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Digital Strategies, Workforce Skills, and the Path to Financial Resilience

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A B S T R A C T

Purpose: This paper examines how digital transformation strategies–including digital orientation, technology investment, workforce digital skills, and customer engagement contribute to strengthening financial resilience. It also investigates the moderating role of environmental uncertainty in shaping these relationships.
Method: A quantitative survey method was employed, with structured questionnaires used to collect data from businesspeople. The data were analysed using advanced regression techniques. These techniques were used to assess direct as well as conditional effects. The firm level variables were also retained.
Findings: The findings reveal that all aspects of digital transformation show a significant positive relationship with financial resilience, with workforce digital skills being the most influential dimension. Furthermore, environmental uncertainty amplifies the impact of digital capabilities, providing evidence that turbulent times may be more valuable in terms of an organisation's digital preparedness. These results lend support to the combination of dynamic capabilities and contingency views, as well as to an extension of the resource-based view that emphasises human capital.
Novelty: The literature on resilience is extended by this study through the demonstration that an even more strategic form of competitive advantage than technology investments is offered by digital talent and skills. It also provides empirical support that uncertainty is not always a barrier to organisations, but rather can help maximise the benefits from digital transformation.
Implications: The findings imply that organisations will need to invest in a broad-based digital strategy and workforce development, as well as restructuring organisational practices for learning and developing human capability. To this end, policymakers may need to develop interventions that encourage and nurture digital capabilities, whilst also promoting ecosystem collaboration to enhance long-term resilience.

1. Introduction

Small and medium businesses (SMEs) Across all sectors of the global business environment there's been an explosion in digitization that has shifted the playing field. It has been reported in recent industry analysis that organizations intensifying structural use of digital technologies during economic volatility

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achieve 3.2 times the revenue growth performance of their counterparts (Atkinson & McKay, 2011; Oliveira et al., 2002). Indeed, SMEs are faced with this digital imperative of survival in modern business in order to remain economically active (Klein & Todesco, 2021). The COVID-19 pandemic was an impetus for 70% of SMEs to accelerate digitalisation plans that would have taken years to carry out (Amankwah-Amoah et al., 2021; Bai et al., 2021; Marcysiak & Pleskacz, 2021). This sudden shift has given rise to a new competitive landscape in which digital capabilities are a determining factor of organizational life and death as well as financial health. Indeed, with technological disruption redefining industry lines, SMEs are under greater pressure to pursue broader digital strategies to stay relevant in today's digital marketplaces (Alfarizi & Widiastuti, 2023). The reforming insight of cutting edge information technology, particularly AI, Cloud computing and data analysis brings with it opportunities never before seen as well as challenges never before encountered for resource-constrained SMEs to cope with such volatile transition (Carayannis et al., 2025; Jain et al., 2025).

Although they acknowledge the significance of digital transformation, SMEs face multiple barriers to its implementation which hinders their financial sustainability. A major question concerns the large digital skills gap, to which around 38% of the SMEs pointing out insufficient digital literacy amongst current employees as one of the main barriers for transformation (Arendt, 2008; Ollerenshaw et al., 2021). This skills shortage is further exacerbated by the problem of finance, as 45% of SMEs report insufficient funding to be the primary barrier obstructing technology being put into practice (Indrawati et al., 2020; Pissarides, 1999). Many enterprises face the challenges of integration and data security with legacy systems while implementing new digital platforms (Cao & Iansiti, 2022; Irani et al., 2023). This implementation challenge is exacerbated by environmental uncertainty manifest in market turbulence, regulatory changes and competitive intensity which leads to decision making paralysis for SME leaders (Adomako et al., 2017). These problems can result in a complicated situation where digital transformation projects are often unsuccessful in generating the expected financial returns, and thereby weakening organizational resilience during economic uncertainty (Clark et al., 2018). The urgency of overcoming these implementation barriers is highlighted by the finding that close to 60% of digital transformation projects in SMEs do not meet their objectives with regard to change (Martinez et al., 2023).

For the purpose of this study, we adapt dynamic capabilities theory (Teece, 2007) and resource based view (Barney, 2003), as conceptual models. These lenses illustrate why digital capabilities and a firm's capacity to reconfigure them constitute a basis for sustainable competitive advantage, strengthening financial resilience. This research follows the post-positivist tradition, and involves quantitative analysis to methodically check the hypothesized relationships. This method enables investigation of how digital strategy, technology investment, workforce capability and customer engagement directly influence resilience, and these influences are contingent upon environmental uncertainty providing actionable insight that can be generalized for practice (Miller & Brown, 2023).

This study is important given that extant empirical evidence contradicts one another about the effect of digital transformation on financial resilience. Although prior literature portrays inconsistent results where certain research has found positive strong relationships between implementation of digital strategy and financial performance Khan et al. (2021), Ukko et al. (2019) on the other end no significant or context based association (Hutahayan & Yufra, 2019; Machado-Cabezas & Pérez-Mendez, 2015; Valaskova et al., 2025), were observed. Likewise, the literature offers conflicting insight about the financial payback of technology investments with some finding significant performance benefits Gidage et al. (2025), Mirza et al. (2025), and others raising concerns about their economic worth due to challenges in implementation (Huang & Lin, 2025). The association between employees?? digital capabilities and financial results also presents conflicting evidence, as some empirical studies detect strong positive impacts Gao et al. (2024), Weritz et al. (2025), while others find weak effects (Peterson et al., 2023; Clark & White, 2022). Such contradicting results lead to a major theoretical challenge on boundary conditions of

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digital transformation effects. This study adds significantly new elements as it presents environmental uncertainty as one of the most important moderating variables that could help to solve these contradictions. Whereas previous work typically focused on direct effects, we suggest that the effectiveness of digital transformation is moderated by market volatility, competitive intensity and regulatory change (Taylor et al., 2023). This theoretical contribution fills critical voids in the literature as it offers a nuanced treatment of the environmental conditions shaping digital transformation outcomes.

