



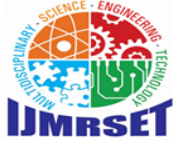
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## International Journal of Multidisciplinary Research in Science, Engineering and Technology (IJMRSET)

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# Behavioral Finance in the Era of Deep Personalisation: A Structural Analysis

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**ABSTRACT:** The field of behavioural finance has been greatly transformed by the incorporation of artificial intelligence (AI) and high-level personalisation in financial services. This paper discusses the way in which conventional cognitive biases, including loss aversion, present bias and overconfidence, develop in AI-oriented, personalised financial contexts. It dwells on the idea of adaptive biases, in which the behaviour of individuals is constantly shaped and altered under the influence of real-time feedback, micro-targeted nudges, and recommendations based on algorithms on fintech platforms.

The study uses available empirical evidence to assess the effectiveness of digital nudges (overspending alerts, goal-setting reminders, and default options) to change financial behaviours associated with savings, consumption, and debt management. There is evidence that these types of interventions can lead to quantifiable short-term behavioural change, but their sustainability in the long-term is uncertain because of other processes like habituation and waning user interest. The study also marks the increased importance of iterative personalisation in increasing the relevance and effectiveness of behavioural interventions.

Additionally, the paper deals with the most important ethical aspects, such as transparency, consumer autonomy, and data privacy, which are the outcomes of the growing use of AI-based nudging. The results indicate that though deep personalisation has a great potential to enhance financial decision-making, its success relies on its continuous adaption, responsible design, and adequate regulation to provide positive and sustainable consumer experiences.

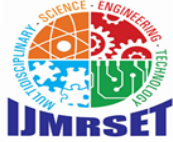
**KEYWORDS:** Behavioural Finance, AI-Driven Personalisation, Digital Nudging

## I. INTRODUCTION

The development of artificial intelligence (AI) into financial services has been rapidly integrating, and the sphere of behavioural finance is changing dramatically due to the advent of deep personalisation (Rossi, 2025). Classical behavioural finance recognises systematic cognitive biases, including loss aversion, present bias and overconfidence, which always affect how people make financial decisions. But, with the emergence of fintech platforms, mobile banking apps, and AI-based advisory systems, these biases no longer remain fixed (Behera et al., 2025). Rather, they are becoming adaptive, being constantly conditioned by individualised digital spaces that personalise financial information, advice, and responses in real-time to individual users.

Recent empirical studies reveal that micro-targeted digital nudges can have a significant impact on financial behaviour. As an example, the daily amount that users spend on personalised overspending alerts sent via mobile financial applications has been found to decrease by about 5% with some signs of greater cumulative changes over time (Owusu Berko, 2025). These interventions work by using behavioural insights like salience, feedback, and timely reminders to influence the users to achieve better financial outcomes and not to limit their options. Meanwhile, machine learning progress allows platforms to continually improve these nudges, making them more precise and engaging over time (Koneti, 2025).

However, there are still critical issues. Research indicates that nudges can be useful in the short-term, but the effect might be undermined in the long-term unless they are continually adapted (Omotayo et al., 2023). This poses some important questions regarding the development of behavioural biases in the context of high levels of personalisation, the real effectiveness of digital intervention on the financial well-being of the target population, and the ethical consequences of the algorithmic effect. This paper thus examines adaptive biases and the impact of scalable and personalised interventions in contemporary fintech systems.



## International Journal of Multidisciplinary Research in Science, Engineering and Technology (IJMRSET)

(A Monthly, Peer Reviewed, Refereed, Scholarly Indexed, Open Access Journal)

### II. RATIONALE AND OBJECTIVE

#### Rationale

The increasing adoption of artificial intelligence and data analytics in the financial services sector has brought about a radical change in the way people engage with money. Fintechs currently leverage real-time data, behavioural analytics, and algorithm technology to provide extremely personalised financial guidance and interventions (Gupta and Rao, 2025). Although the conventional behavioural finance theory presupposes comparably stable cognitive biases, new evidence points to the fact that these biases become more dynamic and context-specific in the online space. As one example, a series of personalised nudges, e.g., overspending notifications or savings reminders, has been found to change short-term financial behaviour, such as quantifiable changes in daily spending and financial-awareness levels (Kanaparathi, 2024).

