A Behavioural Economics Approach to Assessing Formation of Financial Literacy: A Conceptual Framework

Yong Chen Chen

Faculty of Economics and Administration, UM STEM Centre, Universiti Malaya

Email: ccyong@um.edu.my

Muhammad Aizat bin Zainal Alam

Faculty of Economics and Administration, Universiti Malaya

Received Date: 30 April 2021

Accepted Date: 13 July 2021

Available Online: 30 September 2021

ABSTRACT

The importance of a financially secure population in a nation has been emphasised worldwide numerous times regardless of the economic conditions of individual countries. Financially literate individuals have proven to be much empowered, independent, and demonstrated higher financial wellbeing. While the importance is obvious, scholars have wide-ranging views in defining and conceptualising financial literacy, which made empirical studies surrounding financial literacy generating contradicting results. Building on the Theory of Planned Behaviour, the current paper proposes a conceptual model to fulfil the paucity of a sound model to understand how financial literacy is formed in an individual. Deriving insights from previous studies, the proposed conceptual model perceives financial literacy as a process consisting of knowledge dimension and application dimension. Two paths were proposed considering the direct and indirect relationships between financial knowledge and financial behaviour, i.e., through attitude and personality of an individual. Standing as an applied behavioural model anchoring on the Theory of Planned Behaviour, the proposed conceptual model explains how financial literacy is formed within an individual. Future researchers are invited to use the conceptual model by adding context-specific variables since the proposed model only provides a general view on the phenomena supporting the argument that decisions are primarily made at an individual level where individual choices and circumstances influence decisions.

Keywords: *Financial attitude, Financial behaviour, Financial knowledge, Financial literacy, Personality*

INTRODUCTION

Regardless of the disagreements and differences between scholars on definitions and conceptualisations of financial literacy, most would agree on the importance of financial literacy (Potrich, Vieira, & Mendes-Da-Silva, 2016; Lusardi, 2019) on a country's economic wellbeing. The importance of financial literacy is more pronounced as people are living longer and are tasked to make more financial decisions (Lusardi, 2019). Economic inequalities between groups can be minimised if each citizen is provided with sufficient financial knowledge (Loke, 2015). This is as it was found that a higher level of financial literacy leads to higher wealth accumulation, which leads to effective savings where individuals also benefit from the stock market investment risk premium (Agarwal et al., 2010; Kim & Yuh, 2018).

Jappelli and Padula (2013) posit that over a life cycle, a person's wealth increases with his financial literacy level. Studies revealed that financially strong individuals possess strong financial knowledge (Loke, 2015; Kim & Yuh, 2018) and conversely, financially knowledgeable individuals are strong in terms of their financial standing (Kim & Yuh, 2018). In this regard, it is also implied that financially weak individual may lack financial knowledge. However, financially stable individuals cannot be excluded when emphasising the need for financial literacy. For example, Loke (2015) stated that the government pension scheme provided to government employees would not outweigh the need for such employees to possess strong financial knowledge as they remain vulnerable to future economic and financial shocks. In essence, sophisticated financial knowledge serves as a means for the empowerment of individuals in managing their finance (Loke, 2015).

Studies have proven that regardless of financial knowledge level, individuals experience financial constraints (Loke, 2015). Additionally, Lusardi and Mitchell in 2011 showed that responsible financial behaviour among individuals does not necessarily come from an increase of financial knowledge stemming from higher education. Similarly, Bir (2016) found that possessing financial knowledge is insignificant in predicting the financial practices for entry-level employees. Consequently, financial literacy studies are called to extend their spectrum towards a behavioural aspect to investigate further how financial knowledge finally transforms into financial literacy and what paths lead to financial literacy (Shefrin, 2021).

Huston (2010) put forward an argument that financial literacy must be measured using a standard approach to identify barriers to financial wellbeing and thereby used to guide an individual towards the effective financial choice. Further, Huston (2010) emphasised the need for comprehensive models to measure financial literacy as existing measures do not include personal finance components. By 2016, Potrich et al. emphasised that one measure alone is insufficient to measure financial literacy after evaluating alternative models for financial literacy. Financial knowledge, attitude and behaviour are found to be necessary for such a measure while further highlighting the challenge of formulating a model that encapsulates multiple components that make up financial literacy (Rai, Dua & Yadav, 2019). Moreover, the study discussed the possibility of adapting or formulating a new model from existing models with a special emphasis on the major impact of financial attitude on financial behaviour (Potrich et al., 2016).

Financial literacy studies have skewed and limited econometric analysis, which signals researchers to fill the paucity of behavioural studies to enhance the understanding of the topic more inclusively. This is consistent with Shefrin (2021) which called for a widened approach to measure financial literacy levels from a behavioural perspective. The theory of planned behaviour (I. Ajzen, 1985) best qualifies for behavioural economics studies as it aims to predict and understand human behaviour with an emphasis on an individual's intention. From the literature review, financial literacy models should include a behavioural approach to better fill the gaps on the topic. Serving such a need, the current paper proposes a conceptual model by incorporating the financial knowledge, attitude, behaviour, and personality of an individual, making it a comprehensive model to understand how financial literacy is created within an individual. The proposed model in this paper was motivated by the conceptualisation and emphasis given by Huston (2010) and the conceptualisation by Bir (2016) while anchoring on the theory of planned behaviour (I. Ajzen, 1985).

