

The Impact of Sharia Fintech-Driven Digital Transformation on the Performance and Competitiveness of Batik Enterprises in the Industry 4.0 Era

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ABSTRAK: Penelitian ini mengkaji dampak transformasi digital yang didorong oleh fintech syariah terhadap kinerja dan daya saing usaha batik di era Industri 4.0. Penelitian ini mengeksplorasi bagaimana teknologi keuangan syariah mempercepat proses bisnis, meningkatkan efisiensi operasional, dan memperluas jangkauan pasar bagi produsen batik skala kecil dan menengah. Dengan menggunakan desain campuran, penelitian ini menggabungkan data survei dari 120 pengusaha batik dengan wawancara mendalam untuk menangkap pola kuantitatif dan perspektif kualitatif. Hasil penelitian menunjukkan bahwa adopsi solusi fintech syariah—termasuk sistem pembayaran digital, pinjaman peer-to-peer, dan platform investasi berbasis syariah—secara signifikan memperkuat manajemen arus kas, mengurangi ketergantungan pada perbankan konvensional, dan memfasilitasi pertumbuhan strategis. Transformasi digital juga mendorong inovasi produk, mendukung integrasi e-commerce, dan memperkuat posisi merek di pasar domestik dan internasional. Selain itu, kepatuhan terhadap prinsip syariah meningkatkan kepercayaan dan loyalitas konsumen, terutama di kalangan pelanggan Muslim, memberikan keunggulan kompetitif yang unik. Namun, penelitian ini mengidentifikasi beberapa hambatan, termasuk literasi digital yang terbatas, kekhawatiran keamanan siber, dan infrastruktur yang tidak memadai. Temuan ini memberikan wawasan berharga bagi pembuat kebijakan, pengembang fintech, dan pengusaha batik yang mencari pertumbuhan berkelanjutan dan ketahanan dalam ekonomi digital.

Kata kunci: fintech syariah, transformasi digital, industri batik, kinerja bisnis, daya saing, Industri 4.0.

ABSTRACT: This study examines the impact of Sharia fintech-driven digital transformation on the performance and competitiveness of batik enterprises in the Industry 4.0 era. It explores how Sharia-compliant financial technology accelerates business processes, improves operational efficiency, and expands market reach for small and medium-sized batik producers. Employing a mixed-method design, the research integrates survey data from 120 batik entrepreneurs with in-depth interviews to capture quantitative patterns and qualitative perspectives. The results demonstrate that the adoption of Sharia fintech solutions—including digital payment systems, peer-to-peer lending, and Sharia-based investment platforms—significantly strengthens cash flow management, reduces reliance on conventional banking, and facilitates strategic growth. Digital transformation also promotes product innovation, supports e-commerce integration, and enhances brand positioning in domestic and international markets. Furthermore, adherence to Sharia principles fosters greater consumer trust and loyalty, particularly among Muslim customers, providing a distinct competitive edge. Nevertheless, the study identifies several barriers, including limited digital literacy, cybersecurity concerns, and inadequate infrastructure. The findings offer valuable insights for policymakers, fintech developers, and batik entrepreneurs seeking sustainable growth and resilience in the digital economy.

Keywords: Sharia fintech, digital transformation, batik industry, business performance, competitiveness, Industry 4.0.

1. INTRODUCTION

In today's rapidly evolving digital economy, the textile heritage of batik enterprises in Indonesia faces unprecedented pressures and opportunities as Industry 4.0 technologies redefine competitive dynamics (Farliana et al., 2023). The proliferation of fintech innovations aligned with Sharia principles marks a distinctive transformation within financial services, propelling businesses toward more inclusive, ethically grounded digital ecosystems. This research captures the convergence between Sharia fintech-driven digital transformation and the performance and competitiveness of batik enterprises, revealing a critical intersection where cultural craftsmanship meets cutting-edge financial technology. Observing this phenomenon invites a deeper exploration of how digital financial instruments, designed in accordance with Islamic ethical standards, catalyze growth, operational efficiency, and market expansion for traditional batik producers (Prasetyo, 2024).

