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Digital Financial Governance Self Regulation and Students Financial Discipline in Indonesian Islamic Boarding Schools

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Abstract

This study examines how digital payment systems influence financial discipline through self-regulation within Islamic boarding schools as emerging institutions of digitally mediated governance. The study was motivated by the rapid digital transformation of financial governance within Islamic educational institutions and the limited understanding of its behavioural consequences in socially regulated educational communities. Using a quantitative explanatory approach with a cross-sectional survey design, data were collected from 146 students at Pesantren Raudlotut Tholibin, Indonesia. Data were analyzed using regression-based mediation analysis through PROCESS Macro Model 4 with bootstrapping procedures involving 5,000 resamples. The findings indicate that cashless payment systems positively and significantly influence students' financial discipline, both directly and indirectly through self-regulation. Self-regulation functioned as a partial mediator, suggesting that digital payment systems shape financial discipline not only through transaction control mechanisms but also through the strengthening of internal behavioural regulation. The findings further reveal that the behavioural consequences of cashless systems are context-dependent and shaped by institutional structures, social control, and disciplinary culture within pesantren environments. Theoretically, this study contributes to the emerging literature on digital governance, financial behaviour, and institutional regulation by positioning self-regulation as a central behavioural mechanism linking digital financial systems with financial discipline. Practically, the findings highlight the potential of cashless systems to support digitally mediated governance and behavioural regulation within digitally transforming institutions.

INTRODUCTION

The rapid digital transformation of financial systems has not only reconstructed the infrastructure of economic transactions but has also reshaped institutional practices, social interactions, and individual financial behaviour across contemporary societies. The rapid expansion of financial technology (fintech), particularly cashless payment systems, has accelerated broader processes of digital transformation that increasingly influence institutional governance, social interaction, and everyday financial behaviour (Gomber et al., 2017; Ozili, 2021; van Dijck et al., 2018). In this context, payment digitalization should not merely be understood as an innovation that enhances transactional efficiency, but rather as part of a broader transformation of economic systems that influences individual financial decision-making processes. Empirical evidence demonstrates that the expansion of digital financial services is associated with changing transaction patterns and increased financial inclusion, particularly in developing countries (Aracil et al., 2025; Demirgüç-Kunt et al., 2022; Gálvez-Sánchez et al., 2021). Moreover, recent studies indicate that the use of digital payment systems is also linked to changes in economic behaviour, the strengthening of digital financial literacy, and the emergence of new consumption patterns in contemporary society (Liébana-Cabanillas et al., 2021; Morgan et al., 2019). Accordingly, digital payment systems represent not only financial innovations but also socio-technical infrastructures that reshape behavioural regulation and institutional governance within contemporary digital societies.

From the perspective of behavioural economics, payment systems function as mediating mechanisms that shape individuals' psychological experiences during financial transactions. The concept of *pain of paying* suggests that cash transactions generate a more tangible sense of monetary loss than digital payments, thereby serving as a natural mechanism for controlling expenditure (Ahmad et al., 2020; Alkadash et al., 2025; Prelec and Loewenstein, 1998; Raghubir and Srivastava, 2008). When such psychological barriers are reduced through cashless systems, individuals tend to become less sensitive to spending, potentially increasing impulsive consumption behaviour (Feinberg, 1986; Klucarova and He, 2023; Schomburgk et al., 2024; Soman, 2001). Several studies have further demonstrated that digital payment usage is associated with higher transaction frequency and increased spending volume, particularly among younger individuals who are still in the developmental phase of self-control formation (Jonker et al., 2012; Liu et al., 2021). Within this perspective, cashless systems are often viewed as mechanisms that may weaken individuals' internal control over consumption behaviour.

Beyond individual financial behaviour, these technological developments have increasingly transformed how institutions govern, monitor, and regulate everyday social practices through digital infrastructures. However, contemporary literature suggests that the influence of cashless systems on financial behaviour is neither linear nor deterministic. Within the frameworks of *nudge theory* and *choice architecture*, digital technologies can be designed as instruments that shape individual behaviour through structured decision environments (Benartzi et al., 2017; Brandl et al., 2025; Marszałek and Szarzec, 2021). Payment digitalization enables greater transparency, transaction tracking, and spending restrictions compared to conventional cash systems, thereby potentially strengthening financial discipline when integrated into appropriate institutional frameworks (Agarwal et al., 2015; Auer et al., 2021; Jain et al., 2026). Recent studies further reveal that digital payment systems may promote financial discipline by enhancing transaction transparency, expenditure control, and financial awareness (Riitsalu and Murakas, 2019). In addition, fintech development increasingly influences users' economic decision-making processes in more structured and adaptive ways toward modern financial management (Cumming et al., 2023; Jede and Teuteberg, 2025; Setiawan et al., 2021). These findings generate a fundamental theoretical tension within the literature: on one hand, cashless systems are considered capable of encouraging consumptive behaviour through the reduction of psychological spending barriers; on the other hand, the same systems may also function as mechanisms of behavioural control that reinforce financial discipline.