REVIEW ON EXISTING LITERATURE

In the past, the term "financial literacy", "financial knowledge" together, with "financial education" were considered to share the same meaning (Huston, 2010; Goyal & Kumar, 2020). For example, Fernandes et al. (2014) used both terms interchangeably. Huston (2010) was one of the first to suggest that the two terms are unique and distinct concepts that should not be used as synonyms. Meanwhile, the term “financial capability” and “financial literacy” were also used as synonyms while arguments on the importance of each concept over the other are ongoing. As Lusardi (2012) stated, financial literacy instead of financial capability should be analysed from an individual level and thus, should focus on the inputs that model individual behaviour. While some scholars who favour financial capability was criticised for suggesting an over-arching behavioural guideline applicable to all circumstances, some scholars favour financial literacy. These scholars acknowledge that individuals are singular units and, as such, should be considered as separate unique cases, each where they remain responsible for their personal decisions (Dibb et al, 2021). In summary, scholars who highlight the importance of financial literacy should emphasise the need for empowerment of individuals rather than for one overarching guideline for every individual regardless of circumstances.

Financial Knowledge and/or Financial Literacy?

The definitions of financial literacy have varied across a wide spectrum, from merely defining it as knowledge on finances all the way to complex financial decision-making processes (Huston, 2010; Goyal & Kumar, 2020). Further, the analysis concludes that financial literacy and knowledge are equal, alarming future researchers to see the threat of using those two terms interchangeably if these two terms are of different constructs (Huston, 2010; Goyal & Kumar, 2020). In addition to the drastic differences in financial literacy measurements, most studies do not explicitly measure whether an individual is adequately financially literate, as thresholds for these measurements were not identified (Huston, 2010).

Huston (2010) suggested that financial literacy can be categorised into two dimensions where ‘understanding’ forms the financial knowledge element, and ‘use’ forms the application of such knowledge element. In this regard, the knowledge that extends to making financial decisions reflects the overall meaning of financial literacy. In other words, for a person to be called financially literate, the person must have the confidence and ability to use such knowledge (Huston, 2010). Further, financial literacy is also defined as the summation of financial awareness, financial capability, and financial knowledge, where a financially literate is a person who can read, analyse, manage, and communicate financial conditions that affect material wellbeing (Jeyaram and Mustapha, 2015; Rai, Dua & Yadav, 2019). Therefore, financial awareness is a measure of a person’s amount of information he or she holds, while financial knowledge is the ability to put into practice that information. Finally, financial capability is a measure of how financially sound the person currently is (Rai, Dua & Yadav, 2019).

Lusardi and Mitchell (2014) and Lusardi (2019) echoed that an individual is financially literate if he/she has the decision-making ability on personal financial matters. Further, Lusardi (2012) stated that an individual's behaviour always depends on the person’s preferences and economic circumstances, making the definition of good financial behaviour unclear and inconclusive. Therefore, in attempting to comprehend, “understanding” is transformed to “use” (application); it is pertinent to view financial literacy as a process of converting knowledge to the ability which is fulfilled in the proposed conceptual model.

Table 1 Definitions of Financial Literacy

No	Source	Definition	Category
1	(Bowen, 2002, p. 93)	"….financial knowledge is defined as understanding key financial terms and concepts needed to function daily in American society."	Knowledge
2	(Beal & Delpachitra, 2003, p. 1)	"…the ability to make informed judgments and to take effective decisions regarding the use and management of money."	Ability
3	(Mandell, 2008, pp. 163-164)	"…the ability to evaluate the new and complex financial instruments and make informed judgments in both choice of instruments and extent use that would be in their own best long-run interests."	Decision-making, ability, well-being
4	(Lusardi & Mitchell, 2007, p. 36)	"(Familiarity) with "the most basic economic concepts needed to make sensible saving and investment decisions".	Decision-making
5	(Lusardi, 2008a, p. 2; 2008b)	"Knowledge of basic financial concepts, such as the working of interest compounding, the difference between nominal and real values, and the basics of risk diversification"	Knowledge
6	(Servon & Kaestner, 2008, p. 273)	"…refers to a person's ability to understand and make use of financial concepts."	Ability, application
7	(Organization for Economic Cooperation and Development and the International Network on Financial Education, 2017, p.47)	". . . [a] combination of awareness, knowledge, skill, attitude and behaviour necessary to make sound financial decisions and ultimately achieve individual financial wellbeing."	Decision-making, ability, knowledge, wellbeing

To the best of the author's knowledge, scholars have yet to reach a consensus on the definition of financial literacy. The incompatibility and inconsistency of definitions have always been discussed in many empirical studies (Goyal & Kumar, 2020). In most empirical studies, financial literacy refers to an individual's ability and knowledge in terms of personal money management. The conceptual definitions have always been around having the knowledge, skills, and confidence to make responsible financial decisions. The idea of incorporating money management skills as part of general knowledge literacy has started as early as the 1900s and later evolved with the inclusion of consumer education in the United States (Remund, 2010). Since then, many empirical studies were carried out to test financial literacy, and the findings from the empirical tests showed low financial literacy levels across different countries. Across multiple studies, financial literacy was associated with knowledge, application of knowledge, ability, decision making skill, behaviour, wellbeing, and experience (Goyal & Kumar, 2020). Table 1 summarises different conceptual definitions of financial literacy from several studies.

Most of the definitions emphasise ability and knowledge, while Lusardi and Mitchell (2007); Mandell (2008) relate it to decision-making skill as a form of human capital investment towards financial security and wellbeing. Servon and Kaestner (2008) extended their definition to both knowledge and application. Separately, Remund (2010, p. 290) concluded that the operational definition of financial literacy should include "budgeting, saving, borrowing and investing." However, in many studies, researchers conceptually define financial literacy with either financial knowledge or financial behaviour without consistency (Huston, 2010; Goyal & Kumar, 2020). As a single construct, Fernandes et al. (2014) identified financial literacy in terms of knowledge on personal finance concepts such as debt, savings and investments. Better financial knowledge would result in better financial decision making. Echoing Huston (2010) on the composition of financial literacy, notably the two main dimensions of financial literacy should be the knowledge dimension and the application dimension, which was conceptualised as a process of input, throughput and output in the proposed conceptual model.

