

The interplay of skills, digital financial literacy, capability, and autonomy in financial decision making and well-being

Parul Kumar^a, Rekha Pillai^{b,*}, Neha Kumar^c, Mosab I. Tabash^d

^aSchool of Banking, Financial Services and Insurance, Delhi Skill and Entrepreneurship University, India, Dwarka, New Delhi- 110077

^bCollege of Business Administration, Ajman University, United Arab Emirates, P.O Box:346

^cSchool of Management and Liberal Studies, NorthCap University, India, P.O Box: 122017

^dCollege of Business, Al Ain University, United Arab Emirates

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Abstract

Covid-19 and the unprecedented surge in financial technology contributed to unexpected financial challenges, affecting the relevance of financial decision making and perceived financial well-being. This paper examines the mediating effects of digital financial literacy, financial autonomy, financial capability, and impulsivity on financial decision making and perceived financial well-being. The data come from 512 respondents in Delhi/NCR (National Capital Region), India, using a snowball-sampling technique and partial least squares structural equation modeling to test 13 structural hypotheses with SmartPLS3.3. Partial least squares (PLS) prediction is employed to estimate the out-of-sample predictive power of the proposed model. Our findings reveal that skills directly affect financial decision making and perceived financial well-being, and digital financial literacy emerges as a direct and mediating predictor of financial decision making. The dominance of financial capability and financial autonomy as mediators in financial decision making and financial well-being become more evident, and impulsivity fails to have mediating effects on financial decision making. The results have academic, regulatory, and managerial implications, all of which calls for more concerted efforts at recognizing the unique interaction among skills—financial decision making—perceived financial well-being, the cumulative effect of which enhances the critical ability to deal with environmental challenges, manage socioeconomic pressures in a sustainable manner, and translate the benefits into prudent gender-specific policy decisions and practices.

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1. Introduction

The risk, uncertainty, and volatility due to the Covid-19 pandemic not only affect global financial markets but also plagued the psychological, financial, and economic conditions at every stratum of society. In the aftermath, job losses, deterioration in the gross domestic product (GDP), and higher

inflation also affect financial well-being, especially in developing countries such as India. Because of financial weakness, a population explosion, and economic inequality (Andrade, 2020), more than 136 million workers in India became particularly vulnerable (Debata et al., 2020) during the pandemic. This is because India imposed one of the longest and strictest lockdowns in the world, leading to a decline in GDP of 24 percent and a subsequent major rise in unemployment (which rose 24%) and massive slides in household income (which fell 46%) (Ojha & Singh, 2020). Also, prior research (Muir et al., 2017) discusses declines in FWB when unemployment and GDP falls are evident.

* Corresponding author.

E-mail addresses: parul.kumar@dseu.ac.in (P. Kumar), r.pillai@ajman.ac.ae (R. Pillai), nehakumar@ncuindia.edu (N. Kumar), mosab.tabash@aau.ac.ae (M.I. Tabash).

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This paper focuses on the individual perspective, in which the feelings evoked by such upheavals first affect financial decision making. These dynamic and complex situations have the most severe impact on those who are least able to withstand them, as they have little financial education and thus lack the skills required to avoid financial mismanagement. Behavioral finance addresses this kind of emotional turbulence as well as its damaging impact on financial decision making (FDM) (Nayebmohseni et al., 2022), which diminishes financial well-being (FWB), especially subjective FWB. This might be because subjective well-being is closely connected to people's assessment of their ability to maintain financial stability and handle their financial conditions. This is where behavioral heterogeneity paves the way for various coping strategies (Strömbäck et al., 2017) in the sense that individuals with moderate levels of financial literacy respond more sensibly to economic conditions (Barraffrem et al., 2020). At the same time, accelerated digitization and the unprecedented surge in financial technology (fintech) during the pandemic expanded the relevance of FDM in enhancing FWB (Gerth et al., 2021). Prior research shows that the well informed and financially literate make rational and high-quality financial decisions (Gonçalves et al., 2021) while increasing their economic security and well-being. Additionally, prudent financial behavior in the form of consistent expense evaluations, maintenance of contingency reserves (Mokhtar et al., 2020), budgetary preparations, low impulsivity, and cost controls (Xiao et al., 2008) lead to wise financial decisions, which in turn account for FWB.

Sharma (2021) emphasizes that Covid-19 has triggered stress, anxiety, and depression among Indians because of funding shortages and the inability to manage funds wisely, all of which have led to diminished financial well-being. To address this issue, Sharma recommends financial literacy, knowledge of financial concepts, acquisition of specific skills, and sound financial decision making as strategies for improving FWB. Despite the pressing need to determine the antecedents of sound FDM and FWB, limited research has emerged on the topic (Collins & Urban, 2020). Therefore, this study is significant as it considers the main financial skills, such as financial acumen, budgeting skills, and analytical skills, to shed light on their interplay in predicting financial behavior, including digital financial literacy (DFL), financial capability, and financial autonomy, thereby affecting FDM and perceived financial well-being (PFWB) in a developing country such as India. Because psychological traits involving long-term and persistent patterns of thinking and behavior reflect behavioral responses, it is vital to explore them further as they have a bearing on FDM (Roberts, 2009). This paper employs impulsivity as a proxy for psychological traits and examines its effect on FDM. Although several studies have explored FDM and FWB, their results have been equivocal with respect to the region and relationship of the variables used or were ambiguous over time. No study has delved into the complex interplay of the FWB nexus among financial behavior, decision making, and financial behavior. Few studies have explored the relevance of subjective FWB (Gonçalves et al., 2021). Also, as highlighted by Nanda and Banerjee (2021), studies from the

FWB perspective should consider the stress of money management as an indicator of FWB. The nexus is further investigated by including behavioral and psychological factors as mediators in the skill-FDM and skill-PFWB relations, the complexities of which are insufficiently examined. Furthermore, prior research ignores the explicit role of skills and DFL as determinants of FDM and FWB. This void is the prime motivation for our empirical investigation, in this study to reveal the impact of skills (budgeting, financial acumen, analytical) on various types of financial behavior, which in turn affects FDM and PFWB. Therefore, the study has four goals. The first is to determine the principal determinants of FDM and PFWB; the second is to explore the mediating effects of financial behavior (proxied by DFL, financial capability, and financial autonomy) and psychological traits (proxied by impulsivity) on FDM; the third is to investigate the mediating effects of financial behavior (proxied by DFL, financial capability and financial autonomy) on PFWB; and the fourth is to draw practical implications from the results derived, which serve as precursors for enhancing FDM and PFWB.

The paper is organized as follows: Section 2 gives the literature review, theoretical background, and development of the hypotheses, followed by the data and methodology in Section 3. The results are discussed in Section 4 and a discussion in Section 5. Section 6 offers the limitations, implications, and recommendations for future research, and the paper concludes in Section 7.