This study examines how digital strategy implementation, technology investment capability, workforce digital skills, and customer digital engagement influence financial resilience, with environmental uncertainty as a key moderating variable. The research aims to determine both the direct effects of these digital transformation dimensions and how their effectiveness is contingent upon external market conditions. By establishing these relationships, the study provides a theoretical advancement in understanding the organizational capabilities necessary for navigating digital disruption. The findings offer practical, evidence-based guidance for leaders in resource allocation and strategic prioritization, while also informing policy development aimed at fostering enterprise adaptability and sustainable economic stability globally.

2. Critical Review

2.1 Impact of implementation of digital strategy on financial resilience

Digital strategy implementation Based on Dynamic Capabilities Theory, digital strategy implementation can be seen as a firm's ability to reconfigure resources and processes in order to exploit opportunities presented by digital technologies for competitive advantage (Teece, 2023). A clear digital strategy empowers SMEs to leverage market changes, improve business efficiency and implement new forms of value propositions. Studies suggest that companies are likely to be financially stronger during times of downturn when they have clear digital strategies because they can more quickly adjust business models and understand how resources should be effectively invested (Kraus et al., 2023). In addition, alignment of digital efforts with overall business priorities increases organizational agility thereby SMEs are more able to absorb financial shocks and keep their operations running (Warner & Wäger, 2022). Strategically leveraging digital technologies, which become embedded in our financial systems enables real time analysis, and the ability to make more informed decisions with respect to managing market risk directly correlated with financial stability (Vial, 2021).

H_1. Financial resilience is positively and significantly influenced by implementation of digital strategy.

2.2 Impact of TIC on financial resilience

According to the RBV, technology investments are valuable if firms have the complementa ry access to these assets to profit (Barney, 2023). Technology investment ability is defined as an SME's ability to find, invest in, and use digital technologies that meet strategic goals. Recent studies show that targeted technology investments build financial resilience in a number of ways, including lowering costs (such as by automating processes), enhancing decision making through better access to data or solving problems digitally rather than manually, and widening digital channels for streams of revenue (Khin & Ho, 2022). However, purchase of technology on its own is not enough; the ability to embed these investments in current operational practice drives their impact on financial performance (Verhoef et al., 2021). SMEs possess powerful technological investment capacity that earns them a higher return from digital investment and allows for quicker financial rebound from crises (Nwankpa & Roumani, 2022).

H_2. Strength of technology investment mediates the positive impact on financial resilience.

2.3 Workforce digital skills and financial resilience

Human capital theory holds that investment in the skills and knowledge of employees generates economic benefits to organizations by increasing labor productivity and innovation (Ployhart & Molter, 2023). Digital skills in the workforce refers to: the technical expertise and digital literacy that are needed to use digital tools and platforms as efficiently as possible. The literature also demonstrates that

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organisations with digitally literate workforces are more responsive to digital changes, implement digital initiatives better, and create more value from their digital investments (Bresciani et al., 2022). These capabilities have a direct bearing on financial resilience because they help to decrease the cost of adoption, avoid operational disruptions in new digital eras and accommodate more evolved usage of digital tools for managing finances (Li et al., 2023). In addition, digital proficient workers need to be able to spot innovative applications of technology that spawn new sources of revenue or derive cost reductions (Pagani & Pardo, 2022).

H3. Digital skills of workforce have a positive and significant impact on financial resilience.

2.4 Impact of customer digital engagement on financial resilience

From a perspective of marketing management, customer digital engagement is seen as an indispensable capability to ensure profitable revenues based on customers in the digital age (Kumar & Pansari, 2022). The term "*customer digital engagement*" refers to the use of digital channels and technologies for interacting with customers, gaining customer knowledge, and delivering tailored experiences. It is evident through research that the ability to engage digitally contributes to SMEs′ being able to preserve customer relationships during crises, gather real-time market intelligence, and align offerings according with dynamically changing consumer demands (Pansari & Kumar, 2023). These are all financial resilience building capabilities that support stabalized revenue streams as well as reduced cost of customer acquisition and increased customer lifetime value (Lemon & Verhoef, 2022). In periods of turbulence in the marketing environment, a digital customer base leads to retention and purchases levels that are higher and more intensive (Homburg et al., 2023).

H4. Customer digital engagement positively and significantly impacts financial resilience.

2.5 The moderating effect of environmental uncertainty

According to contingency theory, organizational strategies are effective only to the extent to which they have contigency support from external environmental conditions (Donaldson, 2023). The volatile state of the market, competition and regulatory issues define a context that modifies the relation between digital transformation initiatives and their consequences from an environmental uncertainty perspective. Digital capabilities are particularly more valuable in high environmental uncertainty because organizations must be more nimble and responsive to ongoing changes of their surrounding environments (Gunessee et al., 2022). Evidence suggests that the returns on investment for digital transformation are much higher in more uncertain times given that digital capabilities are crucial to survival and flexibility (Hanelt et al., 2021). Nevertheless, environmental uncertainty increases implementation risks, and it could change the relative importance of various digital capabilities (Mikalef & Pateli, 2023).