This theoretical tension indicates that the relationship between cashless systems and financial behaviour cannot be adequately explained through direct associations alone, but instead requires psychological mechanisms that mediate the interaction between technological systems and individual behavioural responses. In this regard, self-regulation emerges as a critical construct explaining how individuals control impulses, establish goals, and continuously monitor their behaviour (Baumeister et al., 2007; Begum, 2025; Bunge, 2024; Zimmerman, 2000). Self-regulation represents not only an individual psychological capacity but also a dynamic process mediating the interaction between external stimuli and human action (Billore et al., 2023; Hofmann et al., 2012). Within the financial domain, self-regulatory capacity has been shown to play a significant role in determining the quality of decision-making, including expenditure control and consistency in economic behaviour (Gathergood, 2012;

Hernandez-Perez and Cruz Rambaud, 2025; Peetz and Davydenko, 2022; Strömbäck et al., 2017). More recent studies further indicate that self-regulation and financial literacy may operate as mediating mechanisms in the formation of healthy financial behaviour within digital environments (Xiao and Porto, 2017).

Nevertheless, empirical studies integrating digital payment systems, self-regulation, and financial behaviour within a unified analytical framework remain relatively limited. Existing studies have predominantly examined the direct relationship between digital payment usage and consumption behaviour, focusing primarily on transactional efficiency, impulsive spending, or financial inclusion outcomes without sufficiently explaining the psychological and institutional mechanisms underlying such behavioural transformations (Faraz and Anjum, 2025; Zhao et al., 2024). As a result, digital payment technologies are often implicitly treated as behaviourally neutral instruments whose effects are assumed to operate uniformly across social contexts. This tendency has contributed to a theoretical limitation within the literature, particularly regarding how institutional environments may reshape the behavioural consequences of digital financial technologies. Consequently, the broader societal implications of digitally mediated financial governance remain insufficiently understood, particularly within institutional communities characterized by strong normative regulation.

More importantly, previous studies have largely been conducted within general societal settings, commercial environments, or secular educational institutions, thereby overlooking value-based educational ecosystems characterized by strong moral regulation, institutional supervision, and collective disciplinary structures. In such environments, the behavioural implications of cashless systems may differ substantially from those identified in mainstream consumer contexts. Consequently, the existing literature remains limited in explaining how digital financial technologies interact with institutional norms, social control mechanisms, and internalized value systems in shaping financial behaviour. This indicates not only a contextual gap but also a broader theoretical gap concerning the institutional embeddedness of digital financial behaviour.

Within this context, pesantren provide a particularly important setting for examining the relationship between digital payment systems and behavioural formation. Unlike many educational organizations that primarily implement digital payment systems for administrative efficiency, pesantren represent socially embedded institutions where digital technologies intersect with moral regulation, institutional governance, and collective behavioural formation (Azra, 2020; Kadi and Billeh, 2006; Memon et al., 2024). The implementation of cashless systems in pesantren, through restricted access to physical cash, centralized digital transaction systems, and continuous institutional monitoring, creates a distinctive socio-technical environment through which digital financial governance becomes embedded within broader institutional and social regulatory practices. In this regard, the behavioural consequences of cashless systems cannot be understood solely through technological functionality, but must also be analyzed in relation to institutional discipline, social supervision, and the internalisation of normative values.

Drawing upon these considerations, this study addresses two important gaps in the existing literature. First, prior studies on digital payment systems have predominantly focused on their direct effects on consumption behaviour within secular, commercial, or general societal contexts, while limited attention has been given to the psychological mechanisms through which digital payment systems shape disciplined financial behaviour. Second, existing studies rarely position pesantren as institutional environments that actively regulate and mediate the interaction between financial technology and behavioural formation. More broadly, limited attention has been devoted to understanding how digitally mediated governance operates within value-based institutional communities. Responding to these gaps, this study argues that the relationship between cashless systems and financial discipline is both psychologically mediated and institutionally conditioned. Specifically, this study positions self-regulation as a central psychological mechanism through which digital payment systems influence disciplined financial behaviour within a value-based educational environment. Accordingly, this study examines the effect of cashless payment systems on students' financial discipline, the effect of cashless systems on self-regulation, the effect of self-regulation on financial discipline, and the mediating role of self-regulation in the relationship between cashless systems and financial discipline within pesantren.

Based on the theoretical framework and empirical findings discussed above, the following hypotheses are proposed:

H1

Cashless payment systems positively influence students' financial discipline.

H2

Cashless payment systems positively influence self-regulation.

H3

Self-regulation positively influences financial discipline.

H4

Self-regulation mediates the relationship between cashless payment systems and financial discipline.

This study offers three major contributions to the literature. First, it extends research on digital governance and financial behaviour by demonstrating that the behavioural consequences of digital payment systems are institutionally embedded rather than technologically deterministic. Second, the study contributes to the growing literature on digitally mediated governance by conceptualizing cashless payment systems as socio-technical infrastructures that regulate financial behaviour through institutional monitoring, behavioural restriction, and value internalisation. Third, by examining Islamic boarding schools as socially embedded institutions, this study expands current understanding of how

digital transformation interacts with institutional governance, normative regulation, and behavioural formation within contemporary societies.

METHODOLOGY

This study employed a quantitative explanatory approach aimed at examining theoretically grounded relationships among variables through hypothesis testing based on a mediation model derived from prior literature. The approach was selected because the study focused on empirically examining the relational mechanisms between the implementation of cashless systems, self-regulation, and students' financial discipline rather than merely describing the phenomenon (Creswell and Creswell, 2017). The study utilized a cross-sectional survey design in which data were collected at a single point in time without experimental intervention. This design was considered appropriate for examining structural relationships among behavioural variables, particularly within mediation models that do not require variable manipulation (Field, 2018; Hayes, 2022). Although cross-sectional designs have limitations in establishing strong causal inference, they remain widely employed in behavioural mediation research to examine theoretically grounded relational patterns among variables. In mediation research, cross-sectional data may still provide meaningful evidence regarding indirect associations among variables when the proposed relationships are supported by strong theoretical foundations and prior empirical findings (Hayes, 2022).