2. Literature review, theoretical background, and hypotheses

In the past decade, FDM and PFWB have received massive attention because of the anomalies revealed in long-term financial planning and depleted savings (Brüggen et al., 2017). FDM is based on the premise that individuals choose from among various alternatives and prefer those that lead to wealth maximization. This is assumed to involve a process of weighing the costs and benefits of a decision (also known as a reflective process), which has financial implications and components associated with it. FWB is the result of consistently competent behavior and the financial competency to sustain oneself, achieve personal goals, and enjoy a reasonable lifestyle (Xiao et al., 2008). The concept can also encompass constructive savings behavior, wise retirement planning, adequate wealth accumulation, and resilience to financial crises.

The concept of FWB is still at a nascent stage (Collins & Urban, 2020) and is pursued objectively (Sehrawat et al., 2021) while limiting the determinants of the multifaceted concept to certain individual predictors, such as financial experience, financial knowledge, financial satisfaction, and financial behavior (Chavali et al., 2021); financial capability, financial literacy, and psychological factors (Mahendru et al., 2020); financial capacity (Gardiner et al., 2015); and noncognitive factors such as self-control, optimism, and deliberative thinking (Strömbäck et al., 2017). Nonetheless, more complex relationships are studied by Falahati and Sabri (2015), who

investigate the individual and combined effects of behavioral variables and socialization agents on financial management and financial strain apart from their combined effect on FWB, with gender as a moderator. Greenberg and Hershfield (2018) present the former argument, that prior research on FWB is confined to determinants divided into three groups: financial behavior, psychosocial factors, and situational factors. Although all the existing studies reflect on the objective dimensions of FWB, which do not assess the depth of individual feelings and reactions to financial conditions (Prawitz et al., 2006), Porter and Thomas Garman (1993) argue that FWB must be studied as a subjective attribute as well to incorporate the perception of wealth adequacy for achieving financial goals in the future.

More recently, Netemeyer et al. (2018) assert that perceived financial well-being (PFWB), a concept that still has no accepted definition, encompasses the personal finance-well-being nexus by embracing several factors, such as individual potential to manage financial resources, expectations of future financial security, and embedded stress in money management. However, the novelty of this paper is that it considers the subjective dimension (Diener, 1984) of FWB, namely, PFWB, as it reflects the perceived assessment of the experience and quality of one's finances without reference to the objective facts of one's circumstances (e.g., wealth). Additionally, Sehrawat et al. (2021) claim that individuals undergoing similar objective conditions perceive FWB differently, as it specifically relates to their evaluation of their ability to manage available funds to support their current and future requirements (Netemeyer et al., 2018). They also add that PFWB reflects people's comprehensive and subjective feelings about their financial situation, which can be the outcome of skills, financial literacy, acumen, and psychological traits, and so on. This study focuses on a sample of developing countries, such as India, thus the subjective measure of PFWB is a better fit (Nanda & Banerjee, 2021).

Prior research does not explore multidimensional pathways that account for the interplay of skills and financial behavior on FDM, specifically PFWB. Prior literature alludes to either the behavioral aspect of FDM (Valaskova et al., 2019) or to a more limited financial literacy–FDM relationship and vice versa (Katarachia & Konstantinidis, 2014; Xue, 2019). Moreover, limited research (Arora & Kumari, 2020; Khawar & Sarwar, 2021; Xue, 2019) explores the mediating effects of behavioral or psychological variables on FDM and FWB, and none investigate the mediating effects of DFL, digital financial autonomy, financial capability, and impulsivity on FDM and PFWB. This paper assumes that FDM and PFWB can be perceived as an outcome of certain inputs, such as skills, digital financial literacy, financial autonomy, financial capability, and impulsivity.

2.1. Skills

Technological advancement and digital transformation have increased the need to develop certain skills in order to make prudent decisions. A report by the Organization for Economic

Cooperation and Development (OECD, 2017) states that skills are required to reap the advantages of digital revolution, protect oneself from the impending risks involved in digital financial services, understand complex information, and make informed financial choices. Some consider having better skills and basic financial knowledge as prerequisites for proper financial transactions (Valaskova et al., 2019). More specifically, elevated levels of cognitive skills, such a learning rate and reasoning ability, lead to fewer financial errors, low payment default, and portfolio diversification (Cole & Shastry, 2009), all of which are outcomes of rational financial decisions. The origins of this concept lie in self-efficacy theory (Bandura, 1977), in which individual cognitive abilities and subsequent accomplishments can significantly affect people's belief in their ability to influence various aspects of life. This paper employs budgeting, analytical, and financial acumen as skills that affect the determinants of sound FDM, namely, DFL and financial autonomy. With regard to the constituents of the skills reviewed, analytical thinking refers to the identification of patterns and discrepancies, and the ability to manage funds and allocate them across a specific period to the right purpose is called budgeting skill. Meanwhile, financial acumen, an imperative for sound FDM, is the availability of essential financial skills to judge the financial relationships and effects of various financial decisions and their impact on FWB. Financial acumen is a vital precursor to sustainable individual and social development as it leads to financial comfort due to sustainable decision making (Fernandes et al., 2014). We argue that budgeting, analytical, and financial acumen skills provide the basis, enhanced reasoning, and confidence to use digital financial tools, as individuals have the required mathematical, critical, analytical competence as well as the financial acumen to understand, evaluate, apply, and compare online financial products and services on offer in this complex financial landscape. Moreover, the cumulative effect of these skills subconsciously leads to individual self-empowerment and optimism to handle financial decisions independently, thus paving way for financial autonomy (Mirza, 2022). However, extant research overemphasizes financial literacy (Lusardi, 2019; Susanti et al., 2020) and downplays the integrated effect of analytical, budgeting, and financial acumen as more of a practice approach than an intellectual process that creates the context for dealing with financial behavior. To fill the gap, we developed the following hypotheses:

Hypothesis 1. Skills have a significantly positive influence on digital financial literacy.

Hypothesis 2. Skills have a significantly positive influence on financial autonomy.

2.2. Digital financial literacy

DFL is a multidimensional concept (Morgan et al., 2019, p.4) that includes “knowledge of digital financial products

and services, awareness of digital financial risks, knowledge of digital financial risk control, and knowledge of consumer rights and redress procedures.” The concept is supported by the “gain goal frame” under the goal framing theory (Lindenberg & Steg, 2007), in which the criterion for achieving goals (sound financial decisions and PFWB) necessitates the enhancement of resources (DFL as an intangible resource). The goal framing theory posits that individuals try to advance their goals, which is overall well-being, by engaging in various kinds of self-regulating behavior. Furthermore, the theory assumes that people try to achieve conflicting/multiple goals, thereby motivating them to become engrossed in higher-order cognitive functions. These goals are then grouped as goal frames, and decision-making behavior is then ruled by one or more of the goal frames, whether hedonic, gain, and normative. The hedonic goal frame focuses on the present notion of feeling good, the gain goal frame is related to wise decision making, which ensures conservation of resources and increases in income. The normative goal frame refers to heuristic behaviors that emerge from external factors. However, goal frames are not mutually exclusive, and the theory postulates the strength of a goal frame being confronted by the individuals current goals arising from unexpected situations (Serido et al., 2019). For example, a financially literate individual who has a saving mentality (gain goal frame) might indulge in overspending or unwise investments] due to impulsivity (hedonic goal frame). Therefore, it should be noted that the extent to which goal frames are part of decision making is a cumulative effect of external factors as well the capacity to regulate one's behavior.