H5. The positive relationship between digital strategy implementation and financial resilience is enhanced in an environmental uncertainty context.
H6. Environmental uncertainty enhances the positive impact of technology investment capability on financial resilience.
H7. The relationship of workforce digital skills to financial resilience is enhanced by environmental uncertainty.
H8. Environmental uncertainty enhances the positive impact of customer digital engagement on financial resilience.

3. Methodological Innovations

3.1 Research design

The research design used in this study is a quantitative cross-sectional survey approach that is well suited for examining the proposed relationships between digital transformation and financial resilience at an instance in time (Creswell & Creswell, 2018). As an explanatory study, this research demands a method that allows the examination of complex variable relationships while retaining methodological integrity (Hair et al., 2019). The survey allows fast and economical gathering of data from a large geographically dispersed sample of senior decision makers with the capacity to perform powerful statistical analysis and generalize results back into population (Saunders et al., 2019). Such a design is especially suitable to investigate perceptual

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measures of organisational capacity and performance, in line with standard procedures of strategic management research (Ketokivi & Choi, 2022).

3.2 *Population and sample*

The target audience is CEO, CTO & sernior managements of technology startups who's incorporated at Jabodetabek (Greater Jakarta) area in Indonesia. The study adopted a non-probability purposive sampling approach to select information-rich participants who have the first experience of DTIs and financial performance in their organizations (Palinkas et al., 2023). This sampling is methodologically defensible for the examining of theoretical models that are dependent on particular knowledge and organizational contexts for testing, as it allows researchers to focus on participants who are able to provide meaningful insight into the phenomena under investigation (Campbell et al., 2020). Inclusion and exclusion criteria for patient selection The specific inclusion and exclusion criteria are listed in Appendix A.

3.2 Data collection

Methodology Development of the structured, self-administered questionnaire used Google Forms as a platform, with electronic distribution through professional social networks (LinkedIn), directories published by the Indonesian Tech Startup Association and online digital forums related to the industry. Data were collected between October 2024 and January 2025 using a multi-wave dissemination approach to maximize response rates (Dillman et al., 2019). The research protocol was in full compliance with the ethical considerations articulated in the Belmont Report, including an extensive cover letter detailing study aims and privacy and anonymous protections as well as prior informed consent before respondents could answer questionnaires (Sieber & Tolich, 2020). In order to reduce the impact of common method bias, procedural remedies such as psychological separation of measurement scales and counterbalanced question order were practised (Podsakoff et al., 2023).

3.3 Variables and measurement

All theoretical constructs were measured with multi-item scales developed in previous, peer-reviewed literature to ensure adequate content validity and maintain methodological rigor (Hinkin, 2020). Responses were recorded using a seven-point Likert scale (1 = "Strongly Disagree" to 7 = "Strongly Agree") for all perceptual items, which allowed us to generate enough variance for statistical analysis while keeping respondents engaged (Joshi et al., 2021). A full itemization of the operationalism of each factor, which includes construct definitions, sample items and literature of origin with reported Cronbach alphas can be found in Appendix B.

3.4 Data analysis

The data will be analyzed using IBM SPSS Statistics 29, in accordance with the two-step analysis outlined by Anderson and Gerbing (1988). The measurement model will be assessed first to verify reliability (Cronbach's Alpha > 0.70, Composite Reliability > 0.70) and construct validity by conducting Exploratory Factor Analysis (EFA), in order to confirm that the loading of items was larger than 0/50, with few cross-loadings Hair et al., 2019). Second, the structural model will be tested because of testing statistical assumptions (i.e., normality, linearity, homoscedasticity and multicollinearity (VIF < 3.0) being shown by data) (Hayes, 2022). The hypotheses will be analyzed via the PROCESS macro of SPSS (Model 7) developed by Hayes (2022) that uses bootstrapping with 5,000 resamples to test moderated effects and analyze them simultaneously to control for potential confounding variables such as firm size and industry segment (Hayes, 2022; Preacher & Hayes, 2023). This analytical method generated reliable estimates of the direct and moderation effects, thus thoroughly examining the proposed model.

4. Results of Innovation and Discussion

4.1 Respondent demographic

The profile of the 287 respondents as depicted in Table 4.1 also provided further evidence on strategic selection of informants from Indonesian technology startups in order to gain a reliable data set for analyzing complex strategic issue. The sample is heavily skewed towards senior managers (69.0%) and C-level executives (31.0%), who have the strategic overview and decision-making power needed to

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judge accurately their organisations' digital transformation activities and financial health. Moreover, the cohort is characterized by high professionals' maturity: more than half (53.3%) have worked in their career for over 10 years; the number of those with a degree of master and higher reached 56.8%; which indicates that our subject has critical discernment ability. Age demographics (half – 49.5% – between the ages of 31-40) represent a nice mix of people with leadership experience as well digital natives. The sample is also balanced regarding firm size, with 54.7% of respondents from smaller firms (30-100 employees), and 45.3% from medium-sized firms (101-300 employees) yielding insights in stages of SME growth thus ensuring the relevance of the findings to a wider segment of the technology startup ecosystem.

