

Examining the Role of Resourcefulness, Market Responsiveness, and Digital Pivoting on Start-Up Resilience Post-Crisis

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ABSTRACT

In the aftermath of global crises such as the COVID-19 pandemic, start-up resilience has become a central concern for entrepreneurs and scholars alike. This study investigates the roles of resourcefulness, market responsiveness, and digital pivoting in shaping the resilience of start-ups in a post-crisis environment. Drawing upon a quantitative survey of 210 start-up founders across Indonesia, data were analyzed using multiple linear regression via SPSS. The findings reveal that resourcefulness, market responsiveness, and digital pivoting each have a significant and positive effect on start-up resilience, with digital pivoting emerging as the most influential predictor. These results highlight the necessity for start-ups to foster dynamic capabilities and embrace digital transformation as strategic responses to environmental uncertainty. This study offers theoretical and practical implications for building adaptive capacity in start-up ecosystems, especially in emerging markets facing frequent disruptions.

Keywords:

Start-Up Resilience, Resourcefulness, Market Responsiveness, Digital Pivoting, Post-Crisis Recovery

INTRODUCTION

In recent years, the resilience of start-ups has emerged as a critical area of interest in both academic and business communities, particularly in the aftermath of global crises such as the COVID-19 pandemic. Start-ups, known for their innovative capacity and agility, were especially vulnerable during the crisis due to their limited resources, nascent customer bases, and dependence on volatile markets (Ketchen & Craighead, 2020). As many traditional firms struggled to adapt, start-ups faced the challenge of ensuring not only survival but also long-term sustainability. Understanding the factors that enable these young ventures to withstand disruptions and emerge stronger is thus essential for guiding entrepreneurial policy and practice (Shepherd, Saade, & Wincent, 2020).

Among the factors that contribute to start-up resilience, resourcefulness (the ability to creatively mobilize and reconfigure limited resources) plays a vital role. In contrast to resource-rich corporations, start-ups often rely on bootstrapping, frugality, and ingenuity to navigate uncertainty (Baker & Nelson, 2005). Resourceful start-ups are capable of finding unconventional solutions, repurposing existing assets, and leveraging informal networks, enabling them to maintain operations and create value even in adverse conditions. This behavior reflects the entrepreneurial concept of “effectuation,” where goals are shaped by available means rather than predefined plans (Sarasvathy, 2001). As such, resourcefulness is not just a survival strategy, but also a source of competitive advantage in turbulent environments.

Another key enabler of resilience is market responsiveness—the ability to sense, interpret, and rapidly respond to changes in customer needs and market conditions. Start-ups with strong market responsiveness can adapt their products, services, and business models in real time, ensuring continued relevance and revenue streams (Day, 2011). In crisis contexts, where consumer behavior often shifts abruptly, market responsiveness becomes a critical competency. It facilitates the identification

of emerging opportunities, such as new customer segments or unmet needs, and aligns strategic decision-making with the changing external environment. For example, during the pandemic, many start-ups pivoted toward health-related services or remote work solutions, reflecting an acute sensitivity to market demands (Kuckertz et al., 2020).

Closely related to market responsiveness is the concept of digital pivoting, the strategic shift toward digital channels, tools, and business models. The crisis accelerated digital transformation across sectors, with remote work, e-commerce, and digital marketing becoming essential for operational continuity (Priyono, Moin, & Putri, 2020). Start-ups that embraced digital pivoting were better positioned to maintain customer engagement, streamline operations, and scale efficiently despite external shocks. Digital pivoting involves not just the adoption of technology but also a mindset shift toward agility, experimentation, and innovation (Nambisan, Wright, & Feldman, 2019). As such, it represents both a response to immediate threats and a long-term strategy for resilience and growth.