The proliferation and decentralization of fintech products and services increased the relevance of DFL, as individuals are becoming more financially independent and taking charge of their financial planning, thus ensuring financial autonomy and financial inclusion. DFL also enables the effective use of fintech products and services while warning them about digital fraud, such as phishing and hacking (OECD, 2020) and empowers citizens to embrace a cashless economy in addition to enhancing financial inclusion (Ozili & Ozili, 2018). Likewise, Park (2011) contends that three discrete digital literacy dimensions have a significant impact on privacy-related online behavior: familiarity with technical aspects of the internet, awareness of common institutional practices, and understanding of current privacy policy.

However, because DFL is a nascent concept (Rahayu et al., 2022), few papers explore its determinants and the need for it (Morgan et al., 2019), no research is explicitly conducted on the DFL-FDM-PFWB nexus. The paper is also the first to investigate the mediating effects of DFL between skills and FDM/PFWB. We argue that having skills (financial acumen, budgeting, analytical) develops competency and motivates people to enhance DFL, which is cost effective, self-motivated, and timely (Khan & Suriseti, 2021), thereby leading to prudent FDM and PFWB. Therefore, we argue that DFL empowers individuals with appropriate digital skills to effortlessly, skillfully, and wisely navigate digital financial domains, thereby making sound financial decisions, which leads to long-term

financial well-being. Therefore, we formulate the following hypotheses:

Hypothesis 3. Digital financial literacy significantly affects financial decision making.

Hypothesis 4. Digital financial literacy significantly affects perceived financial well-being.

Hypothesis 5. The relationship between skills and financial decision making is serially and positively mediated by digital financial literacy.

Hypothesis 6. The relationship between skills and perceived financial well-being is serially and positively mediated by digital financial literacy.

2.3. Financial autonomy

Financial autonomy (FA) means decreased dependency on others (Collins et al., 1997) and the ability and freedom to attain financial goals through FDM (Jariwala, 2020). The concept can be underpinned by the “gain goal frame” under the goal framing theory (Lindenberg & Steg, 2007) in which the criterion for achieving goals (sound financial decisions and PFWB) necessitates the enhancement of resources (financial autonomy as the intangible resource). Moreover, Botha et al. (2020) emphasize that FA is acquired during the phase of emerging adulthood, with more visible effects on men than women. Likewise, Jariwala and Dziegielewski (2017) claim that financial education augments various dimensions of financial autonomy, such as reflexive autonomy, emotional autonomy, and functional autonomy among female participants. By contrast, Jariwala and Sharma (2013) argue that socialization agents, such as parents, and their interaction with children act as vital FA enhancers, thereby leading to FWB (Jorgensen et al., 2017; Xiao et al., 2014). In the corporate and public sector domain, the FA–FDM nexus is established on the premise that FA ensures greater freedom to manage desired outcomes, thereby ensuring accountability, sustainability, and quality information (Hartley et al., 2016). This paper explores the mediating effects of FA between skills and FDM/PFWB. We argue that having skills increases the confidence, knowledge, and willpower to face financial challenges, thereby creating a sense of financial independence, which then leads to rational FDM and PFWB. Prior research either reveals the determinants of financial autonomy (Botha et al., 2020) or studies the impact of FA on investment decision making. FA is also reviewed from the perspective of an organization (Scutariu & Scutariu, 2015), but the individual perception of FA and its relation to FDM and PFWB is still unexplored. Therefore, we argue that FA enables independent and sound decision making due to the experience amassed from family interactions, increased decision-making competence, and evolving responsibility for one's actions, all of which can also lead to

enhanced FWB. Therefore, we formulate the following hypotheses:

Hypothesis 7. Financial autonomy significantly affects financial decision making.

Hypothesis 8. Financial autonomy significantly affects perceived financial well-being.

Hypothesis 9. Financial autonomy positively mediates the relationship between skills and perceived financial well-being.

Hypothesis 10. Financial autonomy positively mediates the relationship between skills and financial decision making.

2.4. Financial capability

Financial capability (FC) is a multidimensional and dynamic concept involving financial literacy, money management, future planning, choosing products and services, and remaining informed (Atkinson et al., 2007). Sherraden (2013) describes financial capability as comprising two dimensions: the ability to act (based on knowledge obtained) and the opportunity to act (product accessibility, affordability, ease of use, safety, and reliability). It also refers to the financial skills, knowledge, attitude, and psychological attributes in the socioeconomic-cultural context, all of which lead to optimal management of financial resources, thereby leading to rational financial decisions, such as financial planning and budgeting (Storchi & Johnson, 2016). Because of these decisions, financial capacity improves, which in turn enhances financial stability and FWB (Bowman et al., 2017; Xiao et al., 2008). Financial capability is perceived as a financial behavior that enhances the financial capacity to indulge in comprehensive financial activities, thereby attaining FWB (Lučić et al., 2022). The concept is best supported by the capability approach pioneered by Amartya Sen and Martha Nussbaum in the 1980's, who argue that this should not be viewed as a personal quality apart from the external sociocultural environment but, rather, perceived as a conversion factor that transforms available resources (e.g., money) into valuable resources (pensions) (Allmark & Machaczek, 2015). However, Xiao (2016) states that several cognitive biases—such as information overload, loss aversion, and status quo bias—impede the transformation from adequate information into goal-oriented behavior. Prior research extensively investigates FC in terms of its determinants (Vyvyan et al., 2014) and financial capability-entrepreneurial performance (Luo et al., 2021). No research to date has explicitly focused on the mediating effects of FC on FDM and PFWB. The current study explores the mediating effects of DFL and FC between skills and FDM-PFWB. We argue that DFL and FC empower people with resilience, cognition, and confidence, to wisely interact with financial service providers in order to convert dormant resources into invaluable resources, hence, leading to sound

FDM and enhanced PFWB. Based on this argument, we present the following hypotheses:

Hypothesis 11. The relationship between skills and perceived well-being is sequentially and positively mediated by digital financial literacy and financial capability.

Hypothesis 12. The relationship between skills and financial decision making is sequentially and positively mediated by digital financial literacy and financial capability.