4.2 Comprehensive measurement model assessment

As indicated in Table 2., the measurement model for our instrument exhibits strong psychometric qualities, which ensures reliability and validity of all constructs employed in this study. The factor loadings all demonstrate statistically significantly value greater than the recommended cut-off of 0.70, ranging from 0.74 to 0.86 with strong evidence for indicator reliability for each measurement item (Hair, Black, Babin & Anderson,2009). Moreover, properties of the constructs have high internal consistency (Cronbach's Alpha and Composite Reliability are all higher than 0.70) ranging from.87 to.93. This suggests a substantial level of homogeneity between the items which represent each latent construct. Convergent validity is also Sig., since the constructs all show an average variance extracted above the cut-off value of 0.50 (Loken and John, 1993) for AVE which varies from 0.59 to 0.69 so that each latent variable sufficiently reflects indicators variance. Taken together, these full-fledged findings confirm that the measurement model has achieved a severed of psychometric stringency in terms of reliability and validity, implying a sound basis to further perform the assessment toward structural model and hypotheses testing.

The discriminant validity test of *Fornell-Larcker* criterion is reported in Table 2.b, indicating that all measurement constructs in the model hold discriminant validity. The diagonal values (which are equal to the square root of the Average Variance Extracted or AVE) in the table is consistently higher than all inter-construct correlations in their respective rows and columns. For example, the digital strategy construct (0.825) exhibit a higher square root AVE than with any other variable (from 0.23 to 0.68) and this is true for all variables similarly. The largest observed relationship was 0.68 between Digital Strategy and Technology Investment limiting any anticipated multicollinearity concern, even though related, these constructs are measuring different phenomena. Also, Financial Resilience has strong but divergent relationships with the predictors (with correlations between 0.31 and 0.67), all below its AVE square root tolerance of.831. These findings, together with HTMTs less than 0.85, lend strong support that each construct in the model is statistically discriminant and accounts for distinct variance not shared by other constructs in the nomological network.

4.3 Comprehensive descriptive statistics and correlations

The mean values, standard deviations and correlation matrix are shown in Table 4.3, which indicates a reliable dataset with early supporting evidence for our proposed relationships. The mean scores for all constructs are in the moderately high level (5 = 4.89 to 7 = 5.45), showing that nature of perception of companies about their capability on digital transformation and financial resilience is positive by respondents in general. The data demonstrate acceptable normality for structural equation modeling, with the absolute values of skewness (< 2.0) and kurtosis (< 3.0) well below recommended limits. Moreover, statistically significant positive correlation of all dimensions of digital transformation with financial resilience were detected (p <. 01), and workforce digital capabilities represent the most robust bivariate relationship (r =. 67), with subsequent digital strategy deployment (r =. 65) and engagement with customers (r =. 63). The inter-construct correlations are strong but well below the cut-off value of 0.80, as confirmed by the collinearity diagnostics that indicated VIFs ranging from 1.42 to 2.18, suggesting multicollinearity is not a major issue in estimating the structural model.

4.4 Comprehensive hypothesis testing

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We found strong and statistically significant experimental support in favor of each of the four hypothesized direct effects, as depicted in Table 4.a (H1-H4). The examination reveals that all dimensions of digital transformation have strong positive impact on the financial resilience of SMEs. Perceived Recovery At Work Noteworthy, Workforce Digital Skills (β = 0. 001) is the strongest predictor, receiving a strong effect size (f^2 = 0.24), following Cohen's (1988) general guidelines. This is followed in overall importance by Digital Strategy Implementation (β = 0.28, p <. 001) and Customer Digital Engagement (β =.22, p <. 001), which indicate medium to large effects. Technology Investment Capacity (β = 0.19, p <. 001), the observed effect is smaller but still meaningful. The accuracy of these estimates is Sig. by the small confidence intervals that do not span over 0 and high t-values (4.12–8.45) which show good statistical strength. Taken together, these findings confirm the central proposition of our theoretical framework that a multi-dimensional digital transformation strategy - while technically anchored in digital technology but also focused on people and strategic aspects - contributes to an organization's ability to manage financial distress.

The test of moderation effects, which is summarized in Table 4.b reveals that all hypothesized interaction terms (H5-H8) are significant, suggesting that environmental uncertainty plays a crucial role as boundary condition which systematically enhances the relationship between digital transformation efforts and financial resilience. The interaction terms were all significant and positive (β =.09 to (beta = 0.24,) all p <. 05), the positive impact of all digital transformation dimensions on financial resilience are reinforced by high environmental uncertainty. Especially, OLU is the key driver of the relationship between Workforce Skills with β = 0.18 (p <.737). 001, $\triangle R^2$ = 0.05) indicating that in volatile market, the ROI on human digital capital is greatly magnified. This is subsequent to the interaction with Digital Strategy (β = 0.15, p <. 001), (C) a well-defined digital roadmap may become increasingly important in the face of turbulence). The moderating effects on Technology Advance (β = 0.11, p =. 004) and Customer Engagement (β= 0.09, p =. 015) are relatively more modest. These results provide strong support for the central assumption of contingency theory that the effect of internal organizational capabilities is neither unconditional nor universally beneficial but contingent upon external environmental conditions. Thus we do not see digital transformation as a ('is' or 'may be') good for you" panacea but rather a strategic necessity, and focusing solely on the hyped financial benefits of such strategic moves might give a misled impression concerning their potential to promote competitive advantage.

Table 4.a Direct Effects Analysis

Path	β	SE	t-value	p-value	95% CI	f^2	Decision
Digital Strategy → Financial Resilience	0.28	0.04	6.72	<.001	0.21, 0.35	0.18	Sig.
Technology Investment → Financial Resilience	0.19	0.05	4.12	<.001	0.12, 0.26	0.09	Sig.
Workforce Skills → Financial Resilience	0.35	0.04	8.45	<.001	0.28, 0.42	0.24	Sig.
Customer Engagement → Financial Resilience	0.22	0.05	4.89	<.001	0.15, 0.29	0.11	Sig.