The study was conducted at Pesantren Raudlotut Tholibin, Banjarnegara, Central Java, Indonesia. Data collection was carried out between February 10 and March 15, 2026. The study population consisted of all students who used the cashless payment system within the pesantren, totaling 285 students. A probability sampling technique with a simple random sampling approach was employed to ensure that each member of the population had an equal opportunity to be selected as a respondent (Etikan, 2017). A total of 146 questionnaires were deemed valid and eligible for analysis.

Before data collection, formal permission to conduct the research was obtained from Pondok Pesantren Raudlotut Tholibin Purwanegara Banjarnegara through an official institutional approval letter following a research permission request issued by the Graduate School of Universitas Islam Negeri Prof. K.H. Saifuddin Zuhri Purwokerto. The study was conducted in accordance with the institutional regulations governing research activities at Pondok Pesantren Raudlotut Tholibin Purwanegara Banjarnegara and the academic research procedures of the Graduate School, Universitas Islam Negeri Prof. K.H. Saifuddin Zuhri Purwokerto. Prior to questionnaire administration, all participants were informed about the objectives of the study, the voluntary nature of participation, their right to withdraw at any stage without consequences, and the confidentiality of their responses. Written informed consent was obtained from all participants before data collection, and all responses were anonymized prior to statistical analysis.

A priori statistical power analysis was conducted using G*Power 3.1 to determine the minimum sample size required for the mediation analysis. Using a medium effect size ($f^2 = 0.15$), a significance level of $\alpha = .05$, and statistical power of 0.80, the analysis indicated that a minimum sample of 92 respondents

was required. Therefore, the final sample of 146 respondents exceeded the recommended minimum threshold and was considered statistically adequate for regression-based mediation analysis. The sample size was also consistent with recommendations for Ordinary Least Squares (OLS)-based mediation models employing bootstrapping procedures (Field, 2018; Hayes, 2022).

Data were collected using a structured questionnaire measured on a five-point Likert scale ranging from 1 = strongly disagree to 5 = strongly agree. The research instrument was developed based on theoretically validated constructs from the international literature and subsequently adapted to the pesantren context. The initial instrument consisted of 24 items covering three major variables: cashless system, self-regulation, and financial discipline. Following reliability testing, two items were removed due to low corrected item-total correlations and their negative impact on construct internal consistency. Consequently, the final instrument consisted of 22 items, including cashless system (7 items), self-regulation (7 items), and financial discipline (8 items). The cashless system variable was measured through dimensions of ease of use, transaction control, and transparency (Gomber et al., 2017). Self-regulation was measured based on dimensions of planning, self-control, and behavioural monitoring (Baumeister et al., 2007; Zimmerman, 2000), whereas financial discipline was measured through indicators of expenditure management, financial responsibility, and behavioural consistency (Strömbäck et al., 2017).

The operationalization of the research variables was derived from theoretically established constructs in prior literature. The cashless payment system construct included dimensions related to transaction ease, expenditure control, and financial transparency (Gomber et al., 2017). Self-regulation was operationalized through indicators of planning, self-control, and behavioural monitoring based on self-regulation theory (Baumeister et al., 2007; Zimmerman, 2000). Financial discipline was measured through indicators associated with expenditure management, financial responsibility, and behavioural consistency in financial practices (Strömbäck et al., 2017). All indicators were contextually adapted to the pesantren environment while maintaining the conceptual integrity of the original constructs.

To ensure contextual relevance, all questionnaire items were adapted to the pesantren environment without altering the substantive meaning of the original constructs. Sample items included “The cashless system helps me control my spending” for the cashless system variable, “I restrain myself from buying unnecessary things” for self-regulation, and “I use money according to primary needs” for financial discipline. In addition, several items were constructed as reverse-worded items to minimize response bias and reduce the potential for common method bias.

To further minimize the potential influence of common method bias resulting from the use of self-reported data collected through a single questionnaire, several procedural remedies were implemented during instrument design and data collection. These included respondent anonymity, voluntary participation, the use of reverse-worded items, and clear instructions emphasizing that there were no right or wrong answers. In addition, Harman’s single-factor test was conducted as an initial statistical assessment of common method variance. The results showed that the first unrotated factor accounted

for less than 50% of the total variance, indicating that common method bias was unlikely to pose a serious threat to the validity of the findings. Nevertheless, consistent with the methodological critique advanced by Podsakoff et al. (2003), Harman's single-factor test has limitations in fully detecting common method variance. Therefore, the findings of this study should be interpreted with consideration of the potential influence of common method bias inherent in self-report cross-sectional research designs.

Prior to the main data collection, a pilot test involving 30 respondents was conducted to ensure the quality of the research instrument. Content validity was evaluated through expert review involving scholars in educational research and financial behaviour to assess item clarity, relevance, and contextual appropriateness. Construct validity was subsequently assessed using corrected item-total correlation to ensure that each item adequately represented the measured construct. Instrument reliability was evaluated using Cronbach's Alpha, with a threshold value of ≥ 0.70 considered indicative of acceptable internal consistency (Hair et al., 2019). The results demonstrated that all constructs satisfied the recommended reliability criteria, indicating that the instrument was suitable for the main data collection process.

Data analysis was conducted using regression-based mediation analysis through PROCESS Macro Model 4 developed by Hayes (2022). All analyses were performed using Jamovi version 2.7 with the medmod module. This approach was selected because it is specifically designed for estimating direct and indirect effects in mediation models using Ordinary Least Squares (OLS) regression and bootstrapping procedures. In line with Hayes (2022), mediation testing employed bootstrapping with 5,000 resamples to obtain robust estimates of indirect effects without relying on normality assumptions. Mediation effects were considered statistically significant when the 95% confidence interval did not cross zero.