2.5. Impulsivity

Impulsivity is a tendency for unintentional purchasing (Beatty & Ferrell, 1998) due to a lack of adequate forethought that violates logical buying behavior and substitutes it with irrational self-indulgence, without consideration of possible outcomes. Whiteside et al. (2005) list four reasons for this psychological trend: lack of perseverance, premeditation, urgency, and sensation seeking. However, the concept is explored as a determinant of purchasing behavior and reward seeking (Heilman et al., 2021; Heyes et al., 2012; Jeske et al., 2016), a mediator between financial literacy and debt decision making (Mette et al., 2019; Ottaviani & Vandone, 2016), as an outcome of financial education (DeHart et al., 2016), and as a moderator between financial literacy and FDM (Tahir et al., 2022). This paper considers impulsivity a sequential mediator along with DFL in the relationship between skills and FDM. This psychological trait needs to be explored to reveal the cognitive psychology, apart from the financial skills that support human behavior in FDM (Barberis & Thaler, 2005). Although the impact of financial education on reducing delayed discounting (caused by impulsivity) is examined by DeHart et al. (2016), no further studies emerged to prove or disapprove it. They argue that skills and DFL minimize impulsivity, which in turn enhances rational and sound FDM as individuals equipped with adequate financial resources (in terms of skills and literacy) are less vulnerable to dubious financial products and offerings and therefore make rational financial decisions. Therefore, we formulate the following hypotheses:

Hypothesis 13. The relationship between skills and financial decision making is sequentially mediated by digital financial literacy and impulsivity.

3. Data and methodology

3.1. Data-gathering process

As the sampling frame for the investor population is unavailable due to the pandemic, we adopted a mixture of simple random and snowball-sampling techniques for sample selection. A structured questionnaire was prepared and administered to the respondents through social media platforms (LinkedIn,

Facebook, and WhatsApp), email, and personal contacts. The study uses a combination of random and non-random sampling for data collection due to the decreasing response rate in the former (Brick & Williams, 2012). Thus, we use social media platforms as a push-to-web tool to increase the response rate and reach broader audiences in Delhi. The study focuses on Delhi as it was the area worst hit by Covid, with an exponential rise in cases. This left the city worse off economically than Mumbai, the financial capital, which at one point was the largest Covid hotspot in the country. Delhi had further lockdowns, crippling the economy and leading to catastrophic effects on financial decision making and well-being. After we filtered the data to remove incomplete questionnaires and unengaged respondents, we ended up with a total of 512 valid questionnaires to use for analysis. This sample size exceeds the suggested minimum sample size (85) obtained from G* Power with an effect size of 0.15, with an alpha level of 0.05 to achieve statistical power of 80 percent; it is advisable to have a sample three times this number (Hair et al., 2013).

3.2. Measures

The constructs are extracted from the literature review related to the FDM. The full theoretical model is divided into two separate questionnaires in order to reduce the number of questions in each one and to reduce the bias and unwillingness to respond. The structured questionnaire captures information on the respondents with respect to whether they are the earning member in family and make financial decisions. Respondents who were not earning members in their families and did not make financial decisions were excluded from the sample, and, among the earning members, respondents who are not the financial decision makers were also excluded. The items for DFL are adapted from Morgan and Trinh (2019) and Muellbauer (1988), those for impulsivity come from Shockey (2002), those for PFWB from Netemeyer et al. (2018), and those for FDM modified and adapted from deLizarraga et al. (2009). The items for financial autonomy are adapted from Micarello et al. (2012). Finally, items for skills are modified and adopted from Indeed (2021) and measured on seven-point Likert scale. Gender and age are measured as categorical variables. Because the scales in the model are modified and adapted, we performed pilot testing has on a sample of 50 respondents (Kapoor et al., 2014) to assess the face and content validity. Cronbach's alpha values exceed 0.70, which indicates that the questionnaire has good construct reliability. The items and their sources are listed in Appendix 1.

3.3. Data analysis

Before conducting multivariate analysis, we need to satisfy several assumptions (Hew et al., 2018). Common method bias (CMB) in the model is checked with Harman's single factor test. The test results reveal that no single factor accounts for more than 50 percent of the variance, with no evidence of substantial CMB. Also, the absence of excessively high

bivariate correlations between the constructs (>0.90) also confirm the absence of CMB (Lowry & Gaskin, 2014). Multicollinearity is checked with the calculated VIFs and tolerance, and the results show that the VIFs are less than 3.3 (Hew & Kadir, 2016). The normality of data is tested through a one sample Kolmogorov-Smirnov and Shapiro Wilk test. Since the p value is less than 0.05, the data is non normal. Hence, in this case, covariance-based structured equation modeling (SEM) is not recommended. Thus, we use variance-based SEM of PLS, as it is robust to nonnormal distribution (Leong et al., 2019). SmartPLS 3.3 (Ringle et al., 2015) is used to test the hypotheses. PLS-SEM also enables the testing of theoretical and complicated empirical models along with assessing the predictive ability of the proposed model. The model used in the study has many complex relationships apart from the presence of formative as well reflective constructs proving the applicability of PLS (Chin, 2010). FIMIX-PLS is used to assess the presence of unobserved heterogeneity in the data. PLS prediction is used to estimate the out-of-sample predictive power, and importance performance map analysis (IPMA) is conducted to assess the performance of the constructs.

4. Results

4.1. Demographics

We collected a total of 648 questionnaires, and 136 of the respondents were not earning members in their families and did not make financial decisions. Among the earning members of the family, 13 respondents refrained from making financial decisions, so they were also deleted from the final sample. Table 1 reports that 56 percent of the respondents were male, and 44 percent were female; 35 percent work at private companies, 25 percent were academics, and 23 percent were students who were working as well as pursuing undergraduate and postgraduate courses; 79 percent of the respondents were in the 21–50 age group, thus providing a bird's-eye view of the FDM capabilities of the working class.

4.2. Measurement model

The theoretical model is assessed with SmartPLS 3.3 (Ringle et al., 2015) to test the validity of the measurement model. The model includes higher-order constructs, thus at first only first-order constructs are added to the model (Fig. 1) to assess the reliability and validity and save their latent scores. In the second step, these latent scores are used to measure the second-order constructs (Fig. 2). This approach is known as the disjointed two-stage approach. The results on reliability and validity of the first-order constructs are shown in Table 2. The Cronbach's alpha and composite reliability (CR) values are larger than 0.70, thus indicating the presence of construct reliability. The average variance extracted (AVE) for all the constructs is greater than 0.50. All the item loadings are greater than 0.708, as recommended by Hair et al. (2019).

Table 1
Demographic profile.

Characteristics	Classification	Frequency	Percent
Are you an earning member in family?	No	123	19%
	Yes	525	81%
Do you take financial decisions	No	136	21%
	Yes	512	79%
Gender	Male	287	56%
	Female	225	44%
Profile	Student	117	23%
	Academician	128	25%
	Businessman/women	26	5%
	Entrepreneur	26	5%
	Private employee	174	35%
	Public employee	41	8%
Age	<20 years	71	14%
	21–30 years	154	30%
	31–40 years	138	27%
	41–50 years	113	22%
	51–60 years	31	6%
	>60 years	5	1%

Table 3 shows the validity of the higher-order construct (HOC) financial autonomy, perceived financial well-being, and skills. To confirm the convergent validity of formative HOC, the outer weights of the indicators must be significant. All the outer weights were found to be significant, and so are the outer loadings. Also, all the VIF values are less than 3, as per the

recommended threshold of 5 (Hair et al., 2019). The skills construct is the higher-order reflective construct. The Cronbach's alpha, CR and AVE values are higher than the thresholds of 0.70 and 0.50, respectively. All the factor loadings are also higher than 0.708, confirming the convergent validity (Hair et al., 2013).

