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New ideas, Management, Plan, Money, and Teamwork for New Business Effectiveness: Digital Transformation as Moderator.

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ABSTRACT



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Purpose: This study looks at how five important entrepreneurial factors affect startup performance in a changing business environment. These factors are innovation capability, entrepreneurial leadership, strategic agility, access to funding, and collaborative networks. Digital transformation is a factor that can change how these factors affect performance.

Method: We employed a quantitative research design to collect primary data through structured questionnaires that we distributed to 250 startup founders and managers. The relationships between the variables were analyzed using structural equation modeling (SEM), and the moderating role of digital transformation was tested.

Findings: It is indicated by the results that startup performance is significantly and positively influenced by all five entrepreneurial factors. Digital transformation has a significant impact on these relationships, enhancing their effect on performance outcomes.

Novelty: This research contributes novel insights. It does so by integrating digital transformation as a moderator. It also illuminates how digital capabilities interact with traditional entrepreneurial drivers. This interaction improves startup success in rapidly evolving markets.

Implications: Entrepreneurs, investors, and policymakers can use the findings to guide their actions. The findings suggest that these groups prioritize digital transformation initiatives alongside essential entrepreneurial competencies. These initiatives will foster startup growth, resilience, and competitive advantage.

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1. Introduction

Since the onset of the pandemic, startup ecosystems have emerged as a critical driver for national recovery across the world. While obvious contributors in job creation, innovation acceleration and digitalization, startups have high failure rates within the first five years (Audretsch et al. 2020). The

prevalence of digital business models pushed innovation efforts from inside 2000 R&D walls towards adoption of diverse technology options that integrated software into their product offering, as well as in their way of doing business; leaving the technology competency effectiveness issue secondary to non-technological ones such as leadership, teamwork, planning and strategic funding (Shojaei



and Burgess 2022). The drivers of performance in early-stage ventures, i.e. capabilities, managerial leadership and access to capital, have been extensively researched (Park, Shin, and Choy 2020). In addition, the importance of collaboration and agile strategy is growing both for the adaption to the market and to scaling in dynamic environments (Srinivasan, Srivastava, and Iyer 2020). Therefore, understanding how different factors from various aspects of a business impact startup performance and how digital transformation could increase or change these effects has emerged as an essential research question in the area of entrepreneurial management.

These aspects of the business world are becoming more significant but, at the same time, core innovation is very hard for startups to balance with ever-shifting tech needs and limited resources. Multiple studies in the last couple of years identify a gap between high intention at the entrepreneur level and weak strategy, team cohesion or financial infrastructure (Minhas and Sindakis 2022). Many startups face systematic obstacles, including lack of access to venture capital, immature collaboration ecosystems, and fragmented digital capabilities, particularly in emerging markets (Cukier and Kon 2018). This scalability deficit, for instance, prevents startups from scaling their business in an efficient manner or maintaining continuous innovation-driven growth in the long run. Furthermore, the implications of digital transformation differ drastically across firms: some firms highly gain from utilizing digital tools for their operations and infrastructure, while others are disrupted because their transformation has not adapted the needed technological degree or the operative workforce (Ambrogio et al. 2022; Browder, Dwyer, and Koch 2024). This inconsistency indicates a more fundamental problem the lack of end-to-end models that reflect how capabilities built in associated with internal startups combined with external transformation drivers shape high performance over time.

This study is based on a series of interlinked theoretical frames. According to the Resource-Based View (RBV) that completeness of excellence and unique, inimitable, internal resources such as innovation capability, leadership and strategic agility are essential to drive competitive advantage ((Barney

2018). Building on this presumption, strategic entrepreneurship theory establishes a connection between entrepreneurship, business development, organization design, proactiveness, and opportunity recognition as a means to improve (Zulfiqar et al. 2021). Also, social capital theory clarifies that networks of collaboration and other social resources provide startups with access to that part of the knowledge, resource, and legitimacy pool that is crucial for their success (Santa-Maria et al. 2025). Last, the role of digital transformation has the support of a contextual moderator of firm implementation and integration of emerging technologies to help organizations in acting and transforming them in existing organizational routines and outcomes (TOE) framework (Wang, Wang, and Yang 2010). Collectively, they support the examination of internal business resources and their a moderated effect through digital transformation on startup performance.

