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Revalidation of Financial Well-being Scale: The Fuzzy Delphi Method

Muhammad Zainuddin Mohamed Azudin, Siti Syamira Mohd Ramli, Wan Nurashikin Mahmood, Nor Khairunnisa Mat Yunus & Noor Affeeda Ramli

Universiti Teknologi MARA Pahang, Malaysia
Corresponding Author's Email: zainuddin.azudin@uitm.edu.my

Abstract
Financial well-being is the ability to satisfy one's requirements now and, in the future, to feel confident about the future, to enjoy one's life, and to deal with unexpected costs. Overall issues such as quality of life, retirement income, and future over-indebtedness necessitate a solid understanding of finance. Since the issue is worldwide and significant, measuring methods are required. The Fuzzy Delphi approach was used to obtain 10 experts from a Malaysian public university and banking industries utilising a 7 expert Likert scale. For data analysis, the Fuzzy Delphi approach Logic Software (FUDELO) was employed. The results demonstrate that the total expert consensus agreement surpasses 75%, the overall value of the threshold (d) is 0.2, and α-cut is more than 0.5. Households must also be better able to moderate their spending habits and increase their saving habits in order to enhance their financial well-being.
Keywords: Financial Well-Being, Expert Consensus, Fuzzy Delphi Method

Introduction
Financial well-being is the state of being able to meet one's needs both now and in the future, feel secure about the future, enjoy one's life, and deal with unforeseen expenses. As a result, rising financial wealth reduces poverty and has an impact on many facets of human life. A person's health and psychological state could be impacted by their financial situation (Singh & Malik, 2022). Financial difficulties may worsen social interactions, emotional distress, and life satisfaction (Iramani & Lutfi, 2021). Sorgente and Lanz (2017) found that research has increased as a result of the increased societal and political focus on financial well-being in recent decades. The Consumer Financial Protection Bureau (CFPB, 2015) defines financial well-being as having control over one's current finances, the capacity to withstand financial shocks, the capacity to achieve one's financial goals, and the financial freedom to live and enjoy one's life.

Financial well-being is determined by family, community, and social circumstances in addition to an individual's financial pleasure. An individual's financial situation has a significant impact on their wellbeing. Therefore, addressing issues like quality of life, retirement income, and

over-indebtedness in the future requires people to have a solid understanding of finance (Philippas and Avdoulas, 2020). Studies demonstrate that financial education and literacy lead to higher levels of financial market participation, including better retirement planning and savings (Riyazahmed, 2021). Satisfaction with diverse facets of life is crucial to overall psychological well-being. The individual's financial position is one of those areas. The extent to which a person can fulfil all of their existing obligations and maintain their financial well-being can be (Parvathy & Kumar, 2022).

Financial well-being in Malaysia
According to the report of the Economic Planning Unit, the Malaysian Well-being Index (MWI) is the primary social indicator used by policymakers to determine the level of overall well-being among Malaysians. The MWI assesses the well-being of society from an economic and social perspective and is defined as "the physical, social, and economic gains that contribute to the enhancement in the quality of life and happiness of an individual, family, and the economy" (Mahdzan et al., 2020). Recent statistics indicated that the MWI performance has decreased 2.1 percent from 120.8 points in 2019 to 118.3 in 2020. Both economic and social sub-composite showed a decline in 2020. The social well-being sub-composite decreased 1.2 per cent to 114.0 points, meanwhile the economic sub-composite declined 3.4 percent to 126.2 points in the year of 2020. Findings showed the components were affected due to the uncertain momentum in the socioeconomic landscape of the country following the health (COVID-19) pandemic and economic crisis through the year of 2020 (Department of Statistics Malaysia, 2022).

This supported by evidence reported by the Central Bank of Malaysia (BNM), Malaysians exhibit healthy money management such as living within means and budgeting but fall behind in terms of product knowledge, financial numeracy and planning for long-term goals. Statistics proved only 59.7 percent of Malaysians possessed literacy in finance. Approximately 64 per cent are unfamiliar with the concept of time value of money, 54 per cent have financial savings which is less than three months of their income, 48 per cent do not have knowledge on investment diversification and 34 per cent do not have a long-term financial plan. Therefore, the implementation of National Strategy for Financial Literacy (2019 - 2023) outlines strategic priorities to elevate financial literacy and promote responsible financial behaviour of consumers across all life stages (Bank Negara Malaysia, 2022).