In addition, several regression assumption tests were conducted to ensure model validity, including tests of residual normality, multicollinearity, and heteroscedasticity. Normality was examined using the Shapiro–Wilk test and residual Q-Q plots. Multicollinearity was evaluated using the Variance Inflation Factor (VIF) with a maximum threshold of < 5, whereas heteroscedasticity was assessed through residual scatterplots (Hair et al., 2019). The results indicated that all regression assumptions were satisfied, confirming that the model was appropriate for mediation analysis.

Note

H1 = direct effect of cashless payment systems on financial discipline; H2 = effect of cashless payment systems on self-regulation; H3 = effect of self-regulation on financial discipline; H4 = indirect mediating effect of self-regulation.

As illustrated in Fig. 1, the conceptual model depicts the relationship between the cashless system as the independent variable, self-regulation as the mediating variable, and financial discipline as the dependent variable. The model examines the direct effect of the cashless system on financial discipline,

the effect of the cashless system on self-regulation, and the effect of self-regulation on financial discipline. In addition, the model evaluates the indirect effect of the cashless system on financial discipline through self-regulation as a mediating mechanism.

RESULTS

Descriptive Statistics and Correlation Analysis

Table 1
Descriptive Statistics and Correlation Matrix

Variable	Mean	SD	1	2	3
Cashless System	3.68	0.56	—		
Self-Regulation	3.61	0.69	.575***	—	
Financial Discipline	3.65	0.60	.684***	.677***	—
*Note. ***p < .001.*					

As an initial analytical step, descriptive statistics and correlation analyses were conducted to examine the characteristics of the research variables and the preliminary relationships among them. The results indicate that all variables demonstrated mean scores within the moderate-to-high range, suggesting that respondents generally reported positive perceptions regarding the implementation of the cashless payment system, self-regulation capacity, and financial discipline.

As presented in Table 1, the cashless system variable obtained a mean score of 3.68 (SD = 0.56), self-regulation had a mean score of 3.61 (SD = 0.69), and financial discipline showed a mean score of 3.65 (SD = 0.60). These findings suggest that respondents generally exhibited relatively favorable levels of cashless system utilization, self-regulatory capacity, and financial discipline behaviour.

The Pearson correlation analysis further revealed that all variables were positively and significantly correlated. The cashless system variable was positively associated with self-regulation ($r = .575$, $p < .001$) and financial discipline ($r = .684$, $p < .001$). In addition, self-regulation demonstrated a significant positive correlation with financial discipline ($r = .677$, $p < .001$). These correlation patterns provide preliminary empirical support for the proposed mediation model and indicate that higher levels of cashless system utilization are associated with stronger self-regulation capacities and greater financial discipline among students. The relatively strong correlation coefficients also suggest that the relationships among the variables are substantively meaningful rather than merely statistically significant.

Reliability Analysis

Table 2
Reliability and Convergent Validity Results

Variable	Items	Cronbach's Alpha	Composite Reliability (CR)	AVE
Cashless System	7	0.784	0.842	0.519
Self-Regulation	7	0.710	0.801	0.503
Financial Discipline	8	0.754	0.826	0.516

Reliability and convergent validity testing were conducted to evaluate the measurement quality of the research instrument. In addition to Cronbach's Alpha, Composite Reliability (CR) and Average Variance Extracted (AVE) were assessed to provide a more robust evaluation of construct reliability and convergent validity. As presented in Table 2, all constructs achieved Cronbach's Alpha and Composite Reliability values above the recommended threshold of .70, indicating satisfactory internal consistency. Furthermore, all AVE values exceeded the minimum criterion of .50, confirming adequate convergent validity of the measurement model (Hair et al., 2019). These findings indicate that the instrument possessed acceptable reliability and construct validity for subsequent mediation analysis.

Regression Assumption Testing

Regression assumption testing was conducted to ensure the validity of the analytical model. The residual normality test using the Shapiro–Wilk procedure yielded a significance value of $p = .202$ ($> .05$), indicating that the residuals were normally distributed. Furthermore, examination of heteroscedasticity through residual scatterplots demonstrated that the residual points were randomly distributed without forming any systematic pattern, thereby confirming the assumption of homoscedasticity.

Subsequently, multicollinearity testing was performed to ensure the absence of excessive correlations among the independent variables. As presented in Table 3, all variables had Variance Inflation Factor (VIF) values below the recommended critical threshold ($VIF < 5$) and tolerance values above 0.10, indicating that the regression model was free from multicollinearity issues.

Table 3
Multicollinearity Test Results

Variable	VIF	Tolerance
Cashless System	1.78	0.561
Self-Regulation	1.78	0.561

Mediation Analysis

Table 4
Mediation Analysis Results

Path / Effect	B	SE	t	p	95% CI Lower	95% CI Upper	R^2
Indirect Effect	0.368	0.0616	—	—	0.256	0.496	—
Direct Effect	0.285	0.0659	4.32	< .001	0.151	0.410	.564
Total Effect	0.653	0.0606	10.78	< .001	0.527	0.763	.564
Cashless System → Self-Regulation	0.663	0.0635	10.44	< .001	0.531	0.780	.331
Self-Regulation → Financial Discipline	0.555	0.0726	7.64	< .001	0.414	0.698	.564
Cashless System → Financial Discipline	0.285	0.0659	4.32	< .001	0.151	0.410	.564

Note. B values represent unstandardized regression coefficients. Standardized coefficients were not reported because PROCESS estimates mediation effects using unstandardized OLS coefficients. The indirect effect was estimated using bias-corrected bootstrapping with 5,000 resamples. The reported confidence intervals represent bias-corrected percentile bootstrap confidence intervals. Mediation effects were considered significant when the 95% confidence interval did not cross zero. R^2 values indicate the proportion of variance explained by the regression models.