There are only a few studies which incorporate behavioural aspect into financial literacy and capability studies. One such study was by Serido, Shim, and Tang (2013), where financial behaviour was conceptualised as a developmental process based on theories relating to individual behaviour. The current paper perceives financial literacy as a process that includes knowledge, attitude, behaviour, and the influence of an individual's personality. This is due to the general understanding that literacy varies among individuals and attitude matters on individual-level actual decision-making processes.

Role of Financial Education in Financial Literacy Studies

Financial education has been defined as an ability development process to facilitate the individual in making the right decisions which will lead to successful management of personal finance (Rai, Dua & Yadav, 2019). Meanwhile, financial literacy is defined as how such knowledge and abilities are used. Other findings noted that most individuals depend on their own experience as their education on finance (Hilgert, Hogarth, & Beverly, 2003).

Undoubtedly, financial education can be identified as a major factor that contributes to one's financial knowledge (Lusardi, 2019). However, contradicting evidence was found relating to the relationship between financial education on financial knowledge. It was also demonstrated that financial education almost had no effect on their high school students' financial knowledge. This finding is supported by another finding by Mandell and Klein (2009); Peng, Bartholomae, Fox, and Cravener (2007). The opposite was proven by Go et al. (2012), where it was found that financial education helped to increase good financial attitude and behaviour among respondents.

However, Lusardi (2012) suggested that apart from the financial education and the knowledge level of an individual, the personal preferences and economic circumstances of individuals have a greater influence on financial decisions and behaviours. Therefore, it is important to study financial literacy from a behavioural aspect (Shefrin, 2021) which is the sole purpose of the proposed conceptual model. Financial education is therefore identified as the main sources of financial knowledge in the proposed conceptual model.

Evaluation on existing financial literacy models

Among criticisms on financial literacy was due to their inconsistencies in conceptualisation, measures of the concepts and the dimensions used for such measurements (Ex: Huston 2010). Nevertheless, it was confirmed that individual saving and consumption optimisation are correlated with interest rates and risk (Attanasio & Weber, 2010; Browning & Lusardi, 1996; Skinner, 2007). Moreover, some other researchers link this optimisation to the economic environment where such decisions are made and the social safety nets available to the decision-maker (De Nardi, French, & Jones, 2010; E. French, 2005; K. R. French, 2008). This comes as the fact that many empirical studies based on Modigliani's Life-cycle model of Saving and Friedman's Permanent Income Hypothesis.

Jappelli and Padula (2013) hypothesised that a person would acquire more wealth over a life cycle period along with his financial literacy level. The model by Willis (2008) put forward an argument that an individual's decision to acquire financial knowledge depends on the returns of such investments and the costs associated with such investments. However, Willis (2008, p. 8) did not incorporate other important factors which have been later considered by Lusardi and Mitchell (2014), such as "borrowing constraints, mortality risk, demographic factors, stock market returns and earnings and health shocks."

Using the multi-period dynamic life cycle model, Lusardi, Michaud, and Mitchell (2013); Lusardi and Mitchell (2011) provided a benchmark model that mitigates the weaknesses of earlier models. Then, based on what they described as the principles of "simplicity, relevance, brevity and capacity to differentiate" (Lusardi & Mitchell, 2014, p. 10), they designed three financial literacy questions (also known as the "Big Three") that measure a person's comprehension of interest rates, the concept of inflation and the concept of risk diversification. Their study laid a milestone in the literature on financial literacy. Following this development, many researchers applied the three basic concepts by Lusardi and Mitchell (2011) to measure financial literacy and found similar trends across the globe.

Limitations of existing financial literacy models

As Huston (2010) emphasised, most of the studies and the models do not finally measure whether the respondents are financially literate or not, as thresholds were not identified. There are obvious challenges due to the many definitions of financial literacy. On top of the complexities of the concept of literacy, researchers face a difficult time if they were to measure a non-uniformity concept due to less consensus on the definitions and inconsistencies of the models used. This comes as most studies did not acknowledge the issue that financial knowledge needs to be distinguished from financial literacy (Robb, 2011). In other words, the concept of numeracy in financial application in most of the studies is often unclearly distinguished from that of general cognitive skills (Huston, 2010).

Another challenge confronting most of the previous conceptual models is in linking financial knowledge, behaviour to an individual's ability to make use of such knowledge on a personal level. Therefore, researchers need to find a consistent measurement that can test an individual's financial literacy in terms of what forms their financial knowledge, what decides their financial behaviour and what factors influence the ability to apply financial knowledge on personal financial management. Besides, in relation to “actual” and “perceived” knowledge matter put forward by Lusardi and Mitchell (2007), it was found by Hung, Parker, and Yoong (2009) that an individual’s self-confidence in personal financial knowledge will affect his or her financial behaviour and ability which are found to be uncorrelated to actual knowledge. This made a difference between actual and perceived knowledge.

Some researchers focused more on the behavioural aspects of an individual’s financial decision making. As per Hung et al. (2009), the ability to make the right decision and how decisions are made are important in the study of financial literacy. Such thoughts opened new aspects in the field of financial literacy research, which leads to more relevant explanatory variables. Nevertheless, studies on financial literacy from a behavioural aspect remain limited as previous models did not incorporate the issue of how financial literacy is created within an individual. Instead of considering numerous factors that affect the creation of financial literacy within an individual, it is important to study how knowledge on financial matters finally result in the creation of financial literacy within an individual, which will be served in the proposed conceptual model (Shefrin, 2021).

DEVELOPMENT OF A FINANCIAL LITERACY MODEL

Even though financial literacy, education and knowledge are used as synonyms, these terms reflect different concepts (Potrich et al., 2016). Many researchers agree on the need to consider financial literacy in a broader manner by incorporating these misinterpreted concepts. To the best of the author’s knowledge, it was found that financial literacy has yet to be studied from a perspective of a process that can be developed. Serving such a need in the field of financial literacy research, the proposed model incorporates financial knowledge, attitude, behaviour and personality, where the model proposed two alternative paths towards the creation of financial literacy in an individual.

