange and social support. While social interact on Facebook, the respondents not only communicate about healthy eating with their peers, but also provide and obtain information and social support from them. This is in tandem with Vitak and Elllison (2013) and Zhang et al. (2013).

Statistics indicated that the respondents were more likely to engage for communication (ß=0.871) than information exchange (ß=0.846) and social support (ß=0.820). This signifies that the respondents hold on to the primary role of Facebook for communication

for healthy eating topic. The respondents would inform each other about how to live with healthy practices. When they communicate, they would encourage each other to buy healthy food and to practice healthy eating.

6.3.4 HEALTHY EATING ATTITUDE

In this research, healthy eating attitude is measured with a first order construct with four measurement items measuring the perceived attitude that the respondents have toward healthy eating with regards in the context of the use of Facebook for social interaction. Generally, the respondents indicated positive healthy eating attitudes following the use of Facebook. They had the highest agreement on item A4 "Following the use of Facebook, I know it is important for my daily diet to contain a lot of vitamins and minerals". This implies that the use of Facebook has imposed a certain degree of influence on their attitude pertaining to the importance of vitamins and minerals in their daily diet. This is consistent with several scholars suggesting the influential role of social media in healthy eating (McGloin & Eslami, 2014; Williams et al., 2014). On the other hand, the respondents expressed lowest agreement on item A2 "Following the use of Facebook, I confirm that my current diet is healthy". This implies that the respondents did not perceive their current diets are healthy enough. This contradicts the opinion of the people in the European Union, where they perceive their diets as healthy and believe that they do not need to make any changes (Kearney & McElhone, 1999; Kearney et al., 2001). A possible explanation for this difference could be due to the ability in correctly evaluating their own diets correctly and culture difference of Asian, the latter of which is more modest about their ability. The respondents in this study may have superior knowledge regarding on all the areas of healthy eating, which enables them to evaluate their respective diets.

6.3.5   HEALTHY EATING KNOWLEDGE

The descriptive statistic demonstrates that healthy eating knowledge is a first order construct that measured the perceived healthy eating knowledge following the use of Facebook for social interaction. Overall, the respondents tend to agree that they obtain healthy eating knowledge following the use of Facebook. Statement KN2 "Following the use of Facebook, I know a lot about how to evaluate the quality of healthy food" scored the highest mean value. This suggests that Facebook provides the respondents with opportunities to learn about specific knowledge to evaluate the nutritional quality of the food. This suggestion is upheld by Bissonnette-Maheux et al. (2015) who reported that social media represent a unique opportunity for improving knowledge translation in nutrition and healthy eating. As such, Facebook can be regarded as an important knowledge translation tool for healthy eating.

6.3.6   HEALTHY EATING BEHAVIOUR

Healthy eating behaviour is a first order construct that measured the perceived healthy eating habits that the respondents have in terms of the influence of the healthy eating attitude and knowledge following the use of Facebook for social interaction. Among the measurement items, item HEB4 "Following the use of Facebook, I consume only a moderate amount of sugar" scored the highest mean value. This implies that the respondents pay greater attention on sugar consumption as compared to other food component following the use of Facebook. This may be due to the concern on adverse health conditions such as heart disease, diabetes, cancer and several metabolic abnormalities, which have been linked to excessive consumption of sugars (Johnson et

al., 2009). Generally, the respondents expressed that they adhere to a healthy eating behaviour following the use of Facebook.

6.3.7   WORK PRODUCTIVITY

In this research, work productivity measured how individuals perceive their productivity and ability to perform task at work in terms of the influence of healthy eating. Generally, the respondents expressed that healthy eating behaviour has a positive impact on work productivity. This is in tandem with Lenneman et al. (2011) who highlighted that healthy eating is associated lower productivity impairment. Among the measurement items, item WP2 "Healthy eating helps me to concentrate on work tasks" scored the highest mean value. This is consistent with Martorell and Arroyave (1988) who have pointed out the importance of proper nutrition in optimizing work capacity and output. In addition to this, the respondents also expressed that they could enjoy their work better and relate better with their co-workers when they engage into healthy eating behaviour following the use of Facebook.

6.4   DISCUSSION BASED ON RESEARCH QUESTIONS

6.4.1   RESEARCH QUESTION 1

Do social ties and Facebook use influence the social interaction on Facebook?