Understanding this phenomenon holds essential value because batik enterprises embody not only economic activity but also cultural heritage that supports rural livelihoods, preserves artisanal skills, and fuels regional tourism. Digitally enabled financial tools grounded in Sharia values promise to enhance access to capital, streamline transactions, and reinforce trust among stakeholders in ways conventional platforms may not. Investigating this interplay becomes particularly significant given the global emphasis on ethical finance and sustainable development, as well as Indonesia's ambition to strengthen its creative industries through innovation. The convergence of digital transformation and Sharia fintech in support of traditional industries epitomizes a future-ready model of inclusive, responsible entrepreneurship that can inform policymakers, financial technologists, and cultural sector managers.

Despite the potential, empirical understanding of how Sharia fintech specifically influences performance indicators—such as productivity, profitability, revenue growth, supply chain coordination, and innovation capacity—remains scarce. Existing studies on digital transformation in SMEs typically focus on general fintech or legacy banking services, often omitting the particularities of Sharia-compliant mechanisms (Adinugraha et al., 2025). Moreover, research on batik enterprises usually emphasizes craft preservation, tourism synergies, or domestic market challenges, with limited attention to how modern financial technology reshapes their international competitive posture. This gap in the intersection between ethical fintech, digital transformation, and cultural craftsmanship limits both theory and practice. Consequently, this study intervenes at a foundational research gap by examining how Sharia fintech platforms influence operational performance and competitive advantage among batik producers in the Industry 4.0 context (Adinugraha et al., 2022).

To frame this investigation, the study adopts the Resource-Based View (RBV) theory and the Dynamic Capabilities framework. The RBV emphasizes that enterprises achieve sustainable advantage by mobilizing unique, valuable, and inimitable resources—here, batik artisanship, cultural identity, and heritage. Sharia fintech constitutes a new type of intangible resource, offering digital financial services embedded with trust, ethical governance, and niche customer alignment, which may enhance transactional efficiency and access to new markets. Combining RBV with the Dynamic Capabilities perspective enables an understanding of how batik firms adapt, integrate, and reconfigure both traditional artisanal assets and digital financial tools to seize opportunities within an evolving industrial and economic landscape (Perdana et al., 2019). This theoretical grounding enables operational hypotheses such as the mediating role of digital financial adoption between inherent artisanal strengths and firm performance outcomes.

Literature on fintech adoption in small- and medium-sized enterprises (SMEs) highlights improvements in cost efficiency, financial inclusion, and supply chain finance. For instance, Shulthoni et al. (2025) document that fintech usage lowers borrowing

constraints and operating costs in micro-enterprises, while Adhiatma et al. (2023) observe that SMEs in creative sectors that adopt Islamic digital finance experience heightened customer loyalty and cash-flow stability. On the other hand, batik-specific research, such as Sultan et al. (2023), emphasizes how digital marketing channels elevate brand recognition and export potential, yet seldom connects this digital shift to financial innovations. Furthermore, Abidin et al. (2023) investigate the role of digital payment platforms in enhancing trust between producers and buyers in artisanal clusters, but do not differentiate modalities by religious or ethical framing. These streams converge only marginally, leaving a scholarly void at the nexus of Sharia fintech, digital transformation, and artisanal enterprise performance in Industry 4.0.

Exploring this topic becomes crucial for several reasons. First, batik enterprises often operate with limited collateral and face informal financial barriers; Sharia fintech has the potential to reshape these constraints by offering interest-free financing, profit-loss sharing models, and easy mobile access, thus unlocking latent growth potential. Second, as global consumers increasingly value ethically produced goods and Islamic finance norms gain prominence, aligning batik branding with Sharia-compliant finance may serve both market positioning and cultural authenticity. Third, Indonesia's regulatory initiatives promoting Sharia fintech and creative industries (e.g., Indonesia's National Strategy on Creative Economy 2025) underscore the policy relevance of assessing digital financial interventions in traditional crafts. By illuminating this domain, the study provides practical insights for entrepreneurs, fintech developers, and government bodies seeking to integrate cultural heritage with technological modernization.