Conflicting empirical results allows studies to further examine whether knowledge is the driver or inhibitor of financial literacy, how such knowledge is converted to ability, and what roles are played by attitude, behaviour, and personality in such a process. In essence, the issues remain relevant and ripe for further exploration. Anchoring on the theory of planned behaviour and conceptualising financial literacy in a broader manner, as depicted in figure 01, the proposed conceptual model suggests two alternative paths towards the creation of financial literacy in an individual. As such, it is a process that consists of two dimensions. In the diagram below, box 1 represents the dimension of knowledge while box 2 represent the dimension of application.

The Theory of Planned Behaviour

Based on previous literature which stressed the importance of studying financial literacy with a behavioural approach to broaden the understanding of the topic and the importance of incorporating knowledge, attitude and behaviour into a single model, the conceptual model proposes a process that perceives financial literacy with two different dimensions which reflect knowing and using of knowledge. By understanding the need of studying financial literacy with the central focus on the input that shapes the behaviour, as discussed by Lusardi (2012), it was concluded that the theory of planned behaviour could best underpin the proposed model.

From its inception, the theory of planned behaviour has been used by several scholars across different disciplines (Ajzen, Fishbein, & Fishbein, 1980) and in consumer behaviour related studies on mortgage, credit counselling and investment decisions (Xiao, 2008).

According to the theory, a person's behavioural intention is driven by attitude, subjective norm and perceived control, where an individual's actual behavioural choices are driven by attitude on the forthcoming behaviour. Moreover, the evaluation of such behaviour is backed by the person's perception of the outcome of such behaviour. In other terms, a person will act upon examining the outcome of behaviour, and this introspection determines his/her behavioural attitude.

By understanding the basics of the theory and its applicability on the creation of financial literacy, it is understood that certain financial behaviour can only be acted upon the assessment of the value of such behaviour as being perceived as positive, which can be captured from his or her attitude towards that behaviour and the individual's personality. Regardless of the level of financial knowledge, an individual's attitude and personality remain important in determining behaviour. This leads to the reason behind the proposed model's identification of two alternative paths to financial literacy. Financial education that forms financial knowledge is sieved through attitude and through the moderating effect of personality as it is a general understanding that the type of personality determines an individual's behaviour.

Financial Literacy, Financial Knowledge and Financial Attitude

Loke (2015) found that lack of financial knowledge resulted in individuals' loss of enthusiasm to be actively involved in personal financial management. Financial concepts including inflation, simple interest rates, compounded interest rates, and risk diversification are basic and necessary in measuring financial knowledge. The awareness of the availability of financial products and services and familiarity with the type of payment modes and opening a bank account, for example, can also be considered measures of the level of financial knowledge. As per Loke (2015), the level of education, type of profession and availability of government pensions scheme have significantly impacted the financial knowledge level of working adults.

Serido et al. (2013) propose that the change in financial knowledge triggers the change in financial self-belief and subsequently changes behaviour, whereas the current paper proposes that there are two alternative paths for financial knowledge to financial behaviour. Based on Bir (2016); (Huston, 2010), the proposed model depicted in figure 1 has conceptualised financial literacy that consists of input, throughput and output. In the proposed model, the knowledge dimension aims to shed insights into how knowledge is being created, whereas the application dimension seeks to understand how such knowledge finally generates literacy. It is proposed that an individual's financial knowledge, which was created from financial education, will have two paths towards transforming the knowledge to acceptable financial behaviour. The first path is through the attitude because of improved financial knowledge and the second path is from the knowledge to behaviour which is moderated by personality. In other words, the second proposed path is more of a direct path where the increased knowledge results in a change in the behaviour as it is assumed that higher knowledge on financial matters stimulates good financial behaviour but subject to the influence of an individual's personality. Then it is proposed that the accepted behaviour will create financial literacy on an individual level. Both proposed paths consider the most influencing intervening variables from knowledge to behaviour, given the emphasis by the theory of planned behaviour on intention. Since actual actions vary depending on the attitude of individuals, the first path considers attitude a mediator, and the second path considers personality as a moderating variable.