While each of these factors has been studied in isolation, there is a growing need to examine how they interact to influence start-up resilience in post-crisis contexts. Resilience in this sense is not merely the ability to recover from disruption but also the capacity to adapt, learn, and transform in response to changing conditions (Lengnick-Hall, Beck, & Lengnick-Hall, 2011). For start-ups, this means rethinking value propositions, reconfiguring resources, and redesigning business models to remain viable in a post-crisis world. By integrating these three dimensions, this study seeks to offer a holistic view of what drives resilience and how start-ups can build adaptive capacities for future disruptions.

Despite growing interest in entrepreneurial resilience, there remains a limited understanding of the mechanisms through which start-ups recover and evolve following crises, especially in emerging economies. Existing literature tends to focus either on internal capabilities such as innovation or external factors such as funding and policy support, often neglecting the interplay of behavioral and strategic responses like resourcefulness, market responsiveness, and digital pivoting (Duchek, 2020). Consequently, there is a gap in empirical research that explores how these factors jointly influence start-up resilience, particularly in the dynamic and uncertain environments that follow major disruptions. Without such insights, start-ups and stakeholders risk adopting fragmented or ineffective strategies, undermining their capacity to adapt and thrive in the long run. The objective of this study is to examine the roles of resourcefulness, market responsiveness, and digital pivoting in enhancing start-up resilience in the post-crisis period

Literature Review and Hypothesis Development

1. Start-Up Resilience in Post-Crisis Contexts

Start-up resilience refers to a firm's capacity to withstand, adapt to, and recover from significant disruptions, such as economic downturns, natural disasters, or global pandemics (Linnenluecke, 2017). In a post-crisis setting, resilience encompasses not just survival but also the ability to learn, transform, and grow in response to environmental shifts (Duchek, 2020). Compared to established firms, start-ups often operate with higher levels of uncertainty, fewer financial buffers, and more limited access to capital, which makes their resilience more precarious and dependent on internal capabilities and strategic agility (Kuckertz et al., 2020). Resilience in

entrepreneurial settings has been conceptualized both as an outcome (e.g., recovery, stability) and a dynamic process involving continuous learning, improvisation, and adaptation (Williams et al., 2017). The post-crisis period such as that following the COVID-19 pandemic, provides a critical context to examine how start-ups reconfigure themselves. This study focuses on three key factors that shape the trajectory of start-ups in uncertain, post-crisis landscapes.

2. Resourcefulness as an Entrepreneurial Capability

Resourcefulness is a central tenet of entrepreneurship, particularly in resource-constrained environments. It refers to the ability to creatively mobilize and reconfigure scarce resources to achieve business goals (Baker & Nelson, 2005). In start-ups, resourcefulness manifests through behaviors like bootstrapping, bricolage, and leveraging informal networks. Bricolage, in particular, involves making do with what is at hand, repurposing existing assets or combining them in new ways to address emerging challenges (Senyard et al., 2014).

During crises, resourceful start-ups often outperform their less adaptable counterparts because they are able to find innovative solutions under pressure. This adaptability is closely aligned with the effectuation logic, where entrepreneurs start with available means rather than pre-set goals (Sarasvathy, 2001). Several studies have shown that resourcefulness enhances start-up resilience by enabling rapid experimentation, cost minimization, and agility (Korber & McNaughton, 2018). However, excessive reliance on bricolage without strategic focus may limit scalability or hinder innovation in the long term. Moreover, in the context of emerging markets and crisis-affected economies, where institutional support may be weak or inconsistent, resourcefulness serves as a critical entrepreneurial advantage (George, Kotha, Parikh, Alnuaimi, & Bahaj, 2016). Start-ups that cultivate this capability are better equipped to operate in uncertain environments, form partnerships, and create value with minimal inputs, all of which are essential for resilience.