To estimate the discriminant validity of the constructs, we use the stricter criteria of the heterotrait–monotrait (HTMT) ratio. The HTMT ratio in Table 4 is either less than 0.85 or 0.90, thus no issue of discriminant validity is found, as per Hair et al. (2019) and Henseler et al. (2014).

4.3. Structural model

We test the hypothesis using the bootstrapping technique in Smart PLS 3.3 with 5,000 random subsamples of the structural model (Fig. 2), and the path analysis results are presented in Table 5. The t statistic and the 95 percent bias-corrected confidence interval are used to ascertain the significance of the structural paths in the model. Based on the 95 percent bias-corrected confidence interval, a path is significant if no definite zero is found between the upper and lower boundaries, thus digital financial literacy alone has no significant impact on perceived financial well-being.

Skills have a significant impact on digital financial literacy ($\beta = 0.526, t = 9.35$) as well as financial autonomy ($\beta = 0.605, t = 9.79$). Thus, H1 and H2 are supported. Digital financial literacy significantly affects financial decision making ($\beta = 0.193, t = 3.79$) but its direct effect on perceived financial well-being is insignificant ($\beta = 0.081, t = 1.504$). Likewise, the direct impact on financial decision making of financial

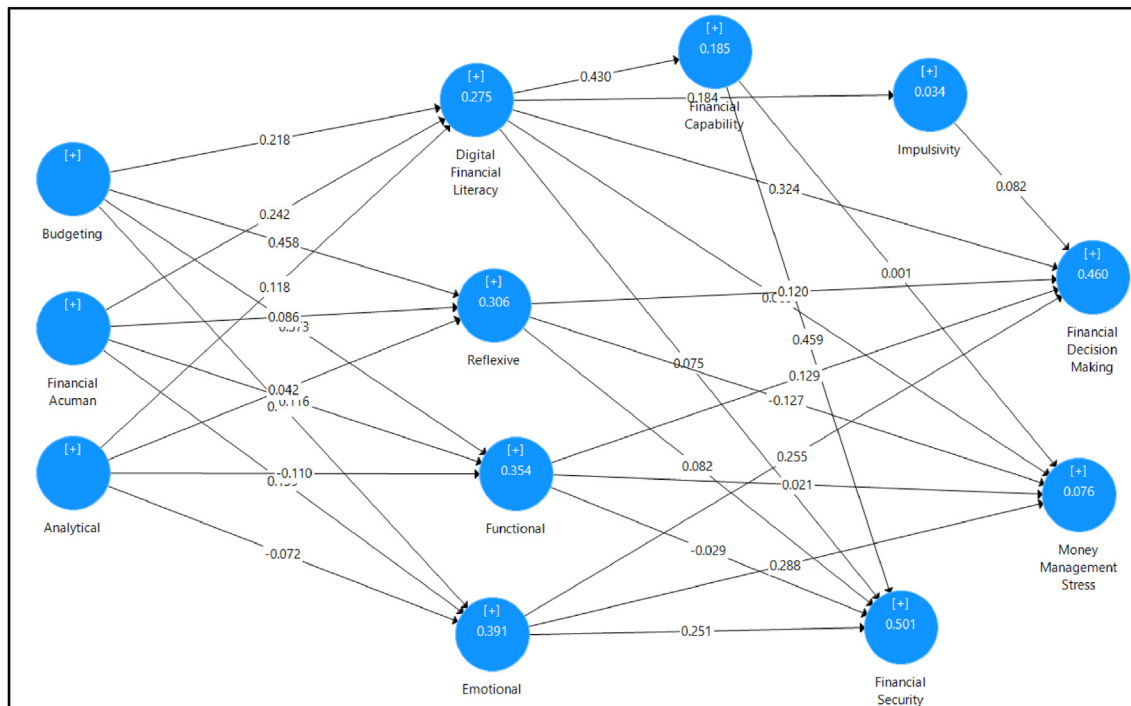


Fig. 1. Measurement model.

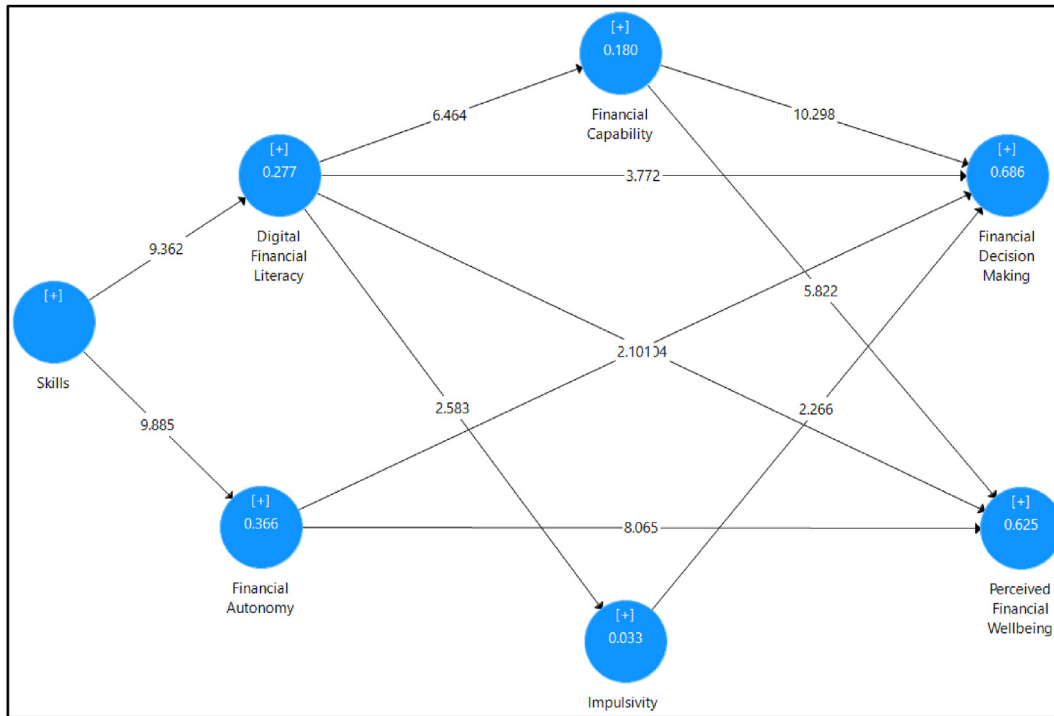


Fig. 2. Structural model.

autonomy is significant ($\beta = 0.113$, $t = 2.09$), and the same is true of perceived financial well-being ($\beta = 0.449$, $t = 8.149$). Thus, H3, H7, and H8 are supported, but not H4.