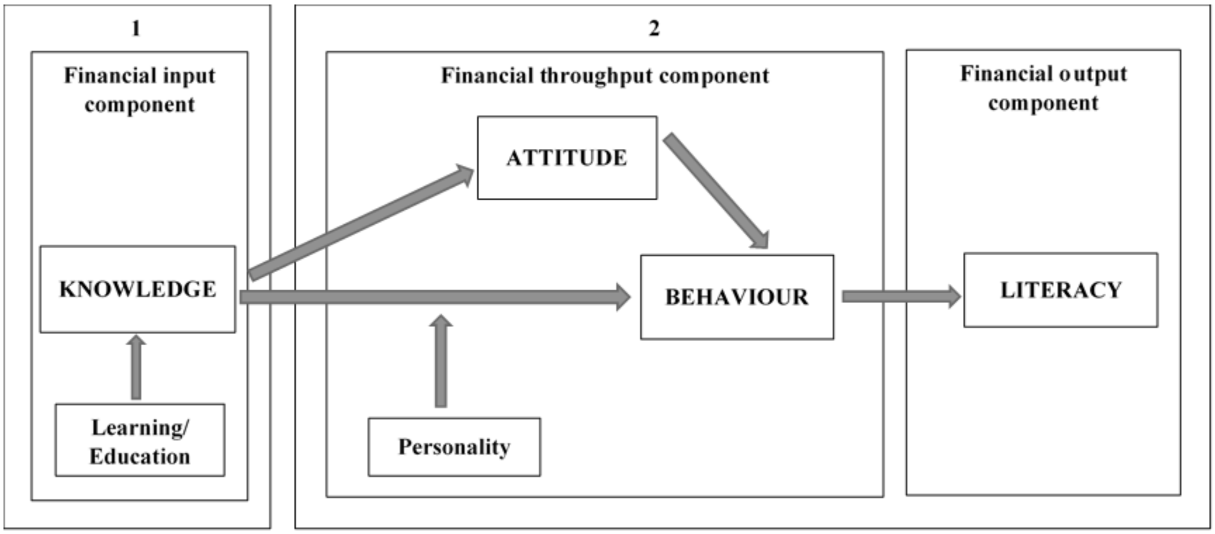

Fig 1 Proposed Financial Literacy Model

Path one: Financial Knowledge to Attitude to Behaviour to Literacy

Only a few studies in financial literacy literature considered the relationship of behaviour and practices as affected by attitude. In a study by Bir (2016), it was found that entry-level employees managed their finances better largely due to a positive financial attitude. Serido et al. (2013) suggested that internalised financial knowledge is reflected in behaviour. Such internalisation can be captured and better explained if a conceptual model consists of the financial attitude of an individual. As per Eagly and Chaiken (1993), an attitude refers to the assessment of the pros and cons of an investment decision. As per Loke (2015), financial attitudes and intrinsic behaviour also matter in financial literacy.

The proposition in the proposed model is as; when an individual's knowledge on financial matters increases, it is expected to develop their empowerment on finance through a positive change in the financial attitude of an individual. This finally results in a demonstration of accepted financial behaviour. The proposition is based on the previous research findings on the relationship between financial knowledge and attitude.

Serido et al. (2013) considered perceived behaviour control, financial self-efficacy, and financial attitudes as factors of financial self-belief and found that subjective financial knowledge was significantly associated with financial attitude than the other two factors in financial self-belief. This made the proposed model considers financial attitude as one construct. Such selection will assist future studies to closely monitor how increased knowledge creates a change in attitude and thereafter on behaviour without the attention getting diverted to less significant factors.

Rai, Dua & Yadav, (2019); Agarwalla, Barua, Jacob, and Varma (2015); Atkinson and Messy (2012); Potrich et al. (2016); Shockey (2002) considered knowledge, attitude and behaviour as components in their financial literacy studies. Borden, Lee, Serido, and Collins (2008); Jorgensen and Savla (2010);

Shim (2010) found that financial knowledge and financial attitude are associated with each other and Jorgensen and Savla (2010); Serido et al. (2013) revealed that attitude acts as a mediator between financial knowledge and behaviour which supports the proposed first path. Contradicting results can be found in the correlation between financial knowledge and attitude. For example, Hayhoe, Leach, Allen, and Edwards (2005) found a correlation between knowledge and attitude, while no such correlation was found in the study by Potrich et al. (2016).

The first path in the proposed model invites future researchers to study those variables in a sequential manner, thus conceptualising it as a process. Evidence can be found from previous literature on the importance of considering knowledge, attitude and behaviour together in a financial literacy model. For example, Hayhoe et al. (2005) supported the argument that financial behaviour can be changed with modification in financial knowledge and attitude. Previous literature also emphasised that financial behaviour is a major determinant of financial literacy (Fernandes et al., 2014; Lusardi & Mitchell, 2014; Potrich et al., 2016), and financial knowledge and attitude precedes financial behaviour (Hayhoe et al., 2005; Potrich et al., 2016). Furthermore, the longitudinal study by Serido et al. (2013) provides clear evidence that financial knowledge affects self-beliefs on finance (which includes financial attitude), which then affects financial behaviour and finally affects the financial and overall wellbeing of an individual.

The understanding of the relationship between financial attitude and financial behaviour can further be extended from studies related to credit card holders. For example, Chien and Devaney (2001); Danes and Hira (1990), Rutherford and DeVaney (2009) found a positive association between the attitude and behaviour of credit card holders. Furthermore, experimental studies support the notion that the financial knowledge obtained from financial education programs influence the financial attitude and later on, the financial behaviour as in path one in the model. For example, Batty (2015) and Garg & Singh (2018) found that students who received financial education have improved financial attitude where they would later demonstrate an improvement in financial behaviour compared to the controlled group.

Path two: Financial Knowledge to Behaviour to Literacy via Personality Traits

An alternative second path was identified due to the contradicting findings on financial behaviour and financial knowledge. Bir (2016) found that the financial knowledge possessed by the respondents had a weak effect in predicting the financial management practices while Hogarth, and Beverly, 2003 [in Serido et al. (2013)] found a positive association between financial knowledge and behaviour. Also, Serido et al. (2013) found a significant effect of objective financial knowledge on financial behaviour that if knowledge on financial matters is internalised, accepted financial behaviour is then visible in an individual. Since it is always encouraged to investigate alternative possibilities to a known occurrence, the current paper also proposes an alternative path to path one in the model, which considers personality to indirectly capture the differences among individuals.

The literature expanded with a shifted focus from how an individual decides to learn financial literacy to trying to establish the relationship between their knowledge and behaviour (Jappelli & Padula, 2013; Lusardi et al., 2013; Willis, 2008). The relationship between financial knowledge and financial behaviour has not always been proven to have a causal relationship, and as Hastings, Madrian, and Skimmyhorn 2012 [in (Batty, 2015)] states, it may not necessarily imply such a relationship. However, recent studies revealed that higher financial knowledge results in a higher standard of financial behaviour (Lusardi, 2019; Hilgert et al., 2003; Potrich et al., 2016; Servon & Kaestner, 2008) and because of a positive relationship between financial knowledge and financial behaviour (Loke, 2015), individual with higher financial knowledge would demonstrate strong, positive financial behaviour.

Anchoring on previous studies which have proven the direct effect of financial knowledge on financial behaviour, the proposed second path supports the notion that increased financial knowledge will directly result in an accepted financial behaviour subject to the type of personality of the person. In this regard, the second path relies more on sophisticated financial education, producing in-depth financial knowledge to an individual. Meanwhile, the second path does not ignore the differences in financial behaviour on individual levels as discussed in the theory of planned behaviour, resulting in the proposed model capturing such effects through the type of individual's personality. As a result, five major personality types were considered the moderator between financial knowledge and financial behaviour.