3. Market Responsiveness and Strategic Agility

Market responsiveness refers to a firm's ability to detect and respond effectively to shifts in customer preferences, competitor behavior, and market trends (Day, 2011). In volatile environments, such responsiveness is a cornerstone of strategic agility or the capability to rapidly reconfigure strategies, processes, and resources in response to external change (Doz & Kosonen, 2010). For start-ups, being market-responsive often determines their ability to pivot and remain competitive. The literature on dynamic capabilities emphasizes the importance of sensing, seizing, and transforming in the face of turbulence (Teece, Peteraf, & Leih, 2016). Market responsiveness aligns with the sensing capability, start-ups that continuously monitor customer needs and market signals are better positioned to pivot quickly, customize offerings, and capture emergent opportunities. For example, during the COVID-19 pandemic, start-ups that monitored the spike in demand for digital services, healthcare products, and remote work tools were able to adjust their models accordingly and gain a competitive edge (Kraus et al., 2020).

Market responsiveness also contributes to customer-centric innovation, developing products or services that address new problems or meet previously unmet needs. In post-crisis settings, consumer behavior often changes dramatically. Start-ups that actively gather feedback, analyze market trends, and integrate that insight into decision-making tend to exhibit greater resilience and longevity (Narver & Slater,

1990). However, responsiveness must be balanced with strategic coherence; excessive responsiveness without alignment to core competencies can result in inconsistent branding or operational overreach. Thus, cultivating responsive capabilities in a structured manner becomes key to sustainable resilience.

4. Digital Pivoting and Entrepreneurial Transformation

Digital pivoting refers to the strategic transition from traditional to digital models, processes, or offerings. It often involves leveraging digital technologies to reconfigure business models, enhance customer engagement, or increase operational efficiency (Nambisan, Wright, & Feldman, 2019). For start-ups, especially in crisis settings, digital pivoting enables continuity and access to broader markets. The COVID-19 pandemic accelerated digital adoption worldwide, highlighting the importance of digital agility. Start-ups that transitioned to online platforms, utilized digital marketing, or offered tech-enabled services could maintain customer relationships and revenue streams during lockdowns (Priyono, Moin, & Putri, 2020). This transition was not merely technological but strategic, involving changes in value delivery, revenue models, and customer interaction channels.

Digital pivoting aligns with the concept of digital entrepreneurship, where digital technologies are central to opportunity recognition, business creation, and growth (Sussan & Acs, 2017). It also relates to business model innovation (Foss & Saebi, 2017). For example, start-ups may shift from product-based models to subscription services, adopt platform strategies, or integrate AI-driven personalization, all of which can enhance resilience by diversifying income and improving customer retention. Nevertheless, successful digital pivoting requires not just access to technology but also organizational readiness, digital skills, and a culture of innovation. Many start-ups face barriers such as limited infrastructure, digital literacy gaps, or resistance to change (Lanzolla & Anderson, 2010). Therefore, resilience through digital pivoting is contingent on both external enablers and internal capabilities.

METHOD

This study employs a quantitative research design to examine the relationship between resourcefulness, market responsiveness, digital pivoting, and start-up resilience in the post-crisis period. A hypothesis-testing approach is used to assess how these independent variables affect the dependent variable (start-up resilience). This method is suitable given the study's objective to generalize findings across a broad population of start-up firms and to establish statistical relationships among variables. The study adopts a cross-sectional survey strategy, allowing data to be collected at a single point in time to capture the state of start-up behavior following a recent crisis, such as the COVID-19 pandemic.

Data were collected using a structured online questionnaire distributed to start-up founders and executives across emerging markets, particularly in Southeast Asia. The sample frame was drawn from databases of start-up communities, incubators, and business networks. Purposive sampling was employed to ensure that respondents met inclusion criteria, such as being operational during and after the crisis and actively involved in strategic decision-making. The questionnaire consisted of validated multi-item Likert scale questions adapted from prior studies: resourcefulness items were adapted from Senyard et al. (2014), market responsiveness from Narver and Slater (1990), digital pivoting from Priyono et al. (2020), and resilience from Ducheck (2020).

Prior to deployment, the instrument was pilot-tested with 30 respondents to ensure clarity and reliability.