As presented in Table 4, mediation analysis was conducted to examine the role of self-regulation as a mediator in the relationship between the cashless system and financial discipline. The results indicate that the indirect effect of the cashless system on financial discipline through self-regulation was statistically significant (B = 0.368; SE = 0.0616; 95% CI [0.256, 0.496]). Since the confidence interval did not cross zero, the findings confirm that self-regulation significantly mediated the relationship between the cashless system and financial discipline.

In addition, the direct effect of the cashless system on financial discipline remained statistically significant (B = 0.285; SE = 0.0659; 95% CI [0.151, 0.410]). This finding indicates that self-regulation functioned as a partial mediator within the proposed relationship. Accordingly, the influence of the cashless system on financial discipline operated both directly and indirectly through the mechanism of individual self-regulation.

Furthermore, the path estimation results demonstrate that the cashless system exerted a positive effect on self-regulation (B = 0.663; SE = 0.0635; 95% CI [0.531, 0.780]). This coefficient indicates a relatively strong positive relationship between the cashless system and self-regulation. Meanwhile, self-regulation also positively influenced financial discipline (B = 0.555; SE = 0.0726; 95% CI [0.414, 0.698]). The magnitude of this effect suggests that self-regulation plays a substantial role in shaping students' financial discipline.

The mediation model demonstrated substantial explanatory power. The cashless system explained 33.1% of the variance in self-regulation (R^2 = .331), while the combined model of cashless system and

self-regulation explained 56.4% of the variance in financial discipline (R^2 = .564).

Overall, the findings indicate that all hypothesized relationships were statistically supported, with self-regulation functioning as a significant partial mediator between the cashless system and financial discipline.

DISCUSSION

The positive influence of cashless payment systems on students' financial discipline in pesantren can be theoretically understood through the interaction between technological monitoring, institutional control, and behavioural internalisation processes. Within highly regulated educational environments, digital payment systems do not merely function as instruments of transactional efficiency, but also operate as behavioural governance infrastructures that shape and discipline financial practices. In the pesantren context, restricted access to physical cash, transparent transaction records, and continuous monitoring mechanisms appear to strengthen students' behavioural control and self-regulation capacities. These findings suggest that digital financial systems may reinforce disciplined financial behaviour when embedded within institutional environments characterized by strong supervision, collective norms, and sustained value internalisation processes.

This interpretation contrasts with dominant behavioural economics perspectives that have traditionally associated cashless payments with increased consumerism due to the reduction of the psychological "pain of paying" in digital transactions (Prelec and Loewenstein, 1998; Raghubir and Srivastava, 2008). Previous studies generally argued that digital payment systems reduce individuals' sensitivity toward spending and thereby encourage impulsive consumption behaviour (Soman, 2001). However, the present study demonstrates that the behavioural consequences of digital payment systems are institutionally contingent rather than universal. In this respect, the study challenges technologically deterministic assumptions within digital payment literature and extends recent discussions suggesting that digital financial technologies may generate distinct behavioural outcomes depending on the institutional and socio-cultural environments in which they are implemented (Couldry and Mejias, 2019; Liébana-Cabanillas et al., 2021; Ramayanti et al., 2023; van Dijck et al., 2018).

Rather than viewing cashless systems solely as transactional technologies, this study conceptualizes them as behavioural governance infrastructures capable of shaping financial conduct through the interaction between technological monitoring, institutional regulation, and psychological internalisation. The findings further reinforce the argument that digital financial technologies do not operate in a socially neutral manner, but instead interact continuously with surrounding institutional structures and behavioural monitoring mechanisms. The positive relationship between cashless systems and self-regulation suggests that systematic transaction records, expenditure transparency, and restricted access to physical cash encourage students to exercise greater caution in controlling their consumption behaviour. These findings are consistent with recent studies indicating that digital payment systems shape financial behaviour through increased transaction transparency, expenditure control, and financial

awareness (Auer et al., 2021; Liébana-Cabanillas et al., 2021; Riitsalu & Murakas, 2019). Research on fintech adoption has likewise demonstrated that digital financial technologies influence not only transactional efficiency but also users' economic decision-making patterns in ways that are more structured and adaptive to modern financial management practices (Aracil et al., 2025; Liébana-Cabanillas et al., 2021; Ozili, 2021; Setiawan et al., 2021). Furthermore, recent studies emphasize that digital financial literacy strengthens individuals' abilities to regulate economic behaviour and make more rational financial decisions within increasingly digitized financial ecosystems (Abdallah et al., 2024; Morgan et al., 2019). In broader terms, these findings support the view that cashless systems have evolved beyond mere payment instruments into forms of socio-technical infrastructure capable of shaping economic habits, behavioural routines, and patterns of financial discipline.

Beyond the immediate educational context, the present findings also contribute to broader discussions concerning digital transformation and institutional adaptation within contemporary societies. Digital payment systems increasingly function as governance technologies that restructure interactions between individuals and institutions through continuous monitoring, algorithmically mediated transaction records, and digitally embedded behavioural regulation. Rather than operating solely as financial infrastructures, these systems increasingly influence how organizations organize accountability, regulate everyday practices, and encourage behavioural compliance through technological design. The present findings therefore suggest that the societal implications of financial digitalization extend beyond economic modernization toward the transformation of institutional governance and behavioural coordination within digitally mediated communities.