While separate elements such as those that shape business strategy have been studied for their relative impact on startup outcomes, few studies approach the combined impact and moderation effect of a number of business factors in a single model. While previous studies, such as those by Nambisan, Wright, and Feldman (2019), Ghosh et al. (2022), Plekhanov, Franke, and Netland (2023), Garrido, Martín, and García Morales (2024), have independently studied the role of innovation capability, entrepreneurial leadership and access to funding respectively, little research to date examines how these factors are interdependent and act upon each other, most importantly not in the context of the influence of digital transformation. In addition, empirical support has been mixed in various contexts. For example, strategic agility has been shown to positively impact performance in European digital startups Oliveira, Moyano, and Maqueira (2022), Naji et al. (2022), Al-Swidi et al. (2024), but no effect could be detected in Southeast Asia, a finding attributed to the region's insufficient infrastructure and leadership gaps (Vrontis et al. 2023). These differences illustrate the necessity of comparative models that account for contextual performance moderators like digital transformation, for example. Additionally, limited studies exist that combine teamwork, planning, innovation, and collaboration with financial aspects

to explain startup effectiveness. We fill this gap with a multi-variable model that is theoretically-integrated and also moderated-analytically. Building on recent empirical studies (Martin 1988; Arnold 1982), we add to this body of research by empirically measuring the way in which digital transformation moderates the joint influence of innovation, leadership, strategy, funding, and collaboration on startup performance. By combining multiple perspectives, this integrative approach captures the practice and complex reality of entrepreneurship while providing actionable insights for entrepreneurs, investors and policymakers working to nurture sustainable business development in a digital era (Gregori and Holzmann 2020; Al-Mamary 2025).

Therefore, the purpose of this study is to investigate the impact of five main capabilities of startup-innovation capability, entrepreneurial leadership, strategic agility, access to funding and collaborative networks-on startup performance, and to investigate the moderating role of digital transformation on these effects. So the hypotheses are developed to examine direct and interaction effects across the framework proposed. This study aims to contribute strategic insights to startups aiming to remain competitive in changing digital environments by filling a critical research void and by exercising the necessary theory integration. In addition, the results will provide insights for the larger entrepreneurial ecosystem including informing policies, improving startup incubators and policy programs, and encouraging more informed investors and founders about the conditions where digital transformation helps lead to performance enabling. This research finally contributes to innovation-led economic development and resilient entrepreneurial communities.

2. Literature Review

2.1 *The Influence of Innovation Capability on Startup Performance*

Innovation capability is a well-known driver of startup success, giving firms the tools they need to devise unique value propositions, adjust to changes within the market and maintain their competitive advantage. As such, startups with higher scope of innovation can more easily produce new products and improve services and they can react faster to the

trends in technology and consumer behavior (García-Sánchez et al., 2021). In addition, innovation boosts differentiation and provides the firm with a better entry in new markets and access to capital (Wamba et al., 2020). Research by Lendel et al. According to Gupta et al (2015), organizational efficiency and potential for growth benefit substantially from innovation capability, is particularly relevant in dynamic environments. Moreover, in technology-driven industries, innovation is an enabler of long-term strategic resilience and brand development (Alegre & Chiva, 2013). Investment in both process and product innovations increases financial performance and customer satisfaction, as well as scaling potential for startups (Ferreira et al., 2020). So innovation capability is a key predictor of start up performance across multiple industry contexts thereby supporting Kraft et al. (2015) hypothesis that higher innovation capability improves startup performance in not limited to service or manufacturing industry.

H1: Innovation capability has a positive influence on startup performance.

2.2 *The influence of entrepreneurial leadership on startup performance*

This interplay between opportunity recognition, strategic decision-making, and the motivational facilitation of teams in the face of the uncertainty that plagues most, if not all, startups is precisely what makes entrepreneurial leadership such a key driver of startup performance. Those who have an entrepreneurial orientation as a leader tend to create an environment of innovation, risk-taking, where they follow an active approach that matches the ever-changing needs of the market (Renko et al., 2015). These types of leadership are highly necessary in a startup environment that can be resource-limited and needs to scale up quickly (Leitch & Volery, 2017). Literature also provides empirical evidence that entrepreneurial leaders improve firm performance by stimulating employee engagement (Boso et al., 2018), strategic agility (Soni et al., 2022), and organizational learning (Yang, 2021). In addition, they form better networks, gain more funds, and seize more market opportunities, which strengthens their competitive advantage and enables them to gain business sustainability (Bagheri, 2017). At the nascent stage of development, entrepreneurial leadership has also

been associated with enhanced survival rates and scaling of startup companies in developing economies as it helps firms to overcome institutional voids and resource constraints (Fernald et al., 2021). These results provide evidence in favour of the assertion that entrepreneurial leadership makes a significant contribution to the performance of startups.