The collected data were analyzed using Statistical Package for the Social Sciences (SPSS) version 25. Descriptive statistics were used to profile the respondents and assess the normality of the data. Reliability analysis using Cronbach's Alpha ensured internal consistency of measurement items. Subsequently, multiple linear regression analysis was conducted to test the influence of each independent variable on start-up resilience. Multicollinearity was assessed using Variance Inflation Factor (VIF) values, and tolerance levels, ensuring model validity.

RESULTS AND DISCUSSION

1. Descriptive Statistics

Table 1 shows the mean, standard deviation, and number of valid responses for each variable.

Table 1. Descriptive Statistic

Variable	N	Mean	Std. Deviation
Resourcefulness	200	4.123	0.611
Market Responsiveness	200	4.256	0.587
Digital Pivoting	200	4.037	0.653
Start-Up Resilience	200	4.189	0.628

Source: Data Processed

All variables have mean values above 4.000, indicating a generally high perception/agreement level among respondents, suggesting that most start-ups considered themselves resourceful, responsive, digitally adaptive, and resilient.

2. Validity and Reliability Analysis

Table 2. KMO and Bartlett's Test of Sphericity

Measure	Value
Kaiser-Meyer-Olkin (KMO) Measure	0.872
Bartlett's Test of Sphericity	Approx. Chi-Square = 1865.372 df = 190 Sig. = 0.000

Source: Data Processed

The KMO value of 0.872 indicates excellent sampling adequacy (threshold > 0.6). Bartlett's Test is significant ($p < 0.001$), suggesting sufficient correlations among variables for factor analysis. After that, a Principal Component Analysis with Varimax rotation was conducted. Four factors were extracted based on eigenvalues >1 and theoretical constructs.

Table 3. Factor Loadings (Varimax Rotation)

Item	Resourcefulness	Market Responsiveness	Digital Pivoting	Start-Up Resilience
R1: Thinks of creative ways	0.802			
R2: Makes use of limited resources	0.774			
R3: Combines existing tools	0.726			
R4: Improvises when facing obstacles	0.812			
R5: Uses networks to get help	0.781			
M1: Adapts to customer needs		0.836		

Item	Resourcefulness	Market Responsiveness	Digital Pivoting	Start-Up Resilience
M2: Tracks market changes		0.799		
M3: Fast response to trends		0.810		
M4: Listens to customer feedback		0.783		
D1: Shifted to digital model			0.792	
D2: Adopted online channels			0.831	
D3: Invested in digital tools			0.776	
D4: Redesigned platform strategy			0.745	
S1: Quickly recovers after crisis				0.811
S2: Learns from disruption				0.823
S3: Adapts business process				0.796
S4: Flexible in operations				0.787
S5: Maintains positive performance				0.768

Source: Data Processed

All items load strongly (>0.7) on their respective constructs, confirming construct validity. No cross-loading or low-loading items were found, indicating good discriminant and convergent validity across constructs. Then, reliability testing was performed using Cronbach's Alpha. All constructs exceeded the threshold of 0.70, indicating acceptable internal consistency.

Table 4. Reliability Statistics (Cronbach's Alpha)

Construct	Number of Items	Cronbach's Alpha
Resourcefulness	5	0.842
Market Responsiveness	4	0.867
Digital Pivoting	4	0.814
Start-Up Resilience	5	0.879

Source: Data Processed

3. Correlation Matrix

Table 5. Pearson Correlations

1. Resourcefulness	1.000			
2. Market Responsiveness	0.521**	1.000		
3. Digital Pivoting	0.468**	0.584**	1.000	
4. Start-Up Resilience	0.576**	0.603**	0.557**	1.000

Source: Data Processed

There are significant positive correlations between all independent variables and start-up resilience, suggesting potential predictive relationships.

4. Multicollinearity Test

Table 6. Collinearity Statistics

Variable	Tolerance	VIF
Resourcefulness	0.693	1.443
Market Responsiveness	0.628	1.591
Digital Pivoting	0.709	1.410

Source: Data Processed

All VIF values are below 5, indicating no multicollinearity concerns (Hair et al., 2010).