Nonetheless, the success of such interventions is not even and enduring. Studies show that nudges can temporarily change behaviour, but the effects in the long-run might fade unless they are constantly modified to user context and engagement patterns. Moreover, improvements in AI-based personalisation enable platforms to continually optimise nudges, forming a feedback loop between user behaviour and system design (Kubińska et al., 2023). This brings the important questions as to whether behavioural biases are being reduced, strengthened or even created in these environments.

With the rising use of fintech platforms in making daily financial choices, there is an apparent necessity to study the functioning of adaptive biases in the context of deep personalisation and determine the scalability and sustainability of digital interventions (Challa, 2023). The study is thus critical in both theoretical and practical knowledge on the development of ethical and effective financial technologies.

#### Objectives

1. The first objective is to examine how traditional behavioural biases, such as present bias, loss aversion, and overconfidence, evolve in AI-driven personalised financial environments. This involves determining how personalisation results in lessening or increasing these biases in the long run.
2. The second goal is to assess the success of micro-targeted digital nudges and commitment devices to affect consumer behaviour (savings, consumption, and debt management) based on evidence of fintech platforms and empirical research.
3. The third goal will be to determine the scalability and long-term sustainability of these interventions, especially in the context of user engagement, behavioural persistence and possible unintended consequences in digitally mediated financial ecosystems.

### III. METHODOLOGY

This paper uses a secondary research design, where the sole source of data is the existing academic literature to study the topic of behavioural finance in the age of deep personalisation (Cheong et al. 2023). The study relies on peer-reviewed journal articles, working papers, and conference publications obtained mostly from Google Scholar, so that all the information and knowledge are obtained on the basis of reliable and academic sources. This method is suited because the topic is conceptually and dynamically changing, and the synthesis of current empirical and theoretical literature is a good starting point for the analysis.

The search strategy was a structured search, with the use of relevant keywords, including behavioural finance, digital nudges, AI personalisation in fintech, adaptive biases, and financial decision-making. Search results were narrowed down to relevance using Boolean operators (e.g., AND, OR). Recent works (since 2015) were given priority to reflect the current trends in AI and fintech, and seminal past works were considered to provide a theoretical basis (Manu and Akotia, 2021). Peer-reviewed and widely cited sources were only used to ensure that the data were reliable and valid.

The literature collected was analysed through a thematic analysis approach. The chosen articles were evaluated and divided into major themes, such as traditional behavioural biases, digital nudging, AI-driven personalisation, effectiveness over time, and ethical considerations. This enabled the detection of patterns, similarities and gaps in various studies (Ralph and Baltes, 2022).

Sources were critically reviewed with regard to relevance, quality of the methodology and empirical evidence to ascertain academic rigour. The research is, however, constrained by the fact that it uses secondary data, which is not the best way



## International Journal of Multidisciplinary Research in Science, Engineering and Technology (IJMRSET)

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of capturing real-time behavioural changes in fast-changing digital spaces (Ruggiano and Perry, 2019). Although this is its limitation, the methodology offers an evidence-based and holistic grasp of the research topic.

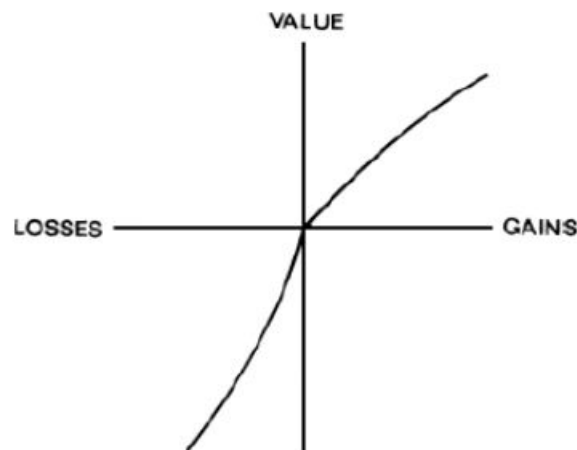
### IV. LITERATURE REVIEW

The available knowledge on the topic of behavioural finance in the scope of deep personalisation can be grouped into five major themes that show the dynamic nature of financial decision-making in online contexts.