The structural model also has mediated relationships developed based on the literature. To confirm the presence of full, partial, or no mediation, the variance accounted for (VAF) is calculated as an indirect effect (IE) divided by the total effect (TE). In terms of parallel mediation, the relationship between skills and PFWB is partially mediated by FA (IE = 0.271, TE = 0.400, VAF = 0.6775), whereas DFL is an insignificant mediator in this relationship. However, in terms of the relationship between skills and FDM, both FA and DFL act as significant mediators. FA (IE = 0.068, TE = 0.320, VAF = 0.2125) and DFL (IE = 0.102, TE = 0.320, VAF = 0.3188) both partially mediate the relationship between skills and FDM. DFL is the strongest mediator in the relationship between skills and FDM. The model validates a new relationship between skills and FDM through the serial mediation of DFL with FC. In other words, skills enhance DFL, which in turns lead to an increase in FC and ultimately enhances the FDM of the respondent. Hence, H11, the serial mediation hypothesis, is supported by the results. Also, the same two mediators are significant in serially mediating the relationship between skills and PFWB. The quantum impact of serial mediators is larger on the FDM than on the PFWB. Thus, H12 fails to be rejected.

To support the results of the PLS-SEM model, PLS predict is performed to test the out-of-sample predictive power of the model. PLS predict with 10-fold and 10 repetitions is applied in the endogenous construct FDM and PFWB. Table 6 shows that all the indicators of both endogenous constructs outperform the

naïve benchmark, because the values of $Q^2_{predict}$ are higher than zero. The PLS error shows that the errors are normally distributed, thus RMSE (Root mean square errors) is used to assess the predictive power. Because the prediction errors estimated by the PLS model are lower than the naive LM (Linear model) benchmark for all indicators, the model has high predictive power.

4.4. Assessment of unobserved heterogeneity using the FIMIX-PLS approach

As per the recent literature on PLS-SEM, the aggregate data results should be free of unobserved heterogeneity bias (Matthews et al., 2016). Hence, we use finite mixture partial least squares (FIMIX-PLS) to detect unobserved heterogeneity in the data. The results of the FIMIX-PLS analysis indicate that selecting two, three, or four segments is not reasonable based on the minimum sample size criteria. Also, according to the decision criteria based on AIC3 and CAIC, the minimum value was found only in cluster 1, thus we find no unobserved heterogeneity. Hence, the results based on aggregate data are valid and generalizable.

4.5. Importance performance map analysis (IPMA)

To extend the results of this study, we perform an IPMA to assess the performance and importance of the constructs. The x-axis in Fig. 3 denotes the total effect, that is, the importance of the constructs, and performance scores (average value of construct scores in the range 0–100) on the y-axis. According to Ringle and Sarstedt (2016), IPMA helps in highlighting the

Table 2
Validity & reliability results.

Construct/Item	Loading	VIF	Cronbach's Alpha	Rho_A	Composite Reliability	Average Variance Extracted (AVE)
Digital Financial Literacy			0.924	0.933	0.936	0.621
DFA1	0.78	3.171				
DFE1	0.77	2.684				
DFE2	0.76	3.748				
DFE3	0.77	4.40				
DFK1	0.72	2.122				
DFK2	0.83	3.392				
DFK3	0.79	3.301				
DFK4	0.84	3.108				
DFK5	0.77	2.246				
Financial Capability			0.943	0.943	0.954	0.746
FC1	0.85	3.463				
FC2	0.88	3.958				
FC3	0.83	2.595				
FC4	0.90	3.985				
FC6	0.90	3.914				
FC7	0.85	3.215				
FC8	0.82	2.739				
Analytical			0.909	0.921	0.930	0.816
S_A2	0.90	4.174				
S_A3	0.91	3.747				
S_A5	0.90	3.789				
Budgeting			0.912	0.918	0.925	0.840
S_BD2	0.89	3.385				
S_BD3	0.89	3.229				
S_BD4	0.91	4.247				
Financial Acumen			0.908	0.921	0.928	0.810
S_FA1	0.88	3.077				
S_FA2	0.93	4.085				
S_FA3	0.89	3.392				
Impulsivity			0.844	0.846	0.906	0.762
IM1	0.84	1.974				
IM2	0.90	2.332				
IM3	0.88	1.898				
Financial Security			0.872	0.878	0.912	0.722
PFW_FS1	0.87	1.878				
PFW_FS3	0.83	1.963				
PFW_FS4	0.82	2.768				
PFW_FS5	0.84	2.877				
Money Management Stress			0.864	0.956	0.896	0.633
PFW_MMS1	0.73	2.074				
PFW_MMS2	0.73	2.081				
PFW_MMS3	0.89	2.107				
PFW_MMS4	0.88	1.983				
PFW_MMS5	0.70	1.666				
Emotional			0.766	0.770	0.850	0.586
FA_E1	0.80	1.673				
FA_E2	0.77	1.825				
FA_E3	0.75	1.455				
FA_E4	0.75	1.620				
Functional			0.863	0.873	0.901	0.646
FA_F1	0.80	2.054				
FA_F2	0.78	1.853				
FA_F3	0.82	2.128				
FA_F4	0.77	1.790				
FA_F5	0.85	2.096				
Reflexive			0.833	0.837	0.900	0.751
FA_R1	0.90	2.526				
FA_R2	0.89	2.474				
FA_R3	0.81	1.548				

(continued on next page)

Table 2 (continued)

Construct/Item	Loading	VIF	Cronbach's Alpha	Rho_A	Composite Reliability	Average Variance Extracted (AVE)
Financial Decision Making			0.933	0.935	0.946	0.715
FDM1	0.78	2.588				
FDM2	0.84	3.024				
FDM3	0.92	3.871				
FDM5	0.86	3.578				
FDM6	0.87	3.480				
FDM7	0.85	2.928				
FDM8	0.79	2.162				

Table 3
Higher order construct validity.

Construct	Item	Outer weight	Outer loading	VIF
Financial Autonomy	Emotional	0.657 ^a	0.943 ^a	1.739
	Reflexive	0.439 ^a	0.867 ^a	1.739
Perceived Financial Wellbeing	Money management Stress	0.565 ^a	0.883 ^a	1.462
	Financial Security	0.567 ^a	0.884 ^a	1.462
Skills		α	CR	AVE
	Analytical	0.885	0.928	0.812
	Budgeting			0.877
	Financial Acumen			0.886
			0.940	3.986

^a Indicates significance at 5% level.

strengths and weaknesses of constructs based on high importance and low performance, which is a major managerial implication. We perform IPMA twice, first with FDM as the target construct, and our results (in Table 7 and Fig. 3) for PFWB show that the FA construct has the highest importance as well as highest performance, followed by the skills construct. DFL is the key area, in which improvement is possible and should occur. Policy makers, managers, and practitioners should work on improving people's DFL. FC and skills are motivated enough to move to quadrant 3 of the IPMA matrix with high performance along with high importance.