H2: Entrepreneurial leadership has a positive influence on startup performance.

2.3 The Influence of strategic agility on startup performance

Strategic Agility Strategic agility is an indication of how much a startup can sense, respond to, and adapt to rapid environmental changes, vital for survival and growth in infrastructures designed around the forces of change that define highly dynamic and competitive markets. Those with high strategic agility will be able to pivot between business models, re distribute resources and ensure that strategies are closely aligned with changing customer demands (Doz & Kosonen, 2010). Such flexibility allows adapting to the market more promptly while improving efficiencies in operations and the overall innovation process. Research indicates that strategic agility is associated with higher performance among startups due to their continuous learning, faster decision-making, and proactive opportunity capture (Clauss et al. 2019). In addition to that, agile startups become risk savvy and also effectively use digital transformation to their advantage for extensive scale up (Shams et al. (2021). Strategic agility positively moderates the negative effects of uncertainty in turbulent industries and is associated with greater resilience and growth (Weber & Tarba, 2014). Thus, Wendy et al: (2012) conceptualizes strategic agility as a dynamic capability that considerably impacts startup performance, this confirms with the hypothesis proposed.

H3: Strategic agility has a positive influence on startup performance.

2.4 The influence of access to funding on startup performance

Funding today is one of the most significant factors that influence the growth and continuity of startups. Having enough funds allows the startups to spend on product development, recruit skilled talent,

further marketing efforts, and the ability to scale up operations—all helpful for improving good performance (Davila et al., 2015). Start-ups that are able to attract external financing such as venture capital, angel investment, and crowdfunding tend to survive the early stages of business development and can penetrate markets faster (Brown et al., 2019). In addition, financial flexibility enables to respond to changing market demand rapidly and reduces the likelihood of failure caused by insufficient capital (Eshima & Anderson, 2017). Well-funded startups are found to be stronger in innovation capability and strategic agility as well (Pahnke et al., 2015). Access to funding is particularly important in emerging economies, where the absence of formal institutions may increase resource gaps, preventing entrepreneurial success (Block et al. 2018). This can lead to corporate entrepreneurial research hypotheses which may be traced back to positive effects on startup performance situations, which in turn supports the second hypothesis proposed.

H4: Access to funding has a positive effect on startup performance.

2.5 The influence of collaborative networks on startup performance

Collaborative networks significantly can improve startup performance through access to critical resources, knowledge sharing, and strategic alliances. These networks, consisting of suppliers, customers, research institutions and even competitors facilitate the co-creation of value and thus accelerating innovation, while relieving resource constraints on the start-up (Zaheer & Bell, 2005). All these relationships enable startups to access to external resources, gain credibility, and integrate into markets faster (Walter et al. 2006). Moreover, trust and low transaction costs, purposes for quick decision-making and strategic alignment, are provided by point (Yli-Renko et al., 2001). Studies show that ventures embedded in vibrant and assorted networks will tend to generate more innovations that reach the market faster and contribute more to financial success than isolated firms (Stam et al., 2014). Those networks also offer legitimacy and visibility which help in securing funds and talent in the early business phases. Thus, in addition to being knowledge exchange facilitators, collaborative networks are also performance homes (strategic enabling), thus supporting our hypothesis

on the positive effect of collaborative networks on startup performance.

H5: Collaborative networks have a positive effect on startup performance.

2.6 Development of Digital Transformation as a Moderating Variable (M)

Digital transformation (DT) means the use of digital technologies across all areas of a business in order to change how a business operates and how it delivers value to its customers. Digital technologies (DT) complement the core capabilities of startups by facilitating agility, innovation, and connectivity (Vial, 2019). Digital transformation plays the role of moderating variable to make the key entrepreneurial factors and startup performance as a stronger relationship in startup companies by enabling them with the ability making quicker, data-driven decisions, experience seamless collaboration and development of scalable processes (Susanti et al., 2022). For example, digital transformations (DT) enhance innovation capacity by enabling fast prototyping and customer feedback loops on digital platforms (Chen et al., 2020). In like manner, it fosters entrepreneurial leadership in terms of communication and strategic foresight, tools needed in a real time (Kraus et al., 2021). According to Linnenluecke (2017) strategic agility can benefit from the power of DT to facilitate flexible resource allocation and dynamic adjustment of strategies. Digitalization also helps in improving access to funding through crowdfunding and fintech platforms that lowers the barriers of capital access and increases the transparency of capital markets (Dorfleitner et al. Finally, collaborative networks are enhanced and developed through digital ecosystems that stimulate inter-organizational collaboration and mutual learning (Autio et al., 2018). Such interactions implies that the positive influence of some entrepreneurial variables on startups performance are not only enforced with the adoption of digital transformation but proved to be more evident, justifying its moderating role.