#### Theme 1: Traditional Behavioural Biases in Financial Decision-Making

Behavioural finance questions the classical economic assumption that all human beings are rational in their decision-making by showing that financial behaviour is in many cases influenced by systematic cognitive biases (Sattar et al., 2020). These biases are because of heuristics-mental shortcuts that people apply to make complex decisions, especially in the face of uncertainty. Some of the best-known biases include loss aversion, present bias, overconfidence, and mental accounting, which all play an important role in the savings, consumption, and investment decisions (Khare and Kapoor, 2024).

#### Graphical representation of loss aversion



<https://neuroprofiler.com/en/loss-aversion-back-to-the-theory/>

Loss aversion is the characteristic that people experience the pain of losses more than the pleasure of equal gains. This can result in too conservative investment decisions or the unwillingness to dispose of losing investments even when it can be financially prudent to do so (Kanapickienė et al., 2024). Contrastingly, present bias is an inclination to prefer the present gains to future gains. This bias is especially noticeable in the low rates of savings and high rates of consumer debt, given that people give preference to immediate consumption rather than financial security in the long run (Hrnjic et al., 2019).

Another vital bias is overconfidence when people overestimate their knowledge or capability to foresee market movements. This often leads to over-trading, high transaction costs, and eventual low returns on investment (Madaan and Singh, 2019). Mental accounting also makes it difficult to make financial decisions, since people will classify money into distinct accounts under subjective criteria, resulting in uneven and even illogical financial decisions (Zahera and Bansal, 2018).

Such biases have been found to be very consistent and uniform among populations as well as in financial settings, which gives a strong theoretical basis to behavioural finance (Kamoune and Ibenrissoul, 2022). Notably, they emphasize that financial decision-making is not a completely rational process but it is highly affected by the psychological factors. These traditional biases are a crucial aspect to understand as they act as a standard against which the impacts of modern digital



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spaces and AI-based personalisation can be assessed in modifying, reinforcing, or alleviating such behaviours in the modern financial landscape (DAVYDENKO et al., 2023).

### Theme 2: Digital Nudging and Behavioural Interventions in Fintech

Digital nudges are now a key attribute of contemporary financial technology (fintech) applications, using behavioural insights. Nudges are minor changes in the choice architecture which affect decision-making without imposing any restriction on the free choice (Agrawal, 2025). In contrast to the conventional financial advice based on rational assessment, nudges should be aligned to human psychology with the help of cognitive biases, like inertia, salience, and framing. These interventions are often directly integrated into user interfaces and are therefore scalable, timely and very contextual in fintech settings (Das and Das, 2025).

Empirical studies indicate that financial behaviour can be impacted significantly through nudges that are conducted using fintech. An example is personalised over-spending notifications in a mobile banking app that were found to decrease the daily spending of the users by an average of 5 per cent, demonstrating a quantifiable and immediate behavioural change (Houna and Wittmann, 2026). They usually operate by making financial information more salient at key decision-making stages and encourage users to rethink discretionary expenditure. Likewise, the presence of goal-setting functionality and automated reminders can be used to motivate people to save on a regular basis, whereas default settings like automatic enrolment in savings plans can take advantage of inertia to help people improve their financial behaviours (Halder and Vijaykarthigeyan, 2025).