Numerous academics have looked at elements that affect psychological well-being and discovered that economic distress is a reliable indicator of lower levels of well-being. As specified by Prawitz et al (2006) the degree of reported economic distress was a significant factor in determining psychological well-being. Many Malaysian working adults are suffering from a lack of financial literacy, inadequate financial management abilities, and awareness of savings and budgeting. These problems are made worse by price increases and declining living standards that are specific to each country, which are influenced by a failing economy, a weakening national currency, a decline in total income, an increase in necessary expenses, and higher borrowing costs (She et al., 2021)

Tie and Nizam (2016) conducted research on Y-Gen samples in Malaysia and found out Malaysia's Gen-Y is not in a decent financial situation. They are in bad physical form, and their financial literacy is low. This has generated a lot of media discussion, and the country's strategy has been set up in large part to encourage a rise in financial literacy among the populace. RinggitPlus' Malaysian Financial Literacy Survey 2021 found that 56 per cent of Malaysians either saved or were unable to save less than RM500 a month. While 52 per cent

would not be able to survive more than three months if they lost their job. Based on the collection of prior and recent reports, there is a need to improve literacy and financial well-being among Malaysians since this issue is still relevant among Malaysians' financial environment.

Significant of Study

Low levels of financial well-being are commonly viewed as a potential and significant indicator for many negative characteristics such as low levels of well-being and also impact a person's mental and physical health. Additionally, low level of financial well-being is closely associated with negative health outcomes. Hence, it is very imperative to have a valid and credible tool in measuring the concept of financial well-being of a test taker in order to proceed with other studies or intervention. Over time, different techniques including subjective and objective measurements were used to assess the concept of financial wellbeing among test takers (Kamaluddin et al., 2018). Based on the reviewers' highlights of the literature, we discovered that no scale particularly examined financial well-being in the Malaysian setting. We perceive the necessity for the development of valid measurement tools that are appropriate for Malaysian society. As a result, we conducted a customised revalidation in this study in the context of Malaysian respondents in order to reap advantages specifically in Malaysia.

The Research Aims

This study is to obtain expert agreement on the impact of financial well-being news by using the Fuzzy Delphi method.

Methodology

This study specifically uses the Fuzzy Delphi Method (FDM). This study was chosen as it is a unique method to obtain expert consent in determining a concrete decision. This study uses two phases of the formation of the elements of the study questionnaire, namely through the literature review. There are two stages in this study's creation of the questionnaire components. The first phase of the researcher makes a literature analysis in identifying the impact of financial well-being. And the second phase is the researcher forms an expert questionnaire 7 points and distributed to 10 experts who are experienced and have profound information in designing included in this think about and analysed using Fuzzy Delphi (FDM) technique.

Sampling Procedure

Purposeful sampling is used in this analysis. This method is appropriate since the researcher wants to find an expert opinion on a predetermined topic. Purposeful sampling is the Fuzzy Delphi Method is the most acceptable technique (Hasson et al., 2000). Ten experts participated in this investigation concurrently. Based on their qualifications and area of experience, these experts were chosen. Table 1 contains a list of the experts who have consented to participate. If every specialist participating in this analysis is the same, then between 5 and 10 professionals are required. When there is some consistency, the required minimum of Delphi experts ranges from 10 to 15 persons (Adler & Ziglio, 1996).

Table 1
List of Experts

Expert	Field of expertise	Institution
5 Professional	Banking	Private Organization
2 Senior Lecturer	Finance	Public University
3 Lecturer		

Expert Criteria
Definition of experts according to Booker and McNamara (2004), are people who have devoted their time and effort to obtain their credentials, training, experience, professional membership, and peer recognition (Nikolopoulos, 2004; Perera, et al., 2012). According to (Cantrill et al., 1996; Mullen, 2003), describe an expert as someone who has knowledge and skill in a certain subject or field. In the Fuzzy Delphi research, expert selection is a crucial aspect to take into account. Concerns such as the legitimacy, validity, and reliability of the study's result may be called into question if the expert selection is done poorly based on criteria (Mustapha & Darusalam, 2017). The expert involved in the research, according to Kaynak and Macauley (1984), must represent and be acquainted with the subject or issues under examination. Based on the specific and standard, the researcher chooses experts with at least five years of experience, experts who are accredited in their field of expertise and relevant to the study based on a set of highly demanding criteria.