In recent developments, behavioural economics, which links economics to psychology (Kahneman, 2003), have shed some insights into human cognitive behaviour to personal finance. First, researchers started to explore the role of personality traits in individual financial decision makings (Caliendo, Fossen, & Kritikos, 2012). Donnelly, Iyer, and Howell (2012) revealed that individuals with openness and materialistic personality traits tend to be less prudent in their money management as compared to those highly conscientious as the latter showed positive financial attitudes and discipline in saving and debt management behaviours. In discussing the findings, Donnelly et al. (2012) highlighted how personality connects to purchasing behaviour. Using the Big Five personality traits, Brown and Taylor (2014) conducted a study on the association between personality traits and the amount of debt and financial assets held by households. The study revealed that personality affects the debt and assets held depending on the type of such debts and assets and further concluded that personality types of extraversion and openness have a larger influence on assets and debt held by households (Brown & Taylor, 2014). Anchoring on those findings, the second path of the model proposes a direct relationship between financial knowledge and behaviour considering the moderating effect of personality type.

SUMMARY AND DISCUSSION FOR FUTURE USE OF THE MODEL

As indicated in the literature, there is no operationally valid instrument to measure financial literacy (Potrich et al., 2016; Remund, 2010). As Serido et al. (2013) concluded, incorporating financial knowledge, attitude and behaviour together in a model as a developmental process will generate a more comprehensive understanding of the topic, which forms the objective of the proposed model. Based on the theory of planned behaviour, the proposed model identifies financial literacy as a process that combines knowledge and application dimensions using intermediary variables such as a person's attitude, behaviour and personality. Due to the clarity and ability to be consistent with other literacy constructs, the current paper agrees upon the definition proposed by Huston (2010) in proposing the new model. Huston (2010, p. 306) defines financial literacy as "measuring how well an individual can understand and use personal finance-related information". It is also consistent with the definition provided by Hung et al. (2009), where financial literacy has been defined using knowledge, attitude, behaviour and ability.

Equal values have been placed upon the knowledge dimension and the application dimension, as Huston (2010) also emphasised, as a comprehensive model on financial literacy must be expressed by itself to assess the impact of financial education on the total process. As per Huston (2010), previous financial literacy measures identify only the human capital requirements to demonstrate accepted financial behaviour and will not guarantee the occurrence of financial literacy, which points to the need of understanding the phenomena on an individual level from a behavioural perspective. As a result, it is important to develop a model that explains how financial literacy is created instead of identifying the conditions and circumstances that influence financial literacy to assist in categorising a person as financially literate and illiterate. This augmentation can be further support by the explanations given by Huston (2010); Lusardi (2012) as individual financial behaviours is affected by personal preferences and economic circumstances.

Obviously, no one can come up with a financial literacy model that incorporates all intervening variables of financial literacy, which is not necessary. Financial literacy must be studied in a broader manner (Potrich et al., 2016) and for effective management of finance at the individual level, knowledge, behaviour and attitude are equally important [(Norvilitis and Maclean, 2010; Xiao et al., 2011) (Potrich et al., 2016) (Rai, Dua & Yadav, 2019)]. Therefore, an approach needs to be taken to explain the phenomena in a broader manner by incorporating the mentioned variables, which will assist readers in understanding the transformation process of knowledge towards the creation of financial literacy within an individual (Shefrin, 2021). Moving forward, future researchers will be able to add context specific variables to study. Numerous literature can be found on the importance of knowledge, attitude and behaviour in financial literacy studies. For example, Agarwalla et al. (2015); Atkinson and Messy (2012); Rai, Dua & Yadav (2019) identified knowledge, attitude and behaviour as the three dimensions of financial literacy. Potrich et al. (2016) argue that a financial literacy model will be more comprehensive if the model captures not only whether a person possesses relevant information and knowledge but also whether the person uses such information and knowledge in a correct way. Therefore, the proposed conceptual model goes beyond the knowledge dimension up to the application dimension, as suggested by Huston (2010), and it is self-descriptive enough to understand how financial knowledge ultimately creates financial literacy within an individual.

ACKNOWLEDGEMENT

The study was funded by the research grant from the Social Wellbeing Research Centre (previously known as Social Security Research Centre) University of Malaya (UM. E/SSRC/628/3/12). The authors would like to acknowledge Mr. Wee Chu Kok from the Faculty of Accountancy, Finance and Business of the Tunku Abdul Rahman University College for his valuable inputs and contributions towards finalising this paper.

REFERENCES

Agarwal, S., Amromin, G., Ben-David, I., Chomsisengphet, S., & Evanoff, D. D. (2010). Financial counseling, financial literacy, and household decision making.

Agarwalla, S. K., Barua, S. K., Jacob, J., & Varma, J. R. (2015). Financial literacy among working young in urban India. *World Development, 67,* 101-109.

Ajzen. (1991). The theory of planned behavior. *Organizational behavior and human decision processes, 50*(2), 179-211.

Ajzen, Fishbein, I., & Fishbein, M. (1980). *Understanding attitudes and predicting social behavior*: Englewood Cliffs, NJ: Prentice-Hall.

Ajzen, I. (1985). From intentions to actions: A theory of planned behavior *Action control* (pp. 11-39): Springer.

Anderloni, L., & Vandone, D. (2010). Risk of overindebtedness and behavioural factors.

Armitage, C. J., & Conner, M. (2001). Efficacy of the theory of planned behaviour: A meta-analytic review. *British journal of social psychology, 40*(4), 471-499.

Atkinson, A., & Messy, F.-A. (2012). Measuring financial literacy.

Attanasio, O. P., & Weber, G. (2010). Consumption and saving: models of intertemporal allocation and their implications for public policy. *Journal of Economic Literature, 48*(3), 693-751.