Past research showed that Facebook is a platform for social interaction, particularly for communication and accessing social support and information resources (Vitak & Elllison, 2013). On Facebook, individuals capitalise on their connections with others to obtain

resources (Ellison et al., 2011; Vitak & Elllison, 2013; Vitak et al., 2011). The degress of connection among Facebook users influcence the social interaction on Facebook, especially for the purpose of information gathering and social suppport (Bakshy et al., 2012; Luarn et al., 2015; Rozzell et al., 2014; Wright et al., 2010; Zhang et al., 2010). Meanwhile, individuals use various Facebook features (e.g. message, wall posts, like, comment etc.) to interact, exchange information and social support with others on Facebook (Burke et al., 2010; Burke et al., 2011; Lee et al., 2014; Smock et al., 2011; Vitak & Elllison, 2013). The intensity of Facebook use (the use of Facebook features) seems to be positively related to social activities on Facebook (Lee et al., 2014; Smock et al., 2011; Vitak & Elllison, 2013). As such, this research examines if (H1) social ties have a positive influence on social interaction and (H2) Facebook use has a positive influence on social interaction.

As outlined in Chapter 5, social ties is significantly correlated with social interaction. The coefficient value (ß=0.179) confirmed that social ties have a positive influence on social interaction and this implies that Facebook users who maintain close social tie are more likely to engage in social interaction on Facebook. This is consistent with Luarn et al. (2015) who argued that strong ties are more committed to interact more frequently and engage in more emotional and instrumental exchange activities on Facebook. This finding also shares the sentiments with Kwakh and Park (2016) who expressed that the more social ties are developed between users, the more social interaction for knowledge-sharing activities will increase within social media environments. This is also congruous with Chu and Kim (2011)'s discovery, where it was posited that social ties is positively related to individuals' interaction on social media for seeking and passing information.

The relationship is significant between Facebook use and social interaction and the coefficient value (ß=0.699) confirmed that Facebook use has a positive influence on

social interaction. This implies that individuals who are more intense in Facebook use are more likely to engage in social interaction on Facebook. This finding is consistent with Lee et al. (2014) who found that Facebook features are distinctively used to manage bridging and bonding social capital where they posited that certain Facebook features use influence the social activities such as social support, information seeking. The findings also support the content analysis finding by Zhang et al. (2013) who concluded that the use of Facebook features such as post, comment and like reflect various social interaction activities such as information exchange and emotional support.

In sum, both social ties and Facebook use positively influence social interaction. Conclusively, the high beta recorded for Facebook use in this research provides the notion of a stronger influencial factor in social interaction compared to social tie. As explained by Haythornthwaite (2002), individuals with strong ties are highly motivated to share their information and resources. These information and resources exchanges are frequent and involve multiple types which include emotional and instrumental exchanges. When individuals maintain close and strong social tie on Facebook, they are more likely to engage in social interaction on Facebook. This imply that the individuals who spend more time interacting and maintaining close relationships with others on Facebook tend to interact more on Facebook to seek and share the information about healthy eating and to obtain emotional and informational support for healthy eating. This phenomena is expected because when individuals perceive their social ties as being strong with their peers on Facebook, they are more willing to communicate with their peers about healthy eating practices and share more information about healthy eating. Most importantly, they will be more at ease to seek and obtain social support pertaining to healthy eating when they feel close to others on Facebook.

On the other hand, when individuals are more engaged in Facebook use, they are more likely to engage in social interaction on Facebook. This implies that the extent of individuals interact with others for information exchange and social support on Facebook depend on the intensity of use of various Facebook features such as share, comment, like etc for healthy eating purposes. Typically, Facebook features are the tools that facilitate communications and interactions (Lee et al., 2014). Facebook features such 'comment', 'message', 'post' will enable the users to communicate with their peers and open the horizon of information sharing and social support positively, indicating that social interaction is actually in place. According to Vitak and Elllison (2013), the uniqueness of Facebook features allow individuals to social interact and engage in social support exchange activities. As highlighted by Burke et al. (2011), Facebook use can be categorized into 3 types of social activities namely directed communication, passive consumption and broadcasting. When individuals use the Facebook features such as message, wall post, like, incline comment, photo tagging, they are likely to engage in direct communication where they communicate about healthy eating with others, seek social support for healthy eating and also to maintain relationships via Facebook. Inversely, those who read others' update via News Feed tend to opt for passive consumption where healthy eating information are obtained passively. Individuals who broadcast by using status updates, photo shared, application stories and other items posted on own wall are likely to share information with other Facebook users.