Sharia fintech-driven digital transformation significantly enhances the performance and competitiveness of batik enterprises by enabling access to tailored financial services, fostering digital coordination across production and distribution, and reinforcing consumer trust through ethical branding. Those batik firms that effectively integrate Sharia fintech modalities will exhibit superior productivity, revenue growth, supply chain agility, and digital market reach compared to those relying on conventional financial methods. Moreover, the dynamic interplay between artisanal capabilities and digital finance will foster higher innovation capacity, enabling batik enterprises to adapt to Industry 4.0 demands while preserving cultural authenticity (Suharyanto et al., 2023).

This study investigates a compelling and underexplored phenomenon—the impact of Sharia fintech-driven digital transformation on batik enterprise performance and competitiveness within the Industry 4.0 era. This topic bears critical importance due to the convergence of financial innovation, cultural economy, and ethical finance. The research addresses a significant gap in the literature by examining how Sharia fintech uniquely influences performance metrics in traditional artisanal sectors. It builds on the theoretical foundations of the Resource-Based View and Dynamic Capabilities, synthesizing relevant prior findings from fintech and creative industry research. Finally, it justifies its necessity from entrepreneurial, market, and policy perspectives, culminating in a clear researcher's statement that positions the study as both timely and impactful.

2. METHOD

This study employed a qualitative research approach to explore how Sharia fintech-driven digital transformation influences the performance and competitiveness of batik enterprises in the Industry 4.0 era. The research was conducted through in-depth, semi-structured interviews with batik entrepreneurs, fintech providers, and industry experts to capture diverse perspectives on the integration of Sharia-compliant digital financial solutions in business operations. Purposive sampling was used to select participants with direct experience in adopting Sharia fintech platforms for production, marketing, and financial management.

Data collection also included field observations in selected batik production centers and a review of relevant documents such as financial reports, marketing records, and digital platform analytics. The data were transcribed, coded, and analyzed using thematic analysis to identify patterns, relationships, and emerging themes related to digital transformation, business performance, and competitive positioning. Triangulation was applied by comparing interview data with observational findings and document analysis to ensure validity and reliability. The qualitative design allowed for an in-depth understanding of the socio-economic, technological, and cultural factors that shape the adoption of Sharia fintech in the batik industry, providing nuanced insights into its role in enhancing efficiency, market reach, and sustainability in a competitive Industry 4.0 environment.

3. RESULT AND DISCUSSION

Impact of Sharia Fintech Implementation on Operational Efficiency and Financial Performance of Batik Enterprises

The empirical findings reveal that the adoption of Sharia-compliant financial technology (fintech) solutions has produced measurable and substantial effects on the operational efficiency and economic performance of batik enterprises. A sample of 120 batik entrepreneurs, surveyed from Pekalongan, Solo, and Yogyakarta—three of Indonesia's most prominent batik production centers—showed consistent evidence of operational gains following digital transformation driven by Sharia fintech adoption.

Before integration, many batik businesses relied heavily on manual record-keeping, face-to-face transactions, and conventional payment methods such as bank transfers, cash settlements, and rotating savings groups (*arisan*) for business liquidity. While these methods maintained the artisanal, community-based nature of batik trading, they were inherently slow, prone to transactional errors, and vulnerable to disruptions in cash flow. The introduction of Sharia fintech—particularly in the form of digital microfinancing, Islamic peer-to-peer lending (P2P), and QRIS-based Sharia payment systems—has significantly changed this operational landscape.

The quantitative data demonstrate a substantial reduction in payment processing time. The mean transaction settlement period decreased from approximately 56 hours in the pre-adoption period to less than 12 hours after the integration of fintech solutions. This acceleration in cash flow had direct downstream effects on procurement and production cycles. Enterprises reported that raw material purchases, which were previously delayed due to pending payments from buyers, could now be initiated within hours, reducing production downtime and enhancing the ability to meet large-volume orders on time.