Fuzzy Delphi Step
Table 2
Fuzzy delphi step

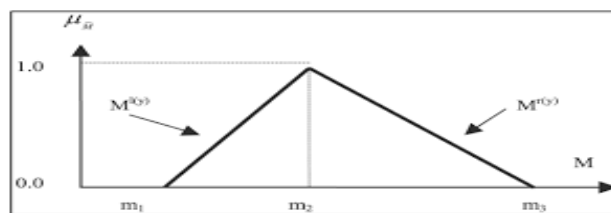| Step	Formulation
1. Expert selection	● A total of 10 experts were included in this report. A panel of experts was assembled to assess the significance of the assessment parameters on the factors to be evaluated using linguistic variables. and definitions of potential problems with the piece, and so on.
2. Determining linguistic scale	● This procedure entails translating all linguistic variables into the counting of fuzzy triangles (triangular fuzzy numbers). This move also includes the addition of fuzzy numbers to the translation of linguistic variables (Hsieh et al., 2004). The Triangular Fuzzy Number represents the values m1, m2, and m3 and is written as follows (m1, m2, m3). The value of m1 represents the smallest possible value, the value of m2 represents a rational value, and the value of m3 represents the highest possible value. While Triangular Fuzzy Number is used to generate Fuzzy Scale for the purpose of converting linguistic variables into fuzzy numbers.

Figure 1: Triangular fuzzy number

3. The Determination of Linguistic Variables and Average Responses	● Once the researcher gains input from the specified expert, the researcher must convert all measurement findings to Fuzzy scales. This is often recognized as the acknowledgment of each answer (Benitez et al., 2007).
4. The determination of threshold value "d"	● The threshold value is crucial in determining the degree of agreement among experts (Thomaidis et al., 2006). The distances for each fuzzy integer m = (m1, m2, m3) and n = (m1, m2, m3) are determined using the formula: $$d(\bar{m}, \bar{n}) = \sqrt{\frac{1}{3}[(m1 - n1)^2 + (m2 - n2)^2 + (m3 - n3)^2]}$$
5. Identify the alpha cut aggregate level of fuzzy assessment	● If an expert consensus is reached, a fuzzy number is assigned to each piece (Mustapha & Darussalam, 2017). The below is the approach for calculating and measuring fuzzy values: (1) 4 (m1 + 2m2 + m3) Amax
6. Defuzzification process	● This process uses the formula Amax = (1) /4 (a1 + 2am + a3). If the researcher uses Average Fuzzy Numbers or average response, the resulting score number is a number that is in the range 0 to 1 (Ridhuan et al., 2014). In this process, there are three formulas namely: i. A = 1/3 * (m1 + m2 + m3), or; ii. A = 1/4 * (m1 + 2m2 + m3), or; iii. A = 1/6 * (m1 + 4m2 + m3). A-cut value = median value for '0' and '1', where α-cut = (0 + 1) / 2 = 0.5. If the resulting A value is less than the α-cut value = 0.5, the item will be rejected because it does not indicate an expert agreement. According to Bojdanova (2006) the alpha cut value should exceed 0.5. It is supported by Tang and Wu (2010) who stated that the α-cut value should be more than 0.5.
7. Ranking process	● The positioning process is carried out by means of defining elements based upon values of defuzzification based on expert agreement that the element with highest importance is the most important place for decision (Fortemps & Roubens, 1996)

Instrumentation
The researcher used pre-existing related literature material to construct the Fuzzy Delphi research instrument. Using literature, pilot studies, and personal experience as a basis, researchers (Skulmowski et al., 2007). As a result, they employed research material, expert

interviews, and focus group methodologies to create questions for the Fuzzy Delphi method (Mustapha & Darussalam, 2017). Furthermore, Okoli and Pawlowski (2004) contend that a review of pertinent literature should come before generating items and content for research. As a result, researchers used published work and literature to measure financial well-being among Malaysian households. Then, using a 7-point scale, a list of expert questions is constructed. The 7-point scale was chosen since the results were more precise and ideal when more scales were used (Chen et al., 2011). The researcher replaced the Fuzzy value in Table 3 with a 1–7 scale value to make it easier for expertise to respond to the questionnaire, as shown:

Table 3
Fuzzy scale

Item	Fuzzy number
Strongly disagree	(0.0, 0.0, 0.1)
Disagree	(0.0, 0.1, 0.3)
Somewhat disagree	(0.1, 0.3, 0.5)
Neutral	(0,3, 0.5, 0.7)
Somewhat agree	(0.5, 0.7, 0.9)
Agree	(0.7, 0.9, 1.0
Strongly agree	(0.9, 1.0, 1.0)

The List of the impact of financial well-being on society
Table 4
The list of the impact of financial well-being on society
Researchers highlighted the critical features impact of financial well-being on society based on a literature review. The researchers will next use the Fuzzy Delphi approach to determine the validity and consensus of the experts on whether this aspect is appropriate for inclusion in this model.

	Early item rank	Financial well-being impact on society
The impact of financial well-being on society	IFWB1	What do you feel is the level of your financial stress today?
	IFWB2	Are you satisfied with your personal finances?
	IFWB3	How do you feel about your current financial situation?
	IFWB4	How often do you worry about being able to meet your monthly living expenses?
	IFWB5	How confident are you of finding the money to pay for a financial emergency costing RM 1,000?
	IFWB6	How frequently do you find yourself eagerly awaiting for the next pay day?
	IFWB7	How often does this happen to you – you want to go out to eat, go to movies or do something else and don't go because you can't afford to?
	IFWB8	How secure do you feel about your retirement plan?
	IFWB9	How confident are you that you will have a financially comfortable retirement?

Finding

This section will give an expert agreement on aspects of the main impact of financial well-being. Fuzzy Delphi questions were presented to 10 experts with in-depth knowledge in the relevant areas, and the findings were collected based on the responses they supplied. The following are the study's findings:

Table 5
The analysis result

Results	Item1	Item2	Item3	Item4	Item5	Item6	Item7	Item8	Item9
Expert1	0.09815	0.06351	0.00577	0.07506	0.04619	0.1097	0.15588	0.0866	0.09238
Expert2	0.01732	0.1097	0.05196	0.07506	0.06928	0.1097	0.15588	0.02887	0.02309
Expert3	0.07506	0.06351	0.00577	0.07506	0.06928	0.05196	0.01732	0.02887	0.02309
Expert4	0.07506	0.05196	0.05196	0.07506	0.10392	0.05196	0.09815	0.0866	0.08083
Expert5	0.07506	0.1097	0.05196	0.07506	0.10392	0.05196	0.01732	0.0866	0.08083
Expert6	0.07506	0.17898	0.05196	0.07506	0.10392	0.1097	0.15588	0.20207	0.08083
Expert7	0.09815	0.05196	0.00577	0.44456	0.30022	0.46765	0.42147	0.0866	0.02309
Expert8	0.21362	0.17898	0.23671	0.09815	0.06928	0.17898	0.24826	0.31754	0.32332
Expert9	0.07506	0.1097	0.05196	0.07506	0.10392	0.1097	0.15588	0.0866	0.08083
Expert10	0.01732	0.05196	0.00577	0.01732	0.04619	0.05196	0.01732	0.02887	0.02309

Statistics	Item1	Item2	Item3	Item4	Item5	Item6	Item7	Item8	Item9
Value of the item	0.08199	0.097	0.05196	0.10854	0.10161	0.12933	0.14434	0.10392	0.08314
Value of the construct									**0.1002**
Item < 0.2	9	10	9	9	9	9	8	8	9
% of item < 0.2	90%	100%	90%	90%	90%	90%	80%	80%	90%
Average of % consensus									**88**
Defuzzification	0.87	0.81	0.91	0.87	0.82	0.81	0.73	0.85	0.86
Ranking	2	6	1	2	5	6	7	4	3
Status	Accept	Accept	Accept	Accept	Accept	Accept	Accept	Accept	Accept

After data processing, the bold threshold value surpasses the threshold value of 0.2 (> 0.2), according to the analysis results (see table 5). To put it another way, there are experts whose points of view do not coincide or even agree on some matters. The average threshold value (d) 0.2, or 0.1002, for all financial well-being, on the other hand, is below <0.2. If the average (d) value is less than 0.2, the item exhibits a high level of expert agreement (Cheng & Lin, 2002; Chang et al., 2011). Meanwhile, the total percentage of expert agreement is at a value of 88 percent, which is greater than (> 75 percent) 100 percent, indicating that the expert agreement requirements on this item have been met.