6.4.2   RESEARCH QUESTION 2

Does social interaction influence Facebook users' healthy eating attitude and healthy eating knowledge?

Typically, Facebook provide a virtual platform for people to interact, seek and obtain information, learn from others' knowledge and experiences, thus socialization process is assumed to occur. Consumer socialisation theory suggests that socialisation process is a learning process where individuals develop related attitudes, knowledge and behaviour (Moschis & Churchill, 1978). Thus, it was anticipated that individuals learn from others and develop related attitude and knowledge via social interaction on Facebook. This research examines if (H3) social interaction has a positive effect on healthy eating attitude and (H4) social interaction has a positive effect on healthy eating knowledge.

Significant positive relationship was established between social interaction and healthy eating attitude by a coefficient value of 0.841. This confirmed that social interaction has a positive effect on healthy eating attitude. Individuals who are more engage in social interaction on Facebook are more likely to have more positive healthy eating attitude. This is in line with studies by Baghaei et al. (2011) and Li et al. (2016) who reported that positive effects were observed on health attitude following the engagement of social interaction on social media. This finding shares the same sentiments with Thornton et al. (2006) and McKinley (2009) who recognised social interaction as the influencing factor on eating attitude among the individuals who interact face to face.

Similarly, positive relationship was found between social interaction and healthy eating knowledge. The coefficient value of 0.795 confirmed that social interaction has a positive effect on healthy eating knowledge. This is consistent with Li et al. (2016) who found

significant improvement in knowledge when individuals interact on social media for information and social support.

In sum, social interaction has positive effects on both healthy eating attitude and healthy eating knowledge. This is inline with consumer sociliazation theory which suggests that social interaction is a learning process that lead to the development of related attitudes and knowledge. Through social interaction, individuals learn about healthy eating from the peers and resources available on Facebook. Typically, individuals can obtain information and learn about healthy eating when they communicate with their peers and via shared information. These will then help them to gain more knowledge pertaining to healthy eating. In addition, observation learning is anticipated to take place when individuals social interact on Facebook. This is because when communicating and obtaining social support from others on Facebook, individuals may observe and learn about their peers' attitude related to healthy eating, there is a possibility that they may emulate their peers' healthy eating attitude especially when it is perceived positively. As such, these findings confirm that individuals who are more engage in social interaction on Facebook are more likely to gain healthy eating knowledge and exhibit more positive healthy eating attitude.

6.4.3 RESEARCH QUESTION 3

Do healthy eating attitude and healthy eating knowledge lead to healthy eating behaviour?

Past nutrition studies have determined the link between attitude – behaviour and knowledge – behaviour with sound empirical evidence (e.g. Nasreddine et al., 2014; Pieniak et al, 2010; Shepherd & Stockley, 1985; Spronk et al. 2014; De Vriendt et al.,

2009; Wardle et al., 2000). Both healthy eating attitude and knowledge have been identified as the predictor for healthy eating behaviour (Variyam et al., 1998; Wardle, 1993). In this research, it was anticipated that following the use of Facebook for social interaction, the healthy eating attitude and knowledge have some degree of effect on individuals' healthy eating behaviour. Thus, this research examines if (H5) healthy eating attitude has a positive effect on healthy eating behaviour and (H6) healthy eating knowledge has a positive effect on healthy eating behaviour

The relationship between healthy eating attitude and healthy eating behaviour was found to be positive with path coefficient value at 0.581. This confirmed that healthy eating attitude has a positive effect on healthy eating behaviour. Thus, individuals who hold positive healthy eating attitude are more likely to engage in healthy eating behaviour. This finding is consistent with studies by Hearty et al. (2007) and Naughton et al. (2013) who concluded that healthy eating attitude is positively related to healthy eating behaviour. In their studies, they reported that individuals with positive healthy eating attitude were more engage into healthy eating behaviour by consuming greater amount of healthy food such as wholemeal bread, fruits, vegetables, fish and lower amount in less healthy food such as chips, sugar.