Moreover, the digital channels are able to provide nudges in real-time, which means that continuous interaction with the users is possible. This immediacy increases their efficacy as opposed to the traditional and static interventions (Jisham et al., 2024). Large user data volumes are also useful to fintech applications, as they can be used to nudge users according to their behavioural patterns, transaction history, and financial objectives. Such a level of customisation makes the interventions more relevant and meaningful, which is more effective than generic ones.

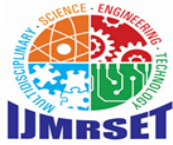
On the whole, the incorporation of digital nudging into fintech platforms demonstrates the potential application of behavioural economics on a large scale (Iuliia, 2025). Fintech companies are not only shaping the personal-level decision-making process but also altering more comprehensive trends of financial behaviour in more and more data-driven ecosystems by integrating psychologically informed interventions into ordinary financial instruments.

### Theme 3: AI-Driven Personalisation and Adaptive Biases

The latest developments in machine learning and artificial intelligence (AI) have revolutionised the sphere of financial services and allowed providing a highly personalised experience to users. In contrast to conventional financial systems, which use standardised advice or generic solutions, AI-based solutions examine vast amounts of personal data, including history of transactions, spending habits, risk preferences, and behaviour of engagement, to provide personalised recommendations in real-time (Somu, 2020). This personalisation has created a great sense of relevance to financial intervention and when such intervention is needed, and created a closer correspondence with individual needs and behavioural inclinations (Oyetunji, 2024).

One of the main evolutions in this regard is the appearance of adaptive biases. Whereas the traditional behavioural finance approach views biases as fairly stable characteristics, recent studies propose that these biases are dynamically changing in reaction to ongoing feedback provided by personalised systems (Swamy, 2025). Such AI-based platforms do not merely respond to user behaviour, but instead actively influence it via the form of iterative learning. As an example, systems may modify the frequency, framing, and timing of nudges based on user response, forming a feedback loop where the user and the algorithm modify both over time (Paramesha et al., 2024).

Such iterative personalisation is proven to be effective. However, experimental studies have revealed that AI-enhanced, personalised nudges can substantially lead to better behavioural consequences than more typical interventions. As an example, customised and constantly evolving nudges have been discovered to enhance user engagement and generate more impactful behavioural changes, such as quantifiable increases in decision quality and resource-saving behaviour (Vandanapu, 2024). One field experiment demonstrated that iterative personalised nudges increased the desired behavioural outcomes by more than 18 percentage points, demonstrating the promise of adaptive systems to instigate lasting change.



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These results imply that behavioural biases can be perceived not as rigid limits but can be transformed by engaging in repeated interactions with intelligent systems. Yet, this also creates key questions about how much AI affects decision-making, which could reinforce some behaviours and neutralise others (Peddamukkula, 2023). As such, AI-driven personalisation represents both an opportunity and a challenge in the evolving landscape of behavioural finance.

### Theme 4: Effectiveness and Limitations of Nudges Over Time

Although digital nudges have proven to be effective in the short term in influencing financial behaviour, the long-run effects of nudges are a contentious topic in the field of behavioural finance. Numerous empirical studies have demonstrated that nudges can effectively trigger immediate behaviour, like increased savings or decreased spending, through reminders, alerts, and default settings. But the continuation of these behavioural changes with age is less definite (van den Akker, 2025). There are indications that people might eventually become desensitised to repeated nudging and become less responsive as the intervention no longer seems novel or attention-grabbing.

The problem of diminishing marginal effectiveness is one of the major limitations. With repeated exposure to similar nudges, the early effect of behavioural influence can decrease, resulting in a drop in engagement (Binhamad, 2025). This is especially applicable to online settings, where users often encounter a series of notifications and prompts, which raises the likelihood of alert fatigue. Consequently, people might start turning a blind eye to such functions or even turn them off completely, which will restrict their usefulness in the long run (Koskelainen et al., 2023).