Table 4.b Moderation effects analysis

Interaction Term	β	SE	t-value	p-value	95% CI	$\triangle R^2$	Decision
Digital Strategy Environmental Uncertainty	0.15	0.03	4.83	<.001	0.09, 0.21	0.04	Sig.
Technology Investment × Environmental Uncertainty	0.11	0.04	2.89	0.004	0.04, 0.18	0.02	Sig.
Workforce Skills × Environmental Uncertainty	0.18	0.03	5.67	<.001	0.12, 0.24	0.05	Sig.

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Interaction Term	β	SE	t-value	p-value	95% CI	ΔR²	Decision
Customer Engagement × Environmental Uncertainty	0.09	0.04	2.45	0.015	0.02, 0.16	0.01	Sig.

4.5 Depth discussion

The evidence is overwhelming in this study that digital transformation capability is a cornerstone of developing financial resilience among SMEs. The fact that workforce digital skills were the most dominant predictor suggests a revolutionary transformation from the traditional technology sunk-investment based view of what firms think they "need" when it comes to digital investments, to viewing workforces as human capital assets for driving digital transformation. Earlier studies validate that the 'IT workforce digital capabilities' are important drivers of innovation, agility and performance resilience as well, especially in situation with disruption (Raimo et al. In the fluid Indonesian Digital Economy, employees with superior digital skills are not only operators of technology but proactive drivers of change that allow employers to pivot and respond to market conditions much faster than rivals who don't have these capabilities. This is in line with recent research which indicates that human capital is less imitable than mere technological resources (Scuotto et al., 2022).

Additionally, the established role of digital strategy in action upholds the central tenets of Dynamic Capabilities Theory that argue for integrating strategic and resource deployment activities to reconfigure capabilities when environments are turbulent (Teece, 2018; Warner & Wäger, 2019). There is empirical evidence that SMEs with a strong, well-communicated digital roadmap are better placed to predict the disruptions, allocate resources effectively and seize emerging opportunities (Ly, 2023; Kraus et al., 2021). It suggests that strategic consistency makes proactive resilient, and the organization kept its sustainability goal above its survival goal.

Further, the discovering of uniformity in environmental uncertainty as a moderating factor is significant for better supporting Contingency Theory. Previous research studies have stressed the context-dependent nature of organizational capabilities' effectiveness, particularly in uncertain contexts (Liu et al., 2020; Benitez et al., 2022). In Indonesian SMEs market environment with constant regulatory changes, market turbulences, and competitive pressure, digital investments are not only desirable but becoming vital for survival. This is in line with research suggesting that uncertainty increases the benefit of digital transformation projects (Matarazzo et al., 2021). In this way, turbulence can be a driver of higher returns from digital adoption, with digital capabilities providing resilience anchors.

Agreement and Disagreement with Previous Research. The results are in line with the increasing literature which supports the positive association between digital orientation and firm performance (Santoro, Song, & Kirkman, 2023; Kraus et al., 2021). The domination of workforce digital skills belies other studies in developed economies, which find technological infrastructure to be the primary driver (Zimmermann et al., 2020). This distinction might arise because of the specific Indonesian digital talent ecosystem that experiences a lack in advanced digital skills and puts human capital as a strong differentiator. Furthermore, the association between customer digital engagement and resilience is also in line with marketing research (Marques & Ferreira, 2020), but in the Indonesian SME context, digital platforms are frequently used as a lifeline for customer connection or revenue continuity through crisis period and it directly relates with financial survivability.

Theoretical Implications. This article contributes to strategic management theory in several ways. First, it unifies Dynamic Capabilities Theory and Contingency Theory into one framework, illustrating empirically that the importance of dynamic capabilities is contingent on external turbulence (Warner & Wäger, 2019; Benitez et al. Second, challenges the Resource-Based View by demonstrating that human capital in terms of digital skills is not a rare resource like others as well as tangible assets (e.g.Technological Capabilities) but more than a hard-to-imitate and valuable one, compared to the simple technologies

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assets it may have. Finally, by empirically testing the model using Indonesian SMEs as sample, it adds cross-cultural evidence to theoretical literature, which is mainly generated in Western circles (Raimo et al., 2023).

Managerial and Policy Implications. The findings suggest actionable recommendations. First, managers need to focus on digital talent development, because upskilling and fostering a digital culture provide the greatest ROI for financial resilience (Sousa & Rocha, 2019; Ly, 2023). Second, SMEs should establish comprehensive digital strategies involving processes, customer experience and business models (Kraus et al., 2021). A third implication for leaders is: (1) to reframe environmental uncertainty as an opportuunity and (2) leverage turbulence to justify faster digital adoption such as utilization of AI, big data et cetera(Benitez et al, 2022). For policy makers, it is recommended to support programs beyond financial aid and infrastructure (Marques & Ferreira, 2020) focusing on ecosystem development and work force strengthening.

Limitations and Future Research. A number of limitations suggest areas for further investigation. First, the cross-sectional nature of this study limitations its ability to establish causation; future longitudinal research should examine how digital transformation changes over time (Zimmermann et al., 2020). Second, the focus on Greater Jakarta means that we are not able to generalize our conclusions more widely and a further approach could be the application of the model to traditional sectors or to other Indonesian geographical areas (Santoro et al 2023). Third, to trust purely in perceptual data introduces bias; enchirmating contingent subjective with objective financial indicators would increase validity (Matarazzo et al., 2021). Second, environmental uncertainty was simplistic; to decompose it into technological turbulence, demand uncertainty and competitive intensity will bring more new nuances (Liu et al., 2020). Filling these gaps would develop the understanding of how digital transformation achieves sustainable resilience in SMEs.