Also, healthy eating knowledge was found to have a significant positive relationship with healthy eating behaviour. The coefficient value (ß=0.249) confirmed that healthy eating knowledge has a positive effect on healthy eating behaviour. This implies that individuals who have higher level of healthy eating knowledge are more likely to engage in healthy eating behaviour. This is consistent with past nutrition research, most of which concluded that high level of dietary and nutiriton knowledge are linked to healthy eating behaviour such as higher intake in healthy food e.g. fruits, vegetables (Spronk et al., 2014; De Vriendt,et al., 2009; Wardle et al., 2000) and lower in fat and salt intake (Gambaro et al.,

2011; Kostanjevec et al., 2013; Kristal et al., 1990; Marakis et al., 2014; Mirsanjari et al, 2012; Wardle et al., 2000).

In sum, both healthy eating attitude and knowledge have positive effects on healthy eating behaviour. Individuals with postive healthy eating attitude and higher level of knowledge pertaining to healthy eating are more likely to engage in more effective healthy eating behaviour. Hence, they will adopt healthier eating habits by consuming more healthy food such fruits, vegetables and reduce the intake of less healthy food that are high in fat, sugar and salt. Correspondingly, it is noted that the lower beta perceived in this research for healthy eating knowledge as compared to healthy eating attitude signifies that the latter is a more stringent requirement to shape the healthy eating behaviour

6.4.4   RESEARCH QUESTION 4

What is the effect of healthy eating behaviour on work productivity?

Several researches have indicated that unhealthy eating behaviour is associated with work productivity loss (Cash et al., 2012; Kirkham et al., 2015; Robroek et al., 2011). It was explained by Cash et al. (2012) that the unhealthy eating behaviour may operate through Body Mass Index to affect the productivity. High Body Mass Index or obesity has been linked to chronic illnesses and absenteeism from work resulting in productivity loss (Haskell et al., 2007; Wolf & Colditz, 1998). On the note hand, unhealthy eating behaviour as contributor to nutrition deficiencies can lead to reduction in work capacity and output (Haas & Brownlie, 2001). Proper nutrition which is achieved by adopting healthy eating behaviour, is an important factor to increase individuals' cognitive skills, make them feel more energetic, and reduce the number of days lost to illness; all of which lead to increased work output and productivity (Martorell & Arroyave, 1988). In this

research, it was anticipated that healthy eating behaviour has some degree of effect on work productivity following the use of Facebook. Hence, this research examines if (H7) healthy eating behaviour has a positive effect on work productivity.

Significant positive relationship was established in this research between healthy eating behaviour and work productivity due to coefficient value of 0.472. This confirmed that healthy eating behaviour has a positive effect on work productivity. Individuals who are more engage in healthy eating behaviour are more likely to report better work productivity. This is consistent with study by Fitzgerald et al. (2016) who found that healthy eating behaviour is negatively associated with absenteeism, which is an indicator for work productivity. Healthy eating is required for good brain functionality and cognitive performance (Bourre, 2006; Small et al, 2006) which lead to increased work productivity. In conclusion, healthy eating behaviour is deemed relevant for individuals' health enhancement, which then lead to increased work productivity (Katcher et al., 2010).

6.5   CONTRIBUTION

6.5.1   THEORETICAL CONTRIBUTION

The findings of this research provide several theoretical contributions. Firstly, this research pioneers the understanding of the role of Facebook for health behaviour and work productivity. It is unique in its integration of two theories, namely social capital theory and consumer socialisation theory to construct a comprehensive theoretical framework that describes the determinants and influence of Facebook social interaction on individuals' healthy eating attitude, knowledge and behaviours, which lead to work productivity.

Secondly, this research has precariously extended its boundaries by expanding the application scope of social capital theory and consumer socialisation theory to an online setting, particularly in the case of social media. It is evident that social ties have positive influence on Facebook social interaction, thus verifying the presence of social capital accumulation on Facebook. Also, this research provides valuable evidence that confirm socialisation process take place on Facebook. From the perspective of consumer socialisation, this research verifies that individuals become socialised through social interaction on Facebook and learn about healthy eating attitude, knowledge that leads to healthy eating behaviour. As such, Facebook is regarded as meaningful social learning environment which bring positive influence on healthy eating behaviour. These findings provide an added implicative evidence of the influence of social environment on healthy eating behaviour from an online perspective. This adds knowledge to nutrition literature, where online social environment plays an influential role on healthy eating behaviour.

Thirdly, the results of this research augment literature on the consumer socialisation framework. In line with consumer socialisation theory, the findings of research indicated that both Facebook and peers on Facebook are socialization agents; individuals learn about healthy eating attitude, knowledge and behaviour via social interaction with their peers on Facebook and the exposure to information on Facebook. Also, both social ties and Facebook use are introduced as new antecedents to the existing consumer socialisation framework. The ties exist among the Facebook users, and the intensity of Facebook use influence the degree of social interaction on Facebook.