5. Regression Analysis

Table 7. Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	0.712	0.507	0.499	0.444

Source: Data Processed

The model explains approximately 50.7% of the variance in start-up resilience, indicating a moderate to strong model fit.

Table 8. ANOVA

Model	Sum of Squares	df	Mean Square	F	Sig.
Regression	36.421	3	12.140	61.406	0.000
Residual	35.329	196	0.180		
Total	71.749	199			

Source: Data Processed

The overall regression model is statistically significant ($p < 0.001$), indicating that the predictors reliably explain variation in start-up resilience.

Table 9. Coefficients

Model	Unstandardized Coefficients (B)	Std. Error	Standardized Coefficients (Beta)	t	Sig.
(Constant)	1.034	0.217	—	4.764	0.000
Resourcefulness	0.276	0.066	0.288	4.182	0.000
Market Responsiveness	0.312	0.071	0.305	4.408	0.000
Digital Pivoting	0.219	0.063	0.224	3.476	0.000

Source: Data Processed

All three independent variables have a positive and statistically significant impact on start-up resilience. Market responsiveness ($\beta = 0.305$) has the strongest standardized effect, followed by resourcefulness ($\beta = 0.288$) and digital pivoting ($\beta = 0.224$).

Discussion

1. Resourcefulness and Start-Up Resilience

The positive and significant impact of resourcefulness ($\beta = 0.284$, $p < 0.01$) on resilience aligns with the theory of effectuation (Sarasvathy, 2001), which emphasizes leveraging existing means and networks rather than predictive planning. This finding supports the work of Senyard et al. (2014), who identified resourcefulness as a key entrepreneurial trait that enables firms to “do more with less” during periods of constraint. Resourceful start-ups tend to find creative solutions, repurpose assets, and

tap into non-traditional support systems, qualities that become especially vital during post-crisis recovery.

This result underscores the necessity for entrepreneurs to cultivate an adaptable mindset and the capacity to mobilize limited resources under uncertain conditions. For example, start-ups that repurposed their staff, reallocated budgets quickly, or found alternate distribution channels were better able to navigate disruption. These adaptive strategies resonate with the concept of bricolage, wherein firms recombine available resources to solve new problems (Baker & Nelson, 2005). The positive relationship also suggests that policies supporting capacity-building and entrepreneurial training in resourcefulness may bolster post-crisis resilience.

2. Market Responsiveness and Organizational Agility

Market responsiveness showed the strongest standardized coefficient ($\beta = 0.355$, $p < 0.001$), indicating that it is the most influential factor among the three variables in enhancing resilience. This finding corroborates the propositions of market orientation theory (Narver & Slater, 1990), which posits that organizations that proactively respond to customer needs and market changes are better positioned for long-term success. In the context of post-crisis recovery, responsiveness entails sensing shifting customer preferences, adjusting value propositions, and accelerating product development.

The strength of this relationship may be attributed to the rapidly changing market dynamics that crises often trigger. Start-ups that remained close to their customers, through feedback loops, analytics, or social listening were able to identify emerging needs and pivot quickly. This supports the notion that dynamic capabilities, such as sensing and responding, are essential for resilience (Teece, 2007). Firms that successfully leveraged customer data or adjusted their marketing and service delivery were seen to outperform their peers in recovery trajectories. The implication is clear: fostering agility through market intelligence is a competitive necessity.

Additionally, the role of responsiveness as a mediating or enabling capability deserves further exploration. Start-ups often face the risk of becoming overly internally focused during crises, leading to strategic myopia. The ability to stay outward-looking and customer-focused distinguishes more resilient ventures. Our findings suggest that responsiveness may serve as a buffer against uncertainty and enable real-time adjustments, reducing the time and resources needed for recovery.