Batty, M., Collins, J. M., & ODDERS-WHITE, E. L. I. Z. A. B. E. T. H. . (2015). Experimental evidence on the effects of financial education on elementary school students' knowledge, behavior, and attitudes. *Journal of Consumer Affairs, 49*(1), 69-96.

Beal, D. J., & Delpachitra, S. B. (2003). Financial literacy among Australian university students. *Economic Papers: A journal of applied economics and policy, 22*(1), 65-78.

Bir, J. S. (2016). Knowledge, Attitude and their Effect on the Recently Graduated Employees' Financial Management Practices and Satisfaction. *Economic Literature, 12*, 69-81.

Borden, L. M., Lee, S.-A., Serido, J., & Collins, D. (2008). Changing college students' financial knowledge, attitudes, and behavior through seminar participation. *Journal of Family and Economic Issues, 29*(1), 23-40.

Bowen, C. F. (2002). Financial knowledge of teens and their parents. *Journal of Financial Counseling and Planning, 13*(2), 93.

Brown, S., & Taylor, K. (2014). Household finances and the 'Big Five'personality traits. *Journal of Economic Psychology, 45*, 197-212.

Browning, M., & Lusardi, A. (1996). Household saving: Micro theories and micro facts. *Journal of Economic Literature, 34*(4), 1797-1855.

Bruhn, M., de Souza Leão, L., Legovini, A., Marchetti, R., & Zia, B. (2013). Financial education and behavior formation: large-scale experimental evidence from Brazil. *Presentation, World Bank, Washington, DC*.

Caliendo, M., Fossen, F., & Kritikos, A. (2012). Trust, positive reciprocity, and negative reciprocity: Do these traits impact entrepreneurial dynamics? *Journal of Economic Psychology, 33*(2), 394-409.

Carpena, F., Cole, S. A., Shapiro, J., & Zia, B. (2011). Unpacking the causal chain of financial literacy.

Chien, Y.-W., & Devaney, S. A. (2001). The effects of credit attitude and socioeconomic factors on credit card and installment debt. *Journal of Consumer Affairs, 35*(1), 162-179.

Conger, R. D., Conger, K. J., Matthews, L. S., & Elder, G. H. (1999). Pathways of economic influence on adolescent adjustment. *American journal of community psychology, 27*(4), 519-541.

Danes, S. M., & Hira, T. K. (1990). Knowledge, beliefs, and practices in the use of credit cards. *Family and Consumer Sciences Research Journal, 18*(3), 223-235.

Danes, S. M., Huddleston-Casas, C., & Boyce, L. (1999). Financial planning curriculum for teens: Impact evaluation. *Journal of Financial Counseling and Planning, 10*(1), 26.

De Nardi, M., French, E., & Jones, J. B. (2010). Why do the elderly save? The role of medical expenses. *Journal of Political Economy, 118*(1), 39-75.

Dibb, S., Merendino, A., Aslam, H., Appleyard, L., & Brambley, W. (2021). Whose rationality? Muddling through the messy emotional reality of financial decision-making. Journal of Business Research, 131, 826–838. https://doi-org.ezproxy.um.edu.my/10.1016/j.jbusres.2020.10.041

Donnelly, G., Iyer, R., & Howell, R. T. (2012). The Big Five personality traits, material values, and financial wellbeing of self-described money managers. *Journal of Economic Psychology, 33*(6), 1129-1142.

Eagly, A. H., & Chaiken, S. (1993). *The psychology of attitudes*: Harcourt Brace Jovanovich College Publishers.

Fernandes, D., Lynch Jr, J. G., & Netemeyer, R. G. (2014). Financial literacy, financial education, and downstream financial behaviors. *Management Science, 60*(8), 1861-1883.

Folk, J. Y., Beh, L. S., & Baranovich, D.-L. (2012). Financial education: Determinant of retirement planning in Malaysia. *E3 Journal of Business Management & Economics, 3*(2), 69-78.

French, E. (2005). The effects of health, wealth, and wages on labour supply and retirement behaviour. *The Review of Economic Studies, 72*(2), 395-427.

French, K. R. (2008). Presidential address: The cost of active investing. *The Journal of Finance, 63*(4), 1537-1573.

Friedman, M. (1957). *A theory of the consumption function*. Princeton: Princeton University Press.

Garg, N. and Singh, S. (2018), "Financial literacy among youth", International Journal of Social Economics, Vol. 45 No. 1, pp. 173-186. https://doi.org/10.1108/IJSE-11-2016-0303

Gathergood, J., & Disney, R. F. (2011). Financial literacy and indebtedness: New evidence for UK consumers.

Go, C. G., Varcoe, K., Eng, T., Pho, W., & Choi, L. (2012). Money savvy youth: Evaluating the effectiveness of financial education for fourth and fifth graders. *San Francisco, CA: Federal Reserve Bank of San Francisco Working Paper, 2*.

Goyal, K., & Kumar, S. (2020). Financial literacy: A systematic review and bibliometric analysis. International Journal of Consumer Studies, 45(1), 80-105).

Hayhoe, C. R., Leach, L. J., Allen, M. W., & Edwards, R. (2005). Credit cards held by college students.

Hilgert, M. A., Hogarth, J. M., & Beverly, S. G. (2003). Household financial management: The connection between knowledge and behavior. *Fed. Res. Bull., 89*, 309.

Hung, A., Parker, A. M., & Yoong, J. (2009). Defining and measuring financial literacy.

Huston, S. J. (2010). Measuring financial literacy. *Journal of Consumer Affairs, 44*(2), 296-316.

Jappelli, T., & Padula, M. (2013). Investment in financial literacy and saving decisions. *Journal of Banking & Finance*, *37*(8), 2779-2792.

Johnson, E., & Sherraden, M. S. (2007). From Financial Literacy to Financial Capability among Youth. *J. Soc. & Soc. Welfare, 34,* 119.