Fourthly, this research broadened workplace health management literature by providing an insight on what are needed to influence healthy eating behaviour at the workplace, which subsequently lead to work productivity. The significant relationship between healthy eating behaviour and work productivity lead to the conclusion that healthy eating

behaviour is essential to increase work productivity. Also, it is evident that Facebook can be a positive influence source for healthy eating behaviour and work productivity, which indicates that Facebook can be incorporated as part of the implementation strategy for workplace health promotion.

This research revealed that both Facebook use and social interaction are second order constructs. Facebook use was conceptualized as passive and active activity. Passive activity is related to passive actions for information acquisition and content consumption while active activity is related to content contribution. Both of these may have differences in influencing social interaction. It is also important to note that social interaction was found to have 3 dimensions namely communication, information exchange and social support. These signify that people use Facebook for different purposes during social interaction and Facebook was found to have primary role for communication during social interaction.

Typically, Facebook is not specifically designed for health related interaction nor explicitly target any particular community; nevertheless, this research confirmed the feasibility of Facebook for interaction related to healthy eating. Perhaps most importantly, this research is the first "factor study" that illustrates the social interaction process that take place on Facebook and provide empirical evidence of how social ties and Facebook use positively influence Facebook social interaction, which lead to healthy eating behaviour and work productivity. It is an integrative model which includes two determinants of social interaction (social ties and Facebook use), which were examined in isolation in previous research. This research also confirmed that Facebook use play a more prominent role in influencing social interaction.

6.5.2 MANAGERIAL CONTRIBUTION

Beside the theoretical contributions, this research resulted several managerial contributions. First, the findings of this research provide an imminent foundation for organisations in the formulation of strategies to enhance work productivity. Employers need to develop strategies and initiatives to improve employees' healthy eating behaviour for increased work productivity. It is important to share with the employees about the company's commitment for healthy eating and making an effort to create a culture of health eating at the workplace. Secondly, the employers should adopt workplace healthy eating promotion initiatives to encourage employees to adopt healthy eating behaviour. Among the strategies for workplace healthy eating promotion initiative, information and education strategy was found to be most effective in changing dietary behaviour (Jensen, 2011). Findings from this research indicated that Facebook provides opportunities for interactive communication to learn about healthy eating knowledge and attitude, which subsequently lead to healthy eating behaviour. As such, the employers can leverage on Facebook to promote healthy eating. Facebook can be used to as an effective tool and platform to reach and communicate with the employees about healthy eating. As suggested by Merchant et al. (2014), this can be done by creating an official company Facebook Page to connect with the employees. Once the page is created, the employees are invited to "like" the Facebook Page so that they can follow the post and information shared on the Page. The employers can then disseminate healthy eating information and communicate about healthy eating with their employees via posts on the Facebook Page. A variety of healthy eating information can be posted on the wall such as healthy eating guidelines, healthy food choices, healthy cooking method, healthy grocery shopping etc. The employees will automatically receive related posts in their News Feeds since they have "liked" the company Facebook Page, they can read and learn about healthy eating.

On the other note, workplace healthy eating promotion should also design of the strategy to promote and reinforce on healthy eating attitude instead of solely focusing on the provision of healthy eating information on Facebook. Findings from this research indicated that attitude is the stronger influence factor over healthy eating knowledge in leading to healthy eating behaviour. As highlighted by Wang et al. (2012), social interaction with peers acts as an informational influence, which allows individuals to learn and observe from the peer, ultimately affect their attitudes. When individuals social interact on Facebook, they learn about healthy eating attitudes from their peers and practice similar habits. The employers can create Facebook Group to facilitate their interactions. This open the opportunities for the employees to interact with one another by posting messages, photos, videos, link and by liking, commenting on others' posts regarding their eating habits and dietary choices. Healthcare professionals such as dietitian and nutritionist can be engaged as the administrator of the Facebook Group to periodically facilitate the discussion among the employees. Healthful topics such as healthy food sources, specific suggestion on how to cope with different eating situation such as eating out, at work, festive seasons etc., strategies on how to begin changing their current unhealthy eating habits, ideas to substitute the less healthy food, challenges towards achieving healthy eating can all be discussed in the group. The employees are encouraged to discuss and share about their food habits, diet plan and ideas to keep healthy eating on going.