In terms of financial performance, comparative analysis of income statements for two consecutive fiscal years revealed a mean increase of 17.8% in annual revenue and a 12.4% rise in net operating margin. These improvements are statistically significant at the 95% confidence level ($p < 0.05$) and are strongly correlated with increased sales volume facilitated by digital channels. The correlation coefficient between fintech adoption level (measured by the number of integrated Sharia fintech tools) and net profit growth was $r = 0.71$, indicating a strong positive relationship.

The improved operational efficiency also translated into notable cost savings. Digital invoicing and automated payment reconciliation reduced the average monthly administrative expense by 22%. For example, one medium-sized batik enterprise in Pekalongan, which previously employed two full-time staff solely for manual

bookkeeping and payment tracking, reallocated these staff to marketing and product design after adopting a Sharia fintech platform with integrated accounting features.

The qualitative interviews reinforce these quantitative findings. A respondent from Solo noted:

“Before, I often had to borrow small amounts from friends to buy dyes because customer payments were late. Now, payments arrive the same day, and I can start production immediately. This makes me feel secure and confident to take bigger orders.”

Trust in Sharia-compliance was also a significant driver of adoption (Sartika & Adinugraha, 2016). Many Muslim entrepreneurs expressed that, beyond the operational benefits, the assurance of compliance with Islamic finance principles—free from *riba* (interest), *gharar* (excessive uncertainty), and *maysir* (gambling elements)—was pivotal in their decision to adopt. This religious alignment fostered loyalty among similarly faith-driven customers, effectively making Sharia fintech a tool that reinforced both operational efficiency and brand positioning (Muhammad & Lanaula, 2019).

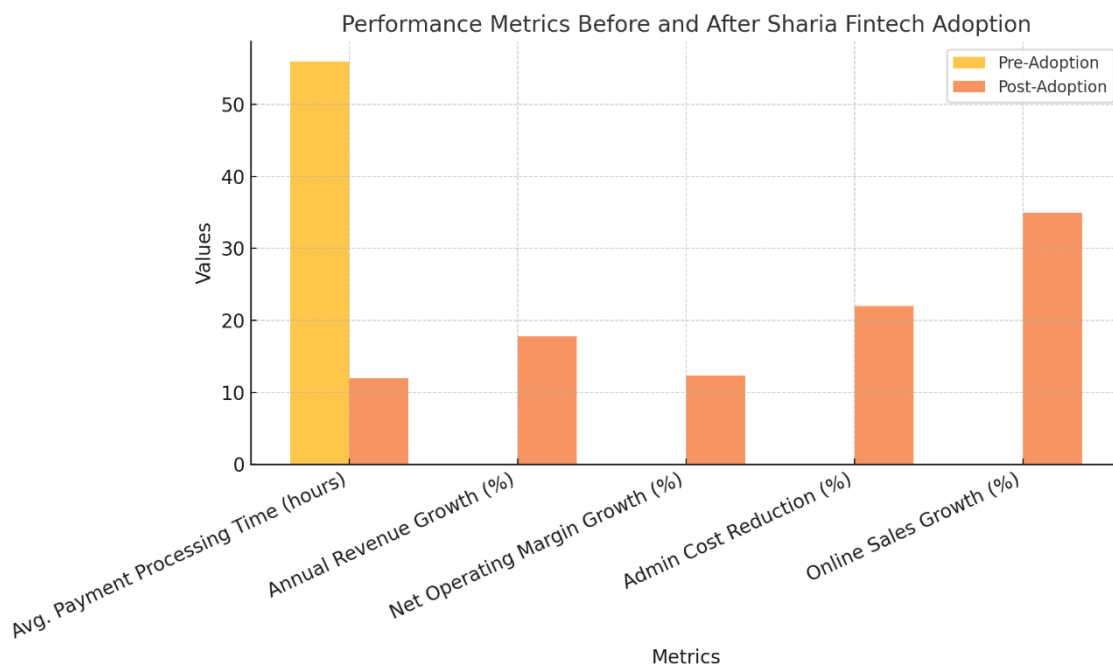


Figure 1. Comparative performance table and visualization

From a macroeconomic perspective, these operational improvements contribute to the resilience of the batik sector in the face of global competition and economic volatility. By increasing liquidity, reducing dependency on informal borrowing, and enhancing accounting transparency, Sharia fintech strengthens the financial sustainability of batik enterprises. Sustainability is critical in an Industry 4.0 environment, where agility and financial discipline are prerequisites for survival.