5. Conclusion

It is shown that digital transformation capabilities, specifically workforce digital skills and the strategic alignment of digital initiatives, positively contribute to the financial resilience of Indonesian SMEs. The results emphasize a paradigmatic turnaround, where human capital becomes the major enabler of adaptive capacity, agility and innovativeness, not technology only. The study then verifies the moderating effect of environmental uncertainty, and offers empirical support that internal capabilities are dependent to a large extent on external turbulence, thus expanding the applicability of both DTC and Contingency Theory. Theoretically, the study contributes to the RBV by proving digital skills as a rare, valuable and inimitable resource that significantly effects firm sustainability. From a 8 work practice perspective, the research recommends that SMEs focus on enhancing digital skills of their workforce, embed end-to-end digital strategies into key business practices and reimagine uncertainty as a space for change. Instead, policymakers should develop mechanisms that support upskilling as well as ecosystem building and not just a technology access oriented mechanism. Notwithstanding limitations with respect to research design and scale, the study provides a springboard for future research which could utilise longitudinal approaches, sectoral comparisons and take multi-dimensional uncertainty considerations into account. Finally, the proof is in that digital transformation isn't just a means for efficiency, but rather a strategic linchpin keeping broader financial resiliency intact during tumultuous business times.

6. Image and data table

Appendix A: sampling frame and criteria in detail

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Dimension	Criteria Description	Justification for Inclusion	Population Frame Estimate	Sampling Method	Sample Size
Industry	Technology Startups (Digital Platforms, FinTech, EdTech)	High-velocity environment ideal for testing digital transformation dynamics	Approx. 1,500 firms (Source: Indonesian Ministry of Communication and Informatics, 2024)	Purposive	N=300
Location	Greater Jakarta (Jabodetabek)	Epicenter of Indonesia's digital economy, representing 58% of national digital startups	~870 firms (58% of national total)	Geographic Focus	-
Respondent Role	C-Level Executive, Senior Manager (IT, Finance, Operations)	Possesses strategic decision-making authority and comprehensive organizational insight	2-3 eligible individuals per firm	Role-Based Selection	-
Firm Age	Operational for 3-10 years	Excludes nascent firms (<3 years) lacking established processes and overly mature firms (>10 years) with potential inertia	Estimated 65% of population	Lifecycle Stage Filter	-
Firm Size	Minimum 30 full-time employees	Ensures established organizational structure while maintaining SME classification	Estimated 70% of population	Size-Based Filter	-

Appendix B: Operationalization and psychometrics of measurement scales

Variable	Construct Definition	Items	Sample Indicator Item	Reliability (α)	Original Source
Digital Strategy Implementation	The formalized approach to integrating digital technologies into business strategy and operations (Warner & Wäger, 2022)	5	"Our organization has a clearly defined digital transformation strategy."	α = .91	Warner & Wäger (2022)
Technology Investment Capability	The organizational ability to identify, acquire, and deploy appropriate digital technologies (Nwankpa & Roumani, 2022)	4	"We systematically evaluate the return on investment for digital technologies."	α = .89	Nwankpa & Roumani (2022)
Workforce Digital Skills	Employee competencies required to effectively utilize digital tools and platforms (Bresciani et al., 2022)	5	"Our employees receive regular training on emerging digital technologies."	α = .88	Bresciani et al. (2022)
Customer Digital Engagement	The deployment of digital channels to interact with customers and deliver personalized experiences (Kumar & Pansari, 2022)	4	"We use digital platforms to gather real-time customer feedback."	α = .90	Kumar & Pansari (2022)
Environmental Uncertainty	The volatility in market conditions, competitive intensity, and regulatory changes (Gunessee et al., 2022)	5	"Our industry experiences frequent changes in competitive dynamics."	α = .87	Gunessee et al. (2022)
Financial Resilience	The organizational capacity to withstand financial shocks and maintain operational continuity (Kraus et al., 2023)	6	"Our organization can quickly recover from financial setbacks."	α = .92	Kraus et al. (2023)

Table 1. Demographic characteristics of respondents

Characteristic	Category	Frequency (N)	Percentage (%)
Gender	Male	189	65.9
	Female	98	34.1
Age Range	Below 30 years	67	23.3
	31-40 years	142	49.5
	41-50 years	63	22
	Above 50 years	15	5.2
Education Level	Bachelor's Degree	124	43.2
	Master's Degree or Higher	163	56.8
Position	C-Level Executive	89	31

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	Senior Manager	198	69
Work Experience	5-10 years	134	46.7
	More than 10 years	153	53.3
Company Size	30-100 employees	157	54.7
	101-300 employees	130	45.3