In terms of the IPMA of FDM (Fig. 4), the impulsivity construct has the worst performance, it should be a low priority for managers. Again, managers, policy makers, and practitioners should focus on improving DFL to further enhance people's FDM power. Next is financial capability, which has a one-percentage-point increase in performance, so FDM is

expected to increase by 0.635 (total effect). Furthermore, FA has the highest performance, but it still has the least importance for people in making financial decisions.

5. Discussion

Over the past decade, FDM and PFWB have garnered attention in terms of both the determinants affecting them and their interaction effects, however, the results are ambiguous. H1 and H2 assume that skills have a positive effect on DFL and FA. The findings of this study to explore the effect of multiple skills on DFL suggest that a person who is adept and has budgeting skills, analytical skills, and financial acumen has the knowledge base required for understanding digital financial products and services. With respect to the positive relationship between skills and FA, the results are consistent with the self-efficacy theory. The findings also imply that an individual

Table 4
Discriminant validity.

Constructs	1	2	3	4	5	6	7	8	9	10	11	12
1. Analytical												
2. Budgeting	0.65											
3. Digital Financial Literacy	0.46	0.48										
4. Emotional	0.45	0.72	0.42									
5. Financial Acumen	0.88	0.79	0.51	0.59								
6. Money Management Stress	0.44	0.67	0.36	0.70	0.58							
7. Financial Capability	0.52	0.67	0.44	0.62	0.57	0.58						
8. Financial Decision Making	0.50	0.68	0.55	0.65	0.59	0.58	0.85					
9. Financial Security	0.42	0.62	0.41	0.67	0.53	0.58	0.70	0.64	0.58			
10. Functional	0.36	0.64	0.38	0.87	0.49	0.69	0.58	0.58	0.60	0.55		
11. Impulsivity	0.07	0.04	0.21	0.18	0.06	0.18	0.09	0.20	0.04	0.20	0.12	
12. Reflexive	0.44	0.62	0.41	0.80	0.52	0.67	0.58	0.57	0.64	0.56	0.86	0.08

Table 5
Structural Model results.

Hypothesis	Structural path	β	t statistics	95% bias corrected CI (LB, UB)	Result
H1	Skills - > Digital Financial Literacy	0.526	9.35**	(0.394, 0.623)	Fail to reject
H2	Skills - > Financial Autonomy	0.605	9.79**	(0.459, 0.708)	Fail to reject
H3	Digital Financial Literacy - > Financial Decision Making	0.193	3.79**	(0.096, 0.298)	Fail to reject
H4	Digital Financial Literacy - > Perceived Financial Wellbeing	0.081	1.504 ^{ns}	(-0.021, 0.189)	Reject
H5	Skills - > Digital Financial Literacy - > Perceived Financial Wellbeing	0.043	1.405 ^{ns}	(-0.01, 0.107)	Reject
H6	Skills - > Digital Financial Literacy - > Financial Decision Making	0.102	3.504*	(0.051, 0.165)	Fail to reject
H7	Financial Autonomy - > Financial Decision Making	0.113	2.09*	(0.016, 0.23)	Fail to reject
H8	Financial Autonomy - > Perceived Financial Wellbeing	0.449	8.149**	(0.337, 0.552)	Fail to reject
H9	Skills - > Financial Autonomy - > Perceived Financial Wellbeing	0.271	5.668**	(0.18, 0.368)	Fail to reject
H10	Skills - > Financial Autonomy - > Financial Decision Making	0.068	1.992**	(0.01, 0.144)	Fail to reject
H11	Skills - > Digital Financial Literacy - > Financial Capability - > Financial Decision Making	0.142	3.939**	(0.078, 0.22)	Fail to reject
H12	Skills - > Digital Financial Literacy - > Financial Capability - > Perceived Financial Wellbeing	0.087	3.482**	(0.045, 0.143)	Fail to reject
H13	Skills - > Digital Financial Literacy - > Impulsivity - > Financial Decision Making	0.008	1.512 ^{ns}	(-0.001, 0.023)	Reject

Note: *p < 0.05, **p < 0.01, nsp > 0.05; β = Beta coefficient; CI = confidence interval; LB = lower boundary; UB = upper boundary.

Table 6
PLS predict.

Construct/Indicators	PLS_RMSE	LM_RMSE	Difference	Q2_Predict
Financial Decision Making				
FDM1	1.310	1.392	-0.082	0.251
FDM2	1.192	1.254	-0.062	0.268
FDM5	1.306	1.378	-0.072	0.309
FDM6	1.311	1.350	-0.039	0.241
FDM7	1.313	1.361	-0.048	0.266
FDM8	1.329	1.402	-0.073	0.286
Perceived Financial Wellbeing				
Financial Security	0.830	0.863	-0.033	0.316
Money management Stress	0.791	0.847	-0.056	0.380

Table 7
IPMA.

Target Construct: Perceived Financial Wellbeing	Total Effect	Performance
Digital Financial Literacy	0.245	65.846
Financial Autonomy	0.449	74.584
Financial Capability	0.388	70.521
Skills	0.400	70.616
Target Construct: Financial Decision Making		
Digital Financial Literacy	0.478	65.846
Financial Autonomy	0.113	74.584
Financial Capability	0.635	70.521
Impulsivity	0.085	48.610
Skills	0.320	70.616

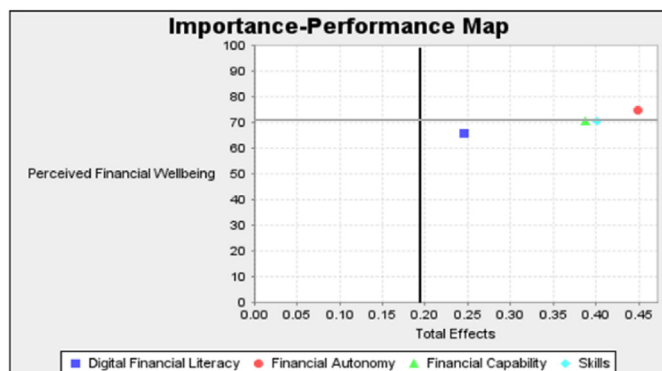


Fig. 3. IPMA - perceived financial wellbeing.

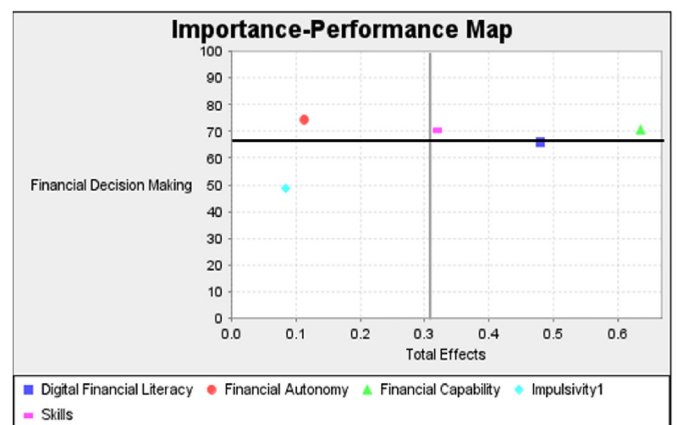


Fig. 4. IPMA - financial decision making.

gains confidence in independent financial decisions from employing money management planning and analytical techniques. The results are further justified by the rationale articulated by Cole and Shastry (2009), that having adequate skills minimizes financial mistakes, mitigates loan defaults, and informs portfolio diversification, all of which reflect appropriate financial decisions and enhanced PFWB.