Moreover, studies also point out that unintended implications may arise due to improperly designed or misplaced nudges. When interventions are considered intrusive, irrelevant or manipulative, users can be opposed to them or even behave contrary to it (AYA et al., 2024). Indicatively, generic or untimely financial prompts might not appeal to the real needs of the users and can be less effective, which may compromise trust in the platform. This highlights the need to design behavioural interventions in context-sensitive and user-centric designs.

To cope with them, researchers note the necessity of constant change and individualisation of nudges. Interventions should change with the behaviour of the users, tastes, and economic conditions in order to be effective. This is especially relevant in the fast-paced financial settings where a set of methods can easily become outdated (Abdul Jamal, 2022). Thus, the long-term view, taking into account the persistence of behaviours, user involvement, and dynamism of digital financial ecosystems, is needed to assess the sustainability of nudges.

### Theme 5: Ethical Considerations and Consumer Autonomy

The growing use of AI-based nudges in the financial sector has resulted in serious ethical issues, especially in terms of transparency, consumer sovereignty, and the ability to manipulate. Although nudges aim to help people make superior decisions in the financial area without limiting their decisions, the concept of deep personalisation brings complications that undermine this principle (Houna and Wittmann, 2026). Newly personalised interventions, fuelled by extensive behavioural and transactional information, can be used to manipulate decision-making in ways that might be unobservable and interpretable to users, thus blurring the distinction between advisory and control.

A key issue is that there is the risk that algorithmic systems can exacerbate and not reduce the presence of the existing biases in behaviour. To take one example, in the context of lending or consumption, platforms might create nudges that lead to more spending or borrowing which may be more supportive of commercial interests than consumer welfare (Agrawal, 2025). This begs the question of whose interests they are serving and whether they are covertly guiding users to make decisions which might not be in their long-term financial best interest. This is increased by the persuasive nature of AI-driven systems, particularly when constantly trained using user information (Sinha et al., 2025).

Informed consent and data privacy are also vital. The personalisation based on AI depends on the gathering and processing of personal data on a mass scale, including sensitive financial information. Often, users do not have the knowledge of how their data are being used to formulate recommendations or manipulate behaviour (Hesami, 2025). This non-transparency may compromise trust and restrict individuals from making full-fledged decisions. Moreover, the issue of equity and unjustness regarding algorithmic systems is gaining more and more importance, whereby a segment of users might fall disproportionately to automated decision-making algorithms (Kumari, 2023).

To this, the literature continues to stress responsible design such as transparent disclosure of nudging mechanisms, user control over personalisation options, and ethical conduct. There should also be regulatory supervision to provide



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accountability and safeguard consumer interests (Popoola, 2025). Finally, the need to make AI-driven interventions to contribute to the consumer well-being, instead of causing it, is one of the main issues of the changing behavioural finance.

### V. CONCLUSION

The history of behavioural finance in the age of deep personalisation demonstrates that there is a major change in the behavioural pattern of cognitive types to active and adaptive behavioural patterns. Conventional biases like loss aversion, present bias, and overconfidence still have an effect on financial decision-making, but the merger of AI-based personalisation and fintech solutions has changed the expression and management of these biases. There are demonstrable improvements in digital nudges and behavioural interventions in the manipulation of short-term financial behaviours, especially with real-time and context-specific engagement.

Meanwhile, it is demonstrated in the literature that these effects do not necessarily persist due to user habituation and disengagement that can diminish the long-term effects. This highlights the need to constantly adapt, personalise, and design interventions carefully to ensure effectiveness in the long term. Moreover, adaptive bias formation implies that user behaviour is becoming more formed due to continuous interaction with intelligent systems, providing possibilities of better financial performance and risking unintentional influence.

What continues to be important in this discussion is ethical considerations. The concerns of transparency, autonomy, and data privacy will need to be resolved so that AI-driven interventions will help consumers remain healthy instead of capitalising on behavioural patterns. In general, despite the potent tools that deep personalisation can bring to the improvement of financial decision-making, the key to its success is the balance between technological innovation and ethical responsibility and long-term sustainability of behaviours.

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