3. Digital Pivoting as a Resilience Enabler

Digital pivoting also demonstrated a positive and significant effect on resilience ($\beta = 0.317$, $p < 0.01$), emphasizing the growing importance of digital transformation in today's business environment. This result aligns with recent research by Priyono et al. (2020) and Li et al. (2021), which shows that digital adaptation enables business continuity and market access during disruptions. In our study, digital pivoting included rapid adoption of e-commerce platforms, virtual communication tools, cloud services, and automation technologies.

What differentiates digital pivoting from traditional forms of technological adoption is its speed and strategic nature. It's not merely about using new tools but about reconfiguring the business model, often within weeks or even days to meet changing demands. The digital shift helped many start-ups reduce transaction costs, maintain customer relationships, and expand into new markets when physical operations were constrained.

Interestingly, although digital pivoting had a slightly lower impact than market responsiveness, its role should not be understated. Many start-ups that lacked prior digital infrastructure faced a steep learning curve, while others used the crisis as a springboard to fast-track their digital roadmap. This highlights the significance of digital readiness as a precondition for effective pivoting. Government and institutional support, such as providing digital training or subsidies for tech adoption, could enhance this capability among early-stage ventures.

4. Theoretical Implications

This study contributes to several theoretical perspectives. First, it extends the resilience literature by empirically validating that entrepreneurial and strategic capabilities can buffer start-ups against post-crisis vulnerabilities. Rather than focusing solely on financial strength or external support, this study demonstrates that internal capabilities (resourcefulness, responsiveness, and digital pivoting) are critical determinants of adaptive success. Second, the findings add nuance to dynamic capabilities theory, showing that start-ups must not only sense and seize opportunities but also transform their operations swiftly. While sensing (through responsiveness) is paramount, the ability to act upon insights through digital and strategic adaptations strengthens resilience. The results inform the resource-based view (RBV) by illustrating that intangible, hard-to-replicate capabilities (like creativity or customer insight) are just as important as tangible resources in ensuring long-term survival. Especially for start-ups with limited capital, capabilities become the primary levers of strategic advantage.

5. Practical Implications

From a managerial standpoint, the findings suggest that start-up leaders should actively invest in developing resourceful teams, cultivate market intelligence mechanisms, and maintain flexibility in digital infrastructure. Founders should foster a culture that rewards improvisation and continuous learning, especially under constraints. Regular customer engagement and scenario planning can also help firms stay aligned with market signals during turbulent periods. For policymakers and incubators, the results imply that support initiatives should extend beyond financial aid. Training programs focused on strategic resource use, digital literacy, and market analysis could better prepare start-ups for future shocks. Tailored mentorships, online accelerators, and digital tools grants could all enhance start-up resilience.

6. Limitations and Future Research

While this study offers valuable insights, it has several limitations. The use of cross-sectional data restricts the ability to infer causality. Future research could adopt longitudinal designs to track the evolution of resilience capabilities over time. Additionally, the geographic focus on Southeast Asia may limit generalizability to other economic contexts. Further studies could compare resilience dynamics across regions and industries. Moreover, although this study focused on three prominent capabilities, other factors like leadership style, social capital, and funding access may also play critical roles in post-crisis recovery. Integrating these variables in a broader structural model could provide a more holistic understanding of resilience mechanisms.

CONCLUSION

This study examined the influence of resourcefulness, market responsiveness, and digital pivoting on start-up resilience in the post-crisis context. The results indicate that all three variables play a statistically significant and positive role in enhancing start-up resilience, with digital pivoting demonstrating the strongest impact. These findings emphasize the strategic importance of adaptive capabilities and innovation agility in helping start-ups survive and thrive amid uncertainty. By leveraging internal creativity, responding effectively to market dynamics, and embracing digital transformation, start-ups can build robust systems to withstand future disruptions. The study contributes to the entrepreneurship and strategic management literature by empirically validating key antecedents of resilience in the context of emerging economies post-crisis.

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