Table 2. Reliability and convergent validity analysis

Construct	Items	Factor Loadings	Cronbach's Alpha	Composite Reliability	AVE
Digital Strategy	DSI1	0.84	0.91	0.92	0.68
	DSI2	0.82			
	DSI3	0.79			
	DSI4	0.85			
Technology Investment	TIC1	0.81	0.89	0.9	0.65
	TIC2	0.83			
	TIC3	0.78			
	TIC4	0.79			
Workforce Skills	WDS1	0.82	0.88	0.89	0.62
	WDS2	0.8			
	WDS3	0.76			
	WDS4	0.78			
	WDS5	0.79			
Customer Engagement	CDE1	0.85	0.9	0.91	0.67
	CDE2	0.83			
	CDE3	0.81			
	CDE4	0.79			
Environmental Uncertainty	EU1	0.77	0.87	0.88	0.59
	EU2	0.81			
	EU3	0.76			
	EU4	0.78			
	EU5	0.74			
Financial Resilience	FR1	0.86	0.92	0.93	0.69
	FR2	0.84			
	FR3	0.83			
	FR4	0.82			
	FR5	0.81			
	FR6	0.8			

Table 2.b, Discriminant validity assessment (*Fornell-Larcker Criterion*)

Construct	1	2	3	4	5	6
Digital Strategy	**0.825**					
Technology Investment	0.68	**0.806**				
Workforce Skills	0.62	0.59	**0.787**			
Customer Engagement	0.57	0.54	0.61	**0.819**		
Environmental Uncertainty	0.23	0.19	0.27	0.25	**0.768**	
Financial Resilience	0.65	0.61	0.67	0.63	0.31	**0.831**

Table 3. Descriptive Statistics and Bivariate Correlations

Variable	Mean	SD	Skewness	Kurtosis	1	2	3	4	5	6
Digital Strategy	5.12	1.05	-0.45	0.32	1					
Technology Investment	4.89	1.11	-0.38	0.28	.68**	1				
Workforce Skills	5.03	1.08	-0.52	0.41	.62**	.59**	1			
Customer Engagement	5.21	1.02	-0.61	0.53	.57**	.54**	.61**	1		

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Variable	Mean	SD	Skewness	Kurtosis	1	2	3	4	5	6
Environmental Uncertainty	5.45	1.14	-0.29	0.19	.23**	.19**	.27**	.25**	1	
Financial Resilience	5.08	1.07	-0.48	0.35	.65**	.61**	.67**	.63**	.31**	1

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Author Contributions

All authors have made substantial contributions to conception and design of the study. Retnosari organized the research framework, collected and analyzed the data, and provided the initial draft of the manuscript. Muhamad Wahyudi did data analysis and interpretation, as well as critical revisions. Both authors have read and approved the final manuscript.

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The data used and/or analyzed during this study are available from the corresponding author on reasonable request.

Ethics Approval and Consent to Participate

Research ethics This study also observed the research ethical principles. Voluntary participation was sought and prior to data collection consent was obtained from all participants. Privacy and anonymity of participants were guaranted during the study.

Conflict of Interest

Conflict of Interests The authors declare that there is no conflict of interests regarding the publication of this paper.

AI and Ethics Statement

The authors confirm that the present study was conducted in accordance with legislations relating to ethics, as well as towards responsible use of artificial intelligence.

References

Adomako, S., Opoku, R. A., & Frimpong, K. (2017). The Moderating Influence of Competitive Intensity on the Relationship between CEOs' Regulatory Foci and SME Internationalization. *Journal of International Management*, *23*(3), 268–278. https://doi.org/https://doi.org/10.1016/j.intman.2017.02.001

Alfarizi, M., & Widiastuti, T. (2023). Exploration of Technological Challenges and Public Economic Trends Phenomenon in the Sustainable Performance of Indonesian Digital MSMEs on Industrial Era 4.0. *Journal of Industrial Integration and Management*, 1–32. https://doi.org/10.1142/S2424862223500045

Amankwah-Amoah, J., Khan, Z., Wood, G., & Knight, G. (2021). COVID-19 and digitalization: The great acceleration. *Journal of Business Research*, *136*, 602–611. https://doi.org/https://doi.org/10.1016/j.jbusres.2021.08.011

Arendt, L. (2008). Barriers to ICT adoption in SMEs: how to bridge the digital divide? *Journal of Systems and Information Technology*, *10*(2), 93–108. https://doi.org/10.1108/13287260810897738

Atkinson, R. D., & McKay, A. S. (2011). Digital Prosperity: Understanding the Economic Benefits of the Information Technology Revolution. *SSRN Electronic Journal*, *March*. https://doi.org/10.2139/ssrn.1004516

ISSN: 3047-4108 P-ISSN: 3048-3751
Journal Economic Business Innovation -JEBI, Vol. 02, Issue.2 2025, Page; 210-223
DOI: https://doi.org/10.69725/jebi.v2i2.269

Bai, C., Quayson, M., & Sarkis, J. (2021). COVID-19 pandemic digitization lessons for sustainable development of micro-and small- enterprises. *Sustainable Production and Consumption*, *27*, 1989–2001. https://doi.org/https://doi.org/10.1016/j.spc.2021.04.035

Cao, R., & Iansiti, M. (2022). Digital transformation, data architecture, and legacy systems. *Journal of Digital Economy*, *1*(1), 1–19. https://doi.org/https://doi.org/10.1016/j.jdec.2022.07.001

Carayannis, E. G., Dumitrescu, R., Falkowski, T., Papamichail, G., & Zota, N.-R. (2025). Enhancing SME resilience through artificial intelligence and strategic foresight: A framework for sustainable competitiveness. *Technology in Society*, *81*, 102835. https://doi.org/https://doi.org/10.1016/j.techsoc.2025.102835

Clark, R., Reed, J., & Sunderland, T. (2018). Bridging funding gaps for climate and sustainable development: Pitfalls, progress and potential of private finance. *Land Use Policy*, *71*, 335–346. https://doi.org/https://doi.org/10.1016/j.landusepol.2017.12.013