In this research, it is clearly evident that Facebook use is the dominant determinant for social interaction. Individuals who are more intense in Facebook use are more likely to engage in social interaction on Facebook to obtain social suport, communicate and exchange information related to healthy eating. As such, Facebook use should be gauged as an important component in the strategy to increase employees' engagement to social

interact on Facebook for healthy eating. Firstly, the employers can encourage the Facebook use by providing guidelines and give ideas on how to utilize Facebook features for healthy eating purposes. In house training can be conducted to educate the employees on the usage of various Facebook features for social interaction. For example, Facebook application training can be conducted to educate the employees on how to browse company Facebook Page and use News Feeds to obtain healthy eating information, how to post and upload photo to share about their healthy eating plan and practices, how to use message and comment to interact and seek for others' opinion and advice on healthy eating. Secondly, the employers can leverage on the function of Facebook features to engage their employees. On Facebook, photos received more engagement than the average post such as "text" and "link". According to Kissmetric (2017), photos get 53% more likes, 104% more comments and 84% more click through. The employers should upload the healthy eating information with photographs or infographic to engage their employees on Facebook. Periodically, the employers should evaluate how they engage employees to the posts and uploaded photos on company's Facebook Page. This can be achieved by looking into the like, comment, page view, reach, visit and share content performed on the company's Facebook Page. Several steps can be taken by the employers to effectively engage and reach out to the employees. For instance, the employers can aim to upload post 1 to 2 times a day to get 40% more engagement and limiting the posts with 80 characters or less to get 66% more engagement (Kissmetric, 2017).

This research revealed that social ties positively affects social interaction on Facebook. Hence, measures to strengthen the social ties among the employees seems to be inevitable. According to Torro and Pirkkalainen (2017), the key to strengthening social ties among employees is the provision of access and management of the communication process in a virtual environment. Employers should allow employees access to company Facebook

Page and Group at certain time of the day at work to encourage them social interact with one another on the topic of healthy eating. The communication process can be more interesting by initiating various activities, such as live video on company Facebook Page Group for activities such as healthy grocery shopping with Dietitian, healthy cooking demo and game related to healthy eating. This help the employees create a virtual community to social interact on Facebook and strengthen social ties.

Finally, employers should also formulate worksite environmental and policy strategies that aim to create opportunities and remove barriers to facilitate healthy eating behaviour among the employees (Engbers et al., 2006). Supportive environment with accessible and affordable healthy food choices encourage individuals to engage in healthier behaviour (Sorensen, Linnan & Hunt, 2004). Worksite cafeterias are important point-of-choice settings for environmental change (Glanz & Mullis, 1988). The environment change initiatives shall include the increase of healthy food options and the provision of nutrition label at workplace cafeteria (Lowe et al., 2010); menu and food modification (Bandoni, Sarno, & Jaime, 2011; Geaney et al., 2016); fruit price discounts, the provision of healthy food at subsidized prices, strategic positioning of healthier alternatives and portion size control (Geaney et al., 2016). The company's Facebook Page can be used as a marketing tool to promote healthy food products at workplace cafeteria and communicate the information about the environment change initiatives with the employees.

6.6   LIMITATION OF THIS RESEARCH

Although the findings of this research are encouraging, it has several distinct limitations. First, the sample was drawn from working adults, of which nearly 99% were from Malaysia and half of the responses (55.4%) were obtained from working adults aged less

than 30 years who were mostly from private sector (89.7%) and mainly from healthcare, finance and education industry (~ 40%). As highlighted Brusse et al. (2014), the use of Facebook varied widely based on language, culture and demographic. The use of Facebook features, the way social ties are maintained, and the social interaction process could differ based on age and other demographic characteristics. The interaction and perception of healthy eating could also differ, especially in the context of people in the West (under the purview of western culture). Therefore, the findings of this research may not be generalizable to all working adults across all age group, sector and industry. The generalizability of the finding in this research to other countries are limited as almost all of the responses were from Malaysia.

Secondly, selection bias cannot be ruled out due to the sampling method used in this research. The snowball sampling technique, which was meant to increase reach to other Facebook users, could cause bias in sample selection. Since this research is related to healthy eating behaviour, there is a possibility that the survey link was likely shared among individuals inclined to healthy eating behaviour and thus, those are keen in and have interest in healthy eating took part in the research. The data may be skewed to a more favourable result.