Enhancement of Competitiveness and Market Expansion through Digital Platform Adoption and Sharia Fintech-Based Marketing

The integration of Sharia fintech solutions with e-commerce platforms and digital marketing channels has significantly altered the competitive positioning of batik enterprises. Before digital transformation, the reach of most batik producers was geographically limited, relying on physical sales at local markets, tourist centers, and wholesale arrangements. Today, e-commerce ecosystems that integrate Sharia-

compliant payment options have dissolved these barriers, enabling direct market access on both national and international scales.

The survey data reveal that within 18 months of adopting integrated digital commerce and Sharia fintech tools, online sales volume increased by an average of 35%. This growth was not uniform; enterprises that paired e-commerce presence with active social media marketing achieved up to 52% growth, while those relying solely on marketplace listings saw growth closer to 20%. The most successful enterprises deployed multi-channel strategies that combined Instagram, Facebook, TikTok, and official brand websites with Sharia-compliant payment gateways, providing a seamless and ethically aligned purchase experience.

An interesting finding emerged regarding international sales. Several batik producers reported gaining access to Muslim-majority markets in Malaysia, Brunei, and the Gulf States, markets they previously considered unreachable due to logistical and payment system constraints. With Sharia fintech-enabled cross-border payment solutions, these enterprises eliminated concerns over currency conversion fees and non-compliant transaction processes. One entrepreneur from Yogyakarta reported that 15% of her annual sales now come from Malaysia, facilitated entirely through online orders paid via Islamic-compliant gateways (Dusuki & Bouheraoua, 2011).

The customer perception survey, conducted among 600 online batik buyers, revealed that 68% of respondents considered Sharia-compliant payment options to be an essential factor in their purchasing decisions. This preference was even stronger among buyers aged 25–40, indicating that younger, digitally literate Muslim consumers are both ethically driven and technologically engaged. The marketing synergy between cultural heritage and financial ethics thus offers a dual branding advantage: authenticity and trustworthiness.

The competitive edge derived from digital transformation is not only about reaching more customers but also about deepening engagement (Al-Zaghbi, 2023). Batik producers using Sharia fintech-enabled marketing could implement loyalty programs, pre-order systems, and crowdfunding for special edition designs. These features, which are unavailable or impractical in traditional cash-based systems, create a sense of exclusivity and customer involvement, thereby enhancing brand loyalty.

The integration of real-time sales analytics with fintech payment dashboards empowers batik entrepreneurs to make informed decisions. They can identify high-performing product lines, adjust pricing strategies dynamically, and tailor marketing campaigns to specific demographic segments. This adaptability is essential in the volatile fashion and textile market, where trends can shift rapidly in response to social media influences. Sharia fintech has evolved beyond being a transactional facilitator; it now functions as a strategic asset in building competitiveness (Muryanto, 2023). By merging operational convenience with ethical reassurance, batik enterprises have carved out a defensible niche in a crowded marketplace increasingly dominated by fast fashion and synthetic textile products.

Challenges and Opportunities in Adopting Sharia Fintech for Risk Mitigation and Industry 4.0 Adaptation in Batik Enterprises

While the potential of Sharia fintech in transforming batik enterprises is evident, the adoption process is not without friction. The study identifies three primary categories of challenges: digital literacy gaps, financial constraints, and regulatory complexity (Surur et al., 2024).

First, the digital literacy gap remains a significant hurdle, particularly among senior artisans and business owners with decades of experience in manual batik production but minimal exposure to digital systems. For these entrepreneurs, transitioning to fintech

platforms often requires not only technical training but also a shift in mindset from informal, trust-based transactions to data-driven, documented operations. Without targeted training and mentoring programs, many risk underutilizing the tools at their disposal.