From the perspective of self-regulation theory, disciplined behaviour emerges through continuous processes of self-monitoring, behavioural evaluation, and self-control (Baumeister et al., 2007; Zimmerman, 2000). In the present study, the cashless system functioned not only as a transaction tool but also as a form of behavioural infrastructure that strengthened students' self-regulatory capacities within an environment characterized by strong institutional supervision and collective discipline. In other words, digital payment systems do not simply transform the mechanics of financial transactions; they also reshape how individuals regulate and monitor their own economic behaviour. These findings support contemporary arguments suggesting that digital systems may function as mechanisms of behavioural formation through monitoring, transparency, restricted access, and repetitive interaction patterns that gradually become internalized within everyday practices (Bucher, 2018; Büchi et al., 2019; Couldry and Mejias, 2019; Kennedy, 2018). Thus, the influence of digital payment systems on financial behaviour appears to involve not only technological efficiency but also the restructuring of behavioural routines and self-control mechanisms.

One of the most significant contributions of this study lies in its contextualization of cashless payment practices within the ecosystem of Islamic boarding school education. Unlike general educational institutions, which typically adopt digital payment systems primarily for administrative efficiency and transactional convenience, pesantren appear to integrate digital financial technologies into broader mechanisms of discipline formation and behavioural regulation among students. In this context, the

cashless system functions not merely as a transactional instrument, but also as a pedagogical mechanism that combines institutional control with the internalisation of disciplined behaviour. Transaction transparency and digital monitoring capabilities create a more systematic form of supervision, while restricted access to cash encourages students to align their financial behaviour with institutional norms and collective expectations. These findings suggest that digital technologies within Islamic education are not simply adopted as symbols of administrative modernization, but are reconstructed as components of an educational ecology that shapes habits, responsibility, and self-control. Consequently, the pesantren context in this study serves not only as an empirical research setting, but also as a social environment that actively moderates the relationship between technology and financial behaviour. The findings further indicate that financial digitalization within Islamic education may function as a mechanism of behavioural formation rather than merely an administrative modernization strategy.

Although the present study was conducted within an Islamic boarding school, the findings may offer broader implications for other institutional settings undergoing digital transformation. Educational organizations, religious institutions, community-based organizations, and other socially regulated environments increasingly rely on digital platforms to organize financial management, behavioural monitoring, and institutional accountability. In this respect, the behavioural effects identified in the present study illustrate how digital financial systems may contribute to wider processes of institutional adaptation in which technological infrastructures become integrated with existing social norms, governance arrangements, and value-based regulatory practices.

Theoretically, this study contributes to the development of behavioural mediation research within the context of digital finance by positioning self-regulation as a central psychological mechanism linking cashless systems and financial discipline. More specifically, the study advances a contextualized behavioural mediation perspective by demonstrating that the effectiveness of digital financial systems in shaping disciplined behaviour depends not only on technological features, but also on institutional environments that structure behavioural norms and self-regulatory practices. The finding of partial mediation demonstrates that the influence of digital payment systems on financial discipline does not operate solely through mechanical transaction control, but also through the internalisation of individuals' self-control capacities. This finding aligns with recent studies indicating that self-regulation, financial literacy, and financial capability may function as mediating mechanisms in the development of healthy financial behaviour (Kennedy, 2018; Ozili, 2021; Xiao and Porto, 2017). Moreover, the significant relationship between self-regulation and financial discipline supports previous evidence showing that individuals with stronger self-control capacities tend to exhibit more responsible financial behaviour and higher levels of financial well-being (Riitsalu and Murakas, 2019; Strömbäck et al., 2017). At the same time, the partial mediation result suggests that self-regulation is not the sole mechanism explaining the relationship between cashless systems and financial discipline. The persistence of a significant direct effect indicates the possible influence of additional institutional and social factors, including disciplinary culture, institutional supervision, transaction restrictions, and community-based social control mechanisms.

In this regard, digital transaction systems may be understood as forms of digital behavioural governance, namely behavioural regulation mechanisms operating through the interaction between technological structures, institutional control, and individuals' psychological internalisation processes. This perspective is consistent with contemporary discussions suggesting that digital systems can shape behaviour through monitoring mechanisms, restricted access, and repetitive technological interaction patterns (Büchi et al., 2019; Couldry and Mejias, 2019). Furthermore, the concept of nudging within digital environments suggests that system design and choice architecture may indirectly influence individual behaviour by structuring decision-making environments (Benartzi et al., 2017; van Dijck et al., 2018; Verma and Arora, 2025). Therefore, the primary contribution of this study lies not merely in establishing statistical relationships among variables, but also in providing a conceptual explanation that the relationship between financial technology and disciplined behaviour is contextual, psychologically mediated, and socially structured. Theoretically, these findings suggest that the behavioural consequences of digital financial technologies should be understood as institutionally embedded and psychologically mediated rather than technologically deterministic. Nevertheless, the present study remains limited to a simple mediation model focusing primarily on self-regulation as the mediating variable. Overall, the findings suggest that the relationship between digital financial technology and financial discipline should not be understood as technologically deterministic, but rather as socially embedded, psychologically mediated, and institutionally governed. In this sense, cashless systems within Islamic educational environments may function not only as instruments of financial modernization, but also as mechanisms of behavioural formation and digital governance.