Table 6
The list based on expert consensus

	Early item rank	New item rank	Financial well-being impact on society
The impact of financial well-being	IFWB1	IFWB2	What do you feel is the level of your financial stress today?
	IFWB2	IFWB6	Are you satisfied with your personal finances?
	IFWB3	IFWB1	How do you feel about your current financial situation?
	IFWB4	IFWB2	How often do you worry about being able to meet your monthly living expenses?
	IFWB5	IFWB5	How confident are you of finding the money to pay for a financial emergency costing RM 1,000?
	IFWB6	IFWB6	How frequently do you find yourself eagerly awaiting for the next pay day?
	IFWB7	IFWB7	How often does this happen to you – you want to go out to eat, go to movies or do something else and don't go because you can't afford to?
	IFWB8	IFWB4	How secure do you feel about your retirement plan?
	IFWB9	IFWB3	How confident are you that you will have a financially comfortable retirement?

Conclusion and Suggestion
The financial well-being of Malaysians varies according to socioeconomic background, including age, education and employment. People must take into account their influential socioeconomic backgrounds as well as their current financial situations first. Earlier research demonstrated that higher levels of financial literacy (a measure of education and maturity) led to higher levels of financial well-being (Falahati & Paim, 2011). Therefore, it is important to impart a grasp of financial topics at a young age.
Financial welfare rises as a result of better financial conduct that is encouraged by financial literacy. To improve their financial well-being, households must also be better able to regulate their behaviour about their spending patterns and raise their saving habits. The recommendations that the researcher is able to suggest are as follows:
●   Spend some time balancing the income and costs so an individual or household can manage spending and lifestyle expectations.
●   Regardless of income level, effective financial planning requires that you practise restraint while spending.

●   Early retirement allows an individual to take advantage of compounding, the growth of one investment on top of another.

●   Always put saving for emergencies first; we never know when an unexpected expense will arise.

Government and financial authorities to further enhance the efficacy of the financial literacy and financial inclusion programmes currently being implemented, as the level of financial literacy and inclusion among Malaysians is still unsatisfactory. The public needs to be encouraged to be more frugal, and this is especially crucial during the current economic crisis to prevent people from running into financial difficulties. Government should concentrate on household income rather than any particular religion, ethnicity, or neighbourhood. A household's possible future financial situation can be better understood by looking at the income position of the comparator groups.

In conclusion, this study aims to validate the financial well-being scale once more. A rigorous procedure was utilised to revalidate the dimensions of financial well-being and create a legitimate scale using the Fuzzy Delphi Method. Results from the defuzzification procedure, threshold "d" value, and percentage of experts' consensus reveal that all items reach consensus and are reliable when subjected to expert judgments. Every procedure utilised in this study is consistent with the fuzzy delphi technique. As a result, the statistics acquired demonstrate that the validated products comply with the necessary requirements. This study specifically offers a fresh input for the validation procedure. The majority of researchers employ factor analysis throughout the item validation process, although there are various approaches that can be used. The variety of approaches can offer fresh perspective on the field of academic writing, particularly in relation to the validation procedure. The researcher exclusively uses Malaysian experts in this study, which has its own constraints. In the future, researchers can use local specialists to carry out the same procedure and obtain more comprehensive data. In order to better understand the results of the current study, additional future research will likely be required to replicate the findings in different groups and cultures using the modified measures of financial well- being.

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Appendix A

	New item rank	**Financial well-being impact on society**
The impact of financial well-being on society	IFWB1	How do you feel about your current financial situation?
	IFWB2	What do you feel is the level of your financial stress today?
	IFWB2	How often do you worry about being able to meet your monthly living expenses?
	IFWB3	How confident are you that you will have a financially comfortable retirement?
	IFWB4	How secure do you feel about your retirement plan?
	IFWB5	How confident are you of finding the money to pay for a financial emergency costing RM 1,000?
	IFWB6	Are you satisfied with your personal finances?
	IFWB6	How frequently do you find yourself eagerly awaiting for the next pay day?
	IFWB7	How often does this happen to you – you want to go out to eat, go to movies or do something else and don't go because you can't afford to?