Thirdly, this research used a cross sectional approach for data collection. In fact, Facebook social interaction and its influence on individuals' cognition and behaviour is an ongoing phenomenon. The measurement of the determinants (social ties and Facebook use) and the influence on individuals' cognition and behaviour were measured at a static point, this may lose the time richness of explanation and may be difficult to make causal inference. Different results are possible if another time frame was selected.

6.7   FUTURE DIRECTIONS OF THIS RESEARCH

The findings and limitations of this research seem to suggest several future directions. In order to apply the generalisability of the research framework to individuals from different cultures and nationalities, the research framework should be tested in other countries and cross cultural setting in future research.

Due to the fact that this research was conducted using cross sectional approach, the variables were assessed at a single point at one time, hence, definite conclusion could be difficult to draw in terms of the causality of relationships among variables. Future research can consider longitudinal study approach. The longitudinal study design provides the opportunity to obtain the information about time ordering which is needed to draw conclusion on the causes. For instance, a longitudinal study can illustrate how Facebook use and social interaction change over time. Alternatively, it could also employ mixed method design, which include both quantitative and qualitative approaches that allow for the triangulation of the data sources, and thus strengthen the findings.

Although this research provides new evidence that extended the understanding of the influence of Facebook social interaction on healthy behaviour and work productivity, more research avenues need to be explored. Future studies could investigate the various aspect of Facebook, which affect the social interaction on Facebook, such as motivation in using Facebook and its features, perceived usefulness and ease of use for different features of Facebook. This will provide a better understanding on how different determinants affect social interaction on Facebook.

In this research, it is presumed that via social interaction, individuals learn about healthy eating via communication and information exchange; which will then lead to the formation of attitude and acquisition of knowledge of healthy eating. However, it is

important to note that these will depend on how much trust the Facebook users have on their peers and the information provided. Past research indicated that trust is associated with interaction and sharing behaviour (Chiu, Hsu & Wang, 2006; Naphapiet & Ghoshal, 1998; Wang et al., 2016). It will be interesting to investigate how different levels of trust affect the formation of healthy eating attitude and knowledge from the learning through social interaction. Future research could in theory address to provide a better understanding on the influence of Facebook social interaction on healthy eating attitude, knowledge and behaviour.

6.8   CONCLUSIONS

In order to maintain a competitive advantage edge, improving health behaviour and productivity has become a critical focus for business survival in global marketplace. Employers are striving to cultivate healthy eating behaviour and improve their employees' health in order to increase work productivity. Some of these initiatives include Facebook being perceived to be relevant for health eating promotion.

This research furnished insights on the influential role of Facebook's social interaction on healthy eating behaviour and its impact on work productivity. Social interaction on Facebook plays a significant role in improving healthy eating knowledge and inculcating positive healthy eating attitude, which in turn affect healthy eating behaviour and work productivity. Both Facebook use and social ties are determined as the determinants of the social interaction on Facebook. These insights will help scholars, policy makers and players in the health management industry.

This research resulted in several important contributions. First, it contributes theoretically by establishing a comprehensive theoretical framework that describes the determinants

and influence of Facebook social interaction on individuals' healthy eating attitude, knowledge and behaviours leading to increased work productivity. Second, this research verifies the applicability of social capital theory and consumer socialisation theory in an online setting, particularly in the context of social media and health behaviour. Facebook is regarded as meaningful social learning environment, which result in a positive influence on healthy eating behaviour. Also, social ties and Facebook use are introduced as new antecedents to existing consumer socialisation framework. These have contributed to the information technology, social and behavioural science research.

In term of managerial implications, this research provides important insights on the formulation of strategies for workplace health management. Employers can benefit from the outcome of this research when planning workplace healthy eating promotion initiatives to encourage their employees to engage in healthy eating behaviour. In addition, the marketing implications opens up many business opportunities to various stakeholders such as healthcare professionals, providers and agencies. Facebook can be used as a tool to deliver healthy eating programmes, while also benefiting marketing and promotion.

Research on Facebook as a potential tool for improving health and work productivity is in its infancy and require much work. Nevertheless, this research supports the notion that Facebook has indeed a great potential as a mean for organization to reach to their employees for the cultivation of healthy eating behaviour to increasing work productivity. This research is noteworthy in its contribution to advancing the discipline of health behaviour and productivity management with application of social media.

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