From a broader societal perspective, these findings reinforce the growing argument that digital technologies should be understood as socio-technical systems whose consequences emerge through the interaction between technological infrastructures, institutional governance, and socially embedded behavioural practices. As digital transformation increasingly reshapes public institutions, educational organizations, and community life, understanding how technological systems influence behavioural regulation becomes essential for developing more accountable and socially responsive forms of digital governance. Consequently, the present study contributes not only to the literature on digital finance but also to wider debates concerning digital society, institutional transformation, and the governance of behaviour within increasingly digitized social environments.

CONCLUSION

This study examined the relationship between cashless payment systems, self-regulation, and financial discipline among students in pesantren. The findings demonstrate that cashless payment systems positively influence financial discipline both directly and indirectly through self-regulation. The mediation analysis further revealed that self-regulation functions as a significant partial mediator, indicating that digital payment systems shape financial behaviour not only through transactional control mechanisms but also through the strengthening of individuals' self-regulatory capacities. These findings suggest that the behavioural effects of digital financial technologies are institutionally embedded and influenced by the social and disciplinary environment in which such systems operate.

This study contributes to the literature on digital financial behaviour by highlighting the contextual role of self-regulation in explaining the relationship between cashless systems and financial discipline within Islamic educational environments. The findings also suggest that digital financial technologies in pesantren may function beyond administrative efficiency by supporting behavioural regulation and financial discipline formation. Nevertheless, this study was limited to a single institutional setting and a cross-sectional research design. Future studies are therefore encouraged to employ comparative and longitudinal approaches in order to develop a more comprehensive understanding of digital financial behaviour within Islamic educational contexts.

PRACTICAL IMPLICATIONS

The findings of this study provide important practical implications for Islamic educational management, particularly in the development of digitally mediated governance systems within pesantren environments. The results suggest that cashless payment systems should not be implemented solely as instruments of administrative efficiency, but also as mechanisms for shaping students' financial discipline, behavioural regulation, and responsibility. Through transaction transparency, expenditure monitoring, and controlled access to financial resources, digital payment systems may serve as institutional tools for integrating financial management with character education practices. In this regard, the study highlights the potential of financial technology to support more accountable, transparent, and behaviour-oriented governance structures within Islamic educational institutions.

More specifically, pesantren administrators may consider configuring spending limits within the cashless platform based on expenditure categories such as food, stationery, transportation, and recreational consumption. Transaction monitoring dashboards and periodic financial reports may also be utilized to help students evaluate their spending behaviour and strengthen self-regulatory awareness. In addition, integrating digital financial literacy programs into student development activities could enhance students' capacities to manage financial resources responsibly within increasingly digitalized financial environments. These findings suggest that the effectiveness of financial digitalization depends not only on technological adoption, but also on the institutional capacity to embed digital systems within value-based educational practices, behavioural supervision mechanisms, and character formation strategies. Consequently, cashless systems within pesantren may function not merely as financial technologies, but also as instruments of digital behavioural governance and financial character education.

LIMITATIONS

Several limitations should be acknowledged when interpreting the findings of this study. First, the research was conducted within a single Islamic boarding school, which means that the institutional characteristics, disciplinary culture, and socio-religious context of the pesantren may limit the broader generalizability of the findings to other Islamic educational institutions or sociocultural settings. As a result, the observed relationships between cashless systems, self-regulation, and financial discipline

should be understood as contextually embedded rather than universally applicable across educational environments.

Second, the study employed a cross-sectional design, which restricts the ability to establish temporal ordering and strong causal inference among the examined variables. Although the mediation model was theoretically grounded and supported by prior empirical literature, the findings primarily reflect associative relationships measured at a single point in time. Consequently, the long-term behavioural effects of cashless systems and the developmental dynamics of self-regulation could not be fully captured within the present design.

Third, the study relied on self-reported questionnaire data, which may be subject to several forms of response bias, including social desirability bias, perceptual bias, and normative response tendencies influenced by the pesantren environment. Although procedural remedies and statistical controls were implemented to minimize common method bias, the possibility of subjective reporting effects cannot be entirely eliminated.

Finally, the analytical model focused primarily on self-regulation as a mediating mechanism and did not incorporate broader institutional or sociocultural variables that may also shape financial behaviour. Factors such as institutional supervision, religiosity, organizational culture, peer influence, and digital financial literacy may interact with cashless systems in more complex ways than represented in the current model. Therefore, the findings should be interpreted within the methodological and contextual boundaries of the study.

FUTURE RESEARCH

Future research should move beyond simple mediation models to develop more comprehensive explanations regarding the formation of financial behaviour within digitally mediated Islamic educational environments. Comparative studies across pesantren with different institutional structures, disciplinary systems, technological infrastructures, and socio-religious cultures are particularly important for identifying how contextual variations shape the behavioural consequences of cashless payment systems. Such comparative approaches may contribute to the development of a more context-sensitive understanding of digital financial behaviour within Islamic educational institutions.

In addition, longitudinal research designs are strongly recommended in order to examine the long-term dynamics of financial discipline and self-regulation following the implementation of digital payment systems. Longitudinal approaches would enable future studies to capture whether behavioural changes emerging from cashless systems represent temporary compliance effects or more stable forms of internalized financial discipline over time. This is particularly important because the present study was limited to cross-sectional behavioural patterns within a single institutional setting.