Jorgensen, B. L., & Savla, J. (2010). Financial literacy of young adults: The importance of parental socialisation. *Family Relations, 59*(4), 465-478.

Kahneman, D. (2003). A perspective on judgment and choice: mapping bounded rationality. *American psychologist, 58*(9), 697.

Kim, K.T. and Yuh, Y. (2018), Financial Knowledge and Household Saving: Evidence from the Survey of Consumer Finances. Fam Consum Sci Res J, 47: 5-24. https://doi.org/10.1111/fcsr.12270

Loke, Y. J. (2015). Financial Knowledge and Behaviour of Working Adults in Malaysia. *Margin: The Journal of Applied Economic Research, 9*(1), 18-38.

Lusardi, A. (2019). Financial literacy and the need for financial education: Evidence and implications. Swiss Journal of Economics and Statistics, 155(1). https://doi.org/10.1186/s41937-019-0027-5

Lusardi, A. (2008). Financial literacy: an essential tool for informed consumer choice? (No. w14084). National Bureau of Economic Research.

Lusardi, A. (2008). Household saving behavior: The role of financial literacy, information, and financial education programs (No. w13824). National Bureau of Economic Research.

Lusardi, A. (2012). Financial Literacy or Financial Capability? Retrieved from http://annalusardi.blogspot.my/2012/10/financial-literacy-or-financial.html

Lusardi, A., Michaud, P. C., & Mitchell, O. S. (2017). Optimal financial knowledge and wealth inequality. Journal of Political Economy, 125(2), 431-477.

Lusardi, A., & Mitchell, O. S. (2007). Financial literacy and retirement planning: New evidence from the Rand American Life Panel.

Lusardi, A., & Mitchell, O. S. (2011). Financial literacy and retirement planning in the United States (No. w17108). National Bureau of Economic Research.

Lusardi, A., & Mitchell, O. S. (2014). The economic importance of financial literacy: Theory and evidence. *Journal of Economic Literature, 52*(1), 5-44.

Mandell, L. (2008). Financial literacy of high school students. *Handbook of consumer finance research*, 163-183.

Mandell, L., & Klein, L. S. (2009). The impact of financial literacy education on subsequent financial behavior.

Meier, S., & Sprenger, C. D. (2013). Discounting financial literacy: Time preferences and participation in financial education programs. *Journal of Economic Behavior & Organization, 95*, 159-174.

Modigliani, F., & Brumberg, R. (1954). Utility analysis and the consumption function: An interpretation of cross-section data. *Franco Modigliani, 1*.

Mustapha, M., & Jeyaram, S. (2015). FINANCIAL LITERACY AND DEMOGRAPHIC FACTORS. *Journal of Technology Management and Business*, *2*(1). Retrieved from https://publisher.uthm.edu.my/ojs/index.php/jtmb/article/view/1091

OECD (2016), "OECD/INFE International Survey of Adult Financial Literacy Competencies", OECD, Paris, www.oecd.org/finance/OECD-INFE-International-Survey-of-Adult-Financial-Literacy-Competencies.pdf

Peng, T.-C. M., Bartholomae, S., Fox, J. J., & Cravener, G. (2007). The impact of personal finance education delivered in high school and college courses. *Journal of Family and Economic Issues, 28*(2), 265-284.

Potrich, A. C. G., Vieira, K. M., & Mendes-Da-Silva, W. (2016). Development of a financial literacy model for university students. *Management Research Review, 39*(3), 356-376. doi:10.1108/MRR-06-2014-0143

Rai, K., Dua, S., & Yadav, M. (2019). Association of Financial Attitude, Financial Behaviour and Financial Knowledge Towards Financial Literacy: A Structural Equation Modeling Approach. FIIB Business Review, 8(1), 51–60. https://doi.org/10.1177/2319714519826651

Remund, D. L. (2010). Financial literacy explicated: The case for a clearer definition in an increasingly complex economy. *Journal of Consumer Affairs, 44*(2), 276-295.

Robb, C. A. (2011). Coming to terms with financial literacy *Consumer knowledge and financial decisions* (pp. 3-13): Springer.

Rutherford, L., & DeVaney, S. A. (2009). Utilising the theory of planned behavior to understand convenience use of credit cards.

Schmeiser, M. D., & Seligman, J. S. (2013). Using the right yardstick: Assessing financial literacy measures by way of financial wellbeing. *Journal of Consumer Affairs, 47*(2), 243-262.

Serido, J., Shim, S., & Tang, C. (2013). A developmental model of financial capability A framework for promoting a successful transition to adulthood. *International Journal of Behavioral Development, 37*(4), 287-297.

Servon, L. J., & Kaestner, R. (2008). Consumer financial literacy and the impact of online banking on the financial behavior of lower-income bank customers. *Journal of Consumer Affairs, 42*(2), 271-305.

Shefrin, H. (2021). Financial literacy and financial education: Recommendations, evidence and policy implications. Financial Education and Risk Literacy, 4-4. https://doi.org/10.4337/9781789908855.00007

Shim, S., Barber, B. L., Card, N. A., Xiao, J. J., & Serido, J. . (2010). Financial socialisation of first-year college students: The roles of parents, work, and education. *Journal of youth and adolescence, 39*(12), 1457-1470.

Shockey, S. S. (2002). *Low-wealth adults financial literacy. Money management behavior and associates factors, including critical thinking*. Utah, Estados Unidos.,Tese de Doutorado. Universidade de Utah, AAT.

Skinner, J. (2007). Are you sure you're saving enough for retirement? *The Journal of Economic Perspectives, 21*(3), 59-80.

Willis, L. E. (2008). Against financial-literacy education. *Iowa L. Rev., 94*, 197.

Xiao, J. J. (2008). Applying behavior theories to financial behavior *Handbook of consumer finance research* (pp. 69-81): Springer.