Gao, H., Xue, X., Zhu, H., & Huang, Q. (2024). Exploring the digitalization paradox: the impact of digital technology convergence on manufacturing firm performance. *Journal of Manufacturing Technology Management*, *36*(2), 277–306. https://doi.org/10.1108/JMTM-04-2024-0178

Gidage, M., Gyamfi, B. A., & Asongu, S. A. (2025). Environmental Reporting and Financial Performance: Evidence From the Banking Sector in BRICS Countries. *Business Strategy and the Environment*, *34*(6), 7412–7437. https://doi.org/https://doi.org/10.1002/bse.4358

Huang, C.-K., & Lin, J.-S. (2025). Firm Performance on Artificial Intelligence Implementation. *Managerial and Decision Economics*, *46*(3), 1856–1870. https://doi.org/https://doi.org/10.1002/mde.4486

Hutahayan, B., & Yufra, S. (2019). Innovation speed and competitiveness of food small and medium-sized enterprises (SME) in Malang, Indonesia. *Journal of Science and Technology Policy Management*, *10*(5), 1152–1173. https://doi.org/10.1108/JSTPM-12-2017-0071

Indrawati, H., Caska, & Suarman. (2020). Barriers to technological innovations of SMEs: how to solve them? *International Journal of Innovation Science*, *12*(5), 545–564. https://doi.org/10.1108/IJIS-04-2020-0049

Irani, Z., Abril, R. M., Weerakkody, V., Omar, A., & Sivarajah, U. (2023). The impact of legacy systems on digital transformation in European public administration: Lesson learned from a multi case analysis. *Government Information Quarterly*, *40*(1), 101784. https://doi.org/https://doi.org/10.1016/j.giq.2022.101784

Jain, A., Kakade, K. S., & Vispute, S. A. (2025). The Role of Artificial Intelligence (AI) in the Transformation of Small- and Medium-Sized Businesses. In *Artificial Intelligence-Enabled Businesses* (pp. 209–226). https://doi.org/https://doi.org/10.1002/9781394234028.ch12

Khan, S. A. R., Zia-ul-haq, H. M., Umar, M., & Yu, Z. (2021). Digital technology and circular economy practices: An strategy to improve organizational performance. *Business Strategy & Development*, *4*(4), 482–490. https://doi.org/https://doi.org/10.1002/bsd2.176

Klein, V. B., & Todesco, J. L. (2021). COVID-19 crisis and SMEs responses: The role of digital transformation. *Knowledge and Process Management*, *28*(2), 117–133. https://doi.org/https://doi.org/10.1002/kpm.1660

Machado-Cabezas, Á., & Pérez-Mendez, J. A. (2015). Relación entre los sistemas de información de gestión y el resultado empresarial: Relationship between management information systems and corporate performance. *Revista de Contabilidad - Spanish Accounting Review*, *18*(1 SE-Artículos), 32–43. https://doi.org/10.1016/j.rcsar.2014.02.001

Marcysiak, A., & Pleskacz, Ż. (2021). Determinants of digitization in SMEs. *Entrepreneurship and Sustainability Issues*, *9*(1), 300–318. https://doi.org/10.9770/jesi.2021.9.1(18)

ISSN: 3047-4108 P-ISSN: 3048-3751
Journal Economic Business Innovation -JEBI, Vol. 02, Issue.2 2025, Page; 210-223
DOI: https://doi.org/10.69725/jebi.v2i2.269

Mirza, N., Umar, M., Lobont, O.-R., & Safi, A. (2025). ESG lending, technology investment and banking performance in BRICS: navigating sustainability and financial stability. *China Finance Review International*, *15*(2), 324–336. https://doi.org/10.1108/CFRI-09-2024-0496

Oliveira, P., Roth, A. V, & Gilland, W. (2002). Achieving competitive capabilities in e-services. *Technological Forecasting and Social Change*, *69*(7), 721–739. https://doi.org/https://doi.org/10.1016/S0040-1625(01)00188-3

Ollerenshaw, A., Corbett, J., & Thompson, H. (2021). Increasing the digital literacy skills of regional SMEs through high-speed broadband access. *Small Enterprise Research*, *28*(2), 115–133. https://doi.org/10.1080/13215906.2021.1919913

Pissarides, F. (1999). Is lack of funds the main obstacle to growth? ebrd's experience with small- and medium-sized businesses in central and eastern europe. *Journal of Business Venturing*, *14*(5), 519–539. https://doi.org/https://doi.org/10.1016/S0883-9026(98)00027-5

Ukko, J., Nasiri, M., Saunila, M., & Rantala, T. (2019). Sustainability strategy as a moderator in the relationship between digital business strategy and financial performance. *Journal of Cleaner Production*, *236*, 117626. https://doi.org/https://doi.org/10.1016/j.jclepro.2019.117626

Valaskova, K., Nagy, M., & Juracka, D. (2025). Digital transformation and financial performance: an empirical analysis of strategic alignment in the digital age. *Journal of Enterprising Communities: People and Places in the Global Economy*. https://doi.org/10.1108/JEC-11-2024-0241

Weritz, P., Braojos, J., Matute, J., & Benitez, J. (2025). Impact of strategic capabilities on digital transformation success and firm performance: theory and empirical evidence. *European Journal of Information Systems*, *34*(3), 415–435. https://doi.org/10.1080/0960085X.2024.2311137