H3–H6 investigate the direct and mediating effects of DFL on FDM and PFWB. We find no statistically significant association between the direct and indirect effects of DFL on PFWB. However, the results are positive and statistically significant between DFL and FDM, thereby expressing congruence to the goal framing theory and the findings of Valaskova et al. (2019) and Rahayu et al. (2022). The results signal that a person's experience, knowledge, and attitude toward digital financial platforms as well as digital products and services minimize behavioral bias and financial mistakes, thereby leading to rational, safe, profitable, and informed financial decisions. DFL also ensures financial resilience, as it facilitates mainstream financial services for the underprivileged and the less informed by opening pathways for credit and savings.

H7–H10 explore the direct and mediating effects of financial autonomy on FDM and PFWB. We find a statistically significant association between these dependent variables when financial autonomy is used as a direct influencer as well as a mediator. These results are also consistent with the goal framing theory as well as the findings of Jariwala (2020), who believe that financial autonomy plays a vital role in influencing FDM.

The positive mediating effects of financial capability and DFL between skills and FDM as well as PFWB are the focal points of attention in H11 and H12. Although this is the first study to explore that complex pathway, the results are consistent with the hypothesized positive relationship in the findings of Lučić et al. (2022), Storchi and Johnson (2016), Xiao (2008), and Bowman et al. (2017). This indicates the exemplary role of the capability approach, which emphasizes financial capacity building, in conjunction with skills, which act as precursors to sound management of financial resources by making optimal financial decisions. Additionally, alluding to Sherraden's (2013) dual dimensions of financial capability, the results suggest that DFL strengthens internal capacities while educating individuals about various digital financial platforms that are accessible, affordable, reliable, and sensible, thereby enhancing their PFWB. Lastly, the joint mediating effects of DFL and impulsivity between skills and FDM is explored in H13, and the results are insignificant. The results show that impulsivity is not determined by skills or DFL and is a psychological trait that emerges when a person foresees immediate short-term gains that exceed long-term gains, without weighing the potential costs, risks, or pitfalls that might arise.

In conclusion, timely and rational financial decisions, along with PFWB, are not a privilege but a right that can be facilitated by decision-making bodies. As individuals become accountable for their own financial planning and well-being in this digital age while being exposed to the myriad financial information available to the public, it is imperative for them to possess a required sophisticated financial skill set to handle that

responsibility. The only solution is seamless access to timely financial guidance, including financial education in school curriculums, investigating roadblocks to FA and capability, and consistently monitoring and enforcing the effectiveness of the initiatives presented to enhance FDM and PFWB. Although promising interventions and approaches have been proposed to create rational FDM and PFWB in terms of financial regulations, financial advice, literacy programs, and digital initiatives, the results do not yet offer a holistic view of the situation because of the complex nature of people's structural, cultural, financial, political, and psychological makeup.

6. Practical, academic and policy implications

This research is significant and enriches behavioral finance research in several ways. For prospective scholars, this is a unique study with a comprehensive empirical analysis of the nexus among skills, financial behavior, financial decision making, and financial well-being as well as the influence of psychological factors, while substantiating them with underpinning theories and contemporary literature to reflect the current thinking about these concepts. For educators, practitioners, and decision makers, this study recognizes the unique interaction among skills, FDM, and PFWB, which expands people's critical abilities, enabling them to address environmental challenges and manage socioeconomic pressures in a sustainable manner, and translates the benefits into prudent gender-specific policy decisions and practices. For countries in the process of rapid automation and digitization, the explanatory power of DFL in the FDM and PFWB relation clearly helps to ensure digital financial inclusion. Policy makers can engage in private-public partnerships to exploit synergies in order to make the relevant benefits, risks, and avenues for obtaining digital financial skills as well as initiate affordable and accessible programs widely available to users to help them navigate unfamiliar DFL horizons and complex financial products and services available on the market.

After the initiation and implementation of these programs, policy makers should also monitor and evaluate them to determine the impact of implementation, the degree of penetration, acceptance, and use of DFL, and the extent of inclusivity created by these initiatives. The results of this paper show that individuals should reinforce their financial skills to enable their seamless acquisition of DFL, to equip themselves with the skills, knowledge, confidence, and experience to enhance their financial capabilities, all of which facilitate FDM and PFWB. Finally, for young people, the study shows promising pathways for understanding the FDM-PFWB nexus so that they can identify the relevant factors of FDM in the current Covid era as well as the core cognitive skills and competencies for building good financial habits as they become adults.

6.1. Limitations and recommendations for future research

Although the paper is unique in terms of its theoretical underpinnings and analysis of complex pathways with a unique

set of mediators and constructive implications for FDM and PFWB, it is not free of limitations. Covid-related restrictions affected the response rates, as they hindered direct access to respondents, therefore restricting our sampling technique to snowball sampling. Future research could enlarge the sample size, perform cross-country research, and extend the investigation to other emerging markets to reveal the variations in driving factors based on regional dimensions. Our limited application of demographic moderators, such as gender, socioeconomic status, and employment status, leads to interpretation of the results from a general perspective. Future research could integrate the variables discussed here to determine the FDM and PFWB determinants for each of the groups studied, adding to the body of knowledge on behavioral finance.

7. Conclusion

Throughout their lives, from youth to old age, everyone continually has to make decisions that have economic consequences. This study highlights the direct and mediating effects of various kinds of financial behavior and psychological determinants on FDM and PFWB, acknowledging the rationale that they are both required for success and peace of mind, economic growth, and prospective wealth maximization effects. Responses from the 270 respondents surveyed in October and November 2021 are analyzed using a variance-based SEM with partial least squares (PLS) in SMART PLS 3.3. Our results demonstrate that skills and financial behavior including components such as FC, DFL, and FA have a significant impact on people's thought process in making financial decisions. DFL does not have a significant association with PFWB, when it is considered as a direct or sole mediating factor. However, when it is associated with financial capability, DFL as a mediator has a significantly positive relationship with PFWB, confirming that DFL increases a person's financial capability at money management and other related functions, thereby enhancing PFWB. Finally, the combined mediating effects of DFL and financial autonomy also have a positive association with both FDM and PFWB.

Author contributions

Dr. Parul Kumar: Conceptualization, Methodology, Formal Analysis; Dr. Rekha Pillai: Conceptualization, Writing – original draft; Dr. Neha Kumar and Dr Mosab Tabash: Conceptualization, Writing – reviewing & editing.

Declaration of competing interest

The authors declare that there is no conflict of interest.

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Appendix A. Supplementary data

Supplementary data to this article can be found online at <https://doi.org/10.1016/j.bir.2022.09.012>.

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