Future studies should also incorporate broader institutional, psychological, and sociocultural variables into the analytical model. Variables such as digital financial literacy, religiosity, institutional supervision, peer influence, organizational culture, and parental financial socialization may provide a more

comprehensive explanation of how financial behaviour is constructed within digital educational ecosystems. Integrating moderating and multi-level institutional variables may further strengthen theoretical development within the emerging field of digital behavioural governance.

Finally, the Islamic fintech ecosystem within pesantren environments remains a promising and underexplored area of inquiry. Future research may investigate how Sharia-based financial technologies are integrated into Islamic educational governance, how digital financial systems contribute to the formation of value-oriented economic behaviour, and how financial digitalization reshapes institutional governance, student discipline, and character education within contemporary Islamic education. Such investigations would contribute not only to fintech and behavioural finance literature but also to broader discussions concerning the digital transformation of Islamic educational institutions in the contemporary era.

Future investigations in this area may contribute to the development of a more contextually grounded framework for understanding digital behavioural governance within Islamic educational ecosystems.

Declarations

DATA AVAILABILITY

The datasets generated and analyzed during the current study are available from the corresponding author upon reasonable request.

ETHICS APPROVAL

Formal permission to conduct this study was granted by Pondok Pesantren Raudlotut Tholibin Purwanegara Banjarnegara following a research permission request issued by the Graduate School of Universitas Islam Negeri Prof. K.H. Saifuddin Zuhri Purwokerto. The study was conducted in accordance with the institutional regulations governing research activities at Pondok Pesantren Raudlotut Tholibin Purwanegara Banjarnegara and the academic research procedures of the Graduate School, Universitas Islam Negeri Prof. K.H. Saifuddin Zuhri Purwokerto. Participation was voluntary, written informed consent was obtained from all participants prior to data collection, and all responses were anonymized and treated confidentially throughout the research process.

CONSENT TO PARTICIPATE

Informed consent was obtained from all participants prior to their participation in the study.

CONSENT FOR PUBLICATION

Not applicable.

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COMPETING INTERESTS

The authors declare that there are no competing interests regarding the publication of this article.

AUTHOR CONTRIBUTIONS

Irfan Musonif contributed to conceptualization, methodology, data collection, formal analysis, investigation, writing the original draft, and manuscript preparation. Ifada Novikasari contributed to supervision, conceptual refinement, theoretical validation, and critical review of the manuscript. Muhamad Slamet Yahya contributed to research design, data interpretation, methodological validation, and manuscript review. Zarkasi contributed to theoretical development, discussion enrichment, and academic review. Agus Setiawan contributed to manuscript editing, language refinement, and final review of the manuscript. All authors have read and approved the final version of the manuscript.

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Figures

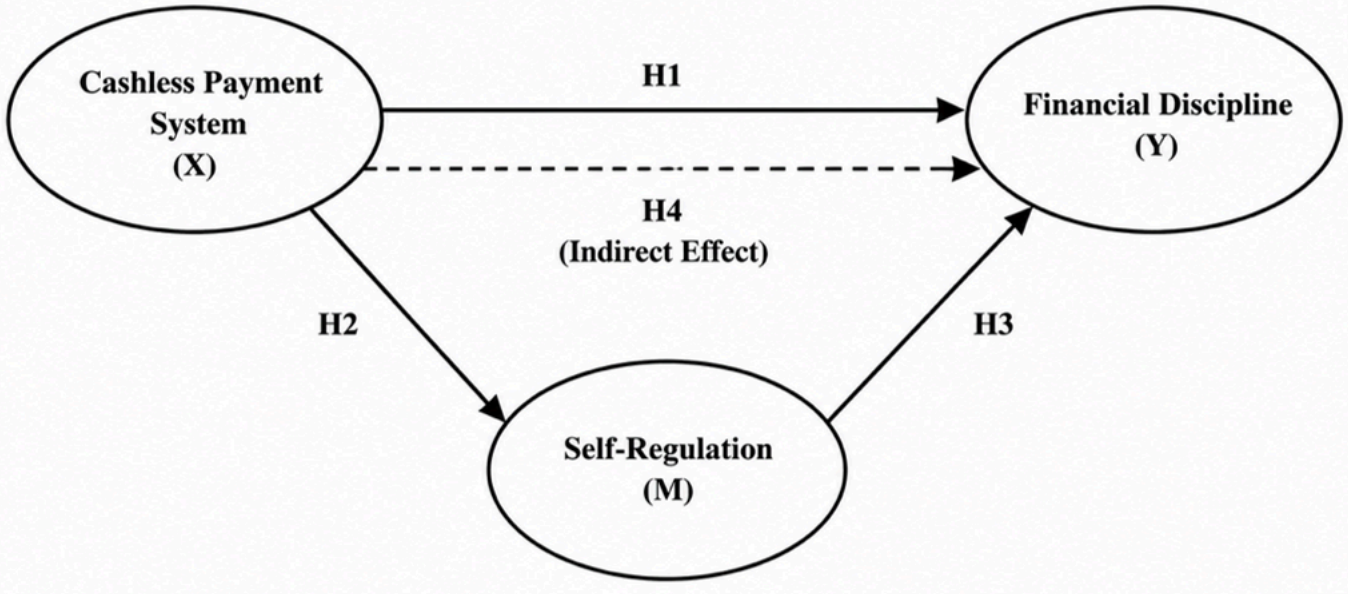


Figure 1

Proposed mediation model of the relationship between cashless payment systems, self-regulation, and financial discipline

Note. H1 = direct effect of cashless payment systems on financial discipline; H2 = effect of cashless payment systems on self-regulation; H3 = effect of self-regulation on financial discipline; H4 = indirect mediating effect of self-regulation.