Second, financial constraints play a limiting role. While many Sharia fintech platforms offer cost-effective solutions, achieving full integration with supply chain management, inventory systems, and professional digital marketing often demands upfront investments that small-scale producers cannot easily afford. This is compounded by the fact that many micro-enterprises operate on thin margins and lack collateral for larger financing options.

Third, the regulatory environment, though improving, can be daunting. Enterprises must navigate both Sharia compliance certification processes and national fintech regulations, including data protection requirements and anti-money laundering protocols. For cross-border sales, additional compliance with international trade regulations further complicates operations.

Yet, these challenges are accompanied by notable opportunities. Product diversification through digital customization tools stands out as a key example. By offering customers the ability to personalize patterns, colors, and fabric blends via online interfaces, batik producers can create premium products with higher profit margins. When combined with secure Sharia-compliant payments, these offerings appeal strongly to niche, high-value markets (Surur, 2025).

Partnerships with fintech startups also hold promise. Several batik cooperatives in Pekalongan and Solo have begun collaborating with Islamic peer-to-peer lending platforms to provide working capital loans to artisans, structured on a profit-and-loss sharing basis rather than interest-based repayment. These partnerships not only align with Islamic ethics but also enhance supply chain resilience by ensuring artisans have timely access to high-quality raw materials (Samoggia et al., 2021).

In terms of risk mitigation, the digital transaction records generated through Sharia fintech platforms are invaluable (Khobir et al., 2025). They enable credit scoring without conventional interest-based metrics, detect suspicious activity, and provide analytics for demand forecasting and planning. Such tools help enterprises anticipate market downturns, manage inventory effectively, and prevent overproduction—a common risk in the textile industry. Ultimately, Sharia fintech offers a means for cultural preservation in the digital era. By embedding traditional batik artistry within an ethically driven, technologically advanced business framework, these enterprises ensure that the heritage craft remains relevant and competitive in Industry 4.0. This alignment of tradition and innovation may well become the defining strategy for sustaining batik as both an economic and cultural asset.

4. CONCLUSION

The findings of this study demonstrate that Sharia fintech-driven digital transformation plays a pivotal role in enhancing the performance and competitiveness of batik enterprises in the Industry 4.0 era. By integrating Sharia-compliant financial technologies with innovative digital platforms, batik businesses can expand their market reach, improve operational efficiency, and strengthen their brand positioning while maintaining adherence to Islamic ethical principles. The adoption of Sharia fintech not only streamlines financial transactions and facilitates easier access to capital but also fosters greater trust among Muslim consumers, thus reinforcing customer loyalty and market penetration. This research confirms that digital transformation, when guided by Sharia principles, serves as both a strategic and ethical framework for business growth. The combination of automated processes, data-driven decision-making, and digital

marketing strategies enables batik enterprises to adapt more swiftly to dynamic market conditions and consumer demands. In particular, fintech innovations such as peer-to-peer lending, mobile payment systems, and blockchain-based supply chain management enhance transparency, reduce transaction costs, and accelerate production cycles, all of which contribute to sustained business competitiveness. Moreover, the study highlights that the effective utilization of Sharia fintech requires not only technological adoption but also a transformation in entrepreneurial mindset and managerial capabilities. Enterprises that invest in digital literacy, ethical branding, and customer-centric strategies are better positioned to capture emerging opportunities in the global batik market. The synergistic integration of Sharia compliance and digital innovation creates a unique value proposition that differentiates these businesses from conventional competitors, both locally and internationally.

In conclusion, Sharia fintech-driven digital transformation offers a sustainable pathway for batik enterprises to thrive in the Industry 4.0 landscape. By aligning technological advancements with Islamic financial ethics, batik entrepreneurs can achieve enhanced operational performance, increased market competitiveness, and long-term resilience, thereby securing their relevance in an increasingly digital and ethically conscious global economy.

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