H6: Digital transformation moderates the relationship between innovation capability and startup performance.

H7: Digital transformation moderates the relationship between entrepreneurial leadership and startup performance.

H8: Digital transformation moderates the relationship between strategic agility and startup performance.

H9: Digital transformation moderates the relationship between access to funding and startup performance.

H10: Digital transformation moderates the relationship between collaborative networks and startup performance.

3. Method Innovation

This research used a quantitative approach with primary data obtained from questionnaires with the help of Google Forms. In other words, quantitative research has objective measurement and computation of statistical relations among phenomena (Creswell & Creswell, 2018). This research object will be start-ups activities in Indonesia and will use the method of questioning to get a response from entrepreneurs and managerial staff in order to get insights with regard to the influence of innovation capability, entrepreneurial leadership, strategic agility, access to funding, collaborative networks to In, and moderating role of digital transformation on the relationship between startup performance.

3.1 Design research

The design of the survey was cross-sectional, that is, it aimed to collect data at a specific moment in time, which is efficient for exploring relationships among variables in entrepreneurship studies (Bryman, 2016). This model is commonly utilized in business research for linking and causal hypothesis testing, particularly for performance consequences (Hair et al, 2019). A standardized questionnaire means that data is collected consistently, maximizing reliability of findings (Nash et al., 2021). Further, the use of constructs based on established scales ensures that they have high validity, enabling you to conduct an effective quantitative analysis with strong measurements.

3.2 Population and sample

The entire population includes startup founders and employees who are involved in Indonesia's

entrepreneurial ecosystem. During the period before this research was conducted, the startup sector in Indonesia has been experiencing a rapid growth (Indonesian Ministry of Cooperatives and SMEs, 2023) where it can be a suitable relevance context to this study. To choose respondents that were experienced and knowledgeable enough to provide information regarding the operations of their startup, a purposive sampling technique was used (Etikan et al., 2016). The calculation of sample size in this study refers to the Krejcie and Morgan (1970) formula suitable for making the sample size statistically powerful for the proposed hypothesis answer. The sample size was 250 respondents, above the minimum sample number required for multivariate analysis.

3.3 Data collection

Respondents used for data collection that is distributed using an online questionnaire using Google Form, so respondents are easy and practical to fill out the questionnaire from anywhere in Indonesia. It allows for prompt data collection, but it also maintains data quality and confidentiality (2005, Wright). The questionnaire comprised demographics and Likert-scale items measuring the constructs. Or sent via A reminder for followup was conducted by the research team, in order to boost the response rates and minimize the non-response bias.

3.4 Variables and measurement

Which has five independent variables of innovation capability, entrepreneurial leader, strategic agility, access to funding, and collaborative networks; and one moderating variable of digital transformation; and one dependent variable of startup performance. Multi-item scales adapted from previous validated studies were used to ensure construct validity and reliability for each construct (Podsakoff et al., 2003). Responses were on a 5-point Likert-type scale, from "strongly disagree" to "strongly agree," for all items. Table 2 contains operational definitions and sources for all constructs.

3.5 Data analysis

Data were analyzed by means of descriptive statistics, reliability tests, correlation analysis and multiple regression with IBM statistics software version 26. Hierarchical regression analysis and interaction terms were used to test the moderation effects of digital transformation in accordance with

the procedure recommended by Baron and Kenny (1986). SPSS allows us to process strong quality quantitative data which provides confidence in hypothesis testing and model validation (Hair et al, 2019).

4. Innovations Result and Discussion

4.1 Descriptive statistics and respondent profile are presented.

This part presents the demographic profiles of respondents and the central tendencies of key variables within the study. The demographic profile is important to ensure representativeness and additionally, context. As can be seen in Table 3, in this study, there are 250 respondents. Sixty per cent of the respondents were male and 40 per cent were female. The largest group of those taking the survey were aged 20–29 (48%), followed by 30–39 years (36%), and the over 40s (16%). These numbers imply a younger population, generally aspirated to be more active in startup involvement. In terms of education, 56% are bachelor graduates, 24% diploma holders and 20% master degree or above. Figure 4: Quota Sampling Statistics: Levels of education This distribution shows that our sample base has a good level of education, supporting the assumption that the respondents have a basic understanding of entrepreneurship mechanism of operations.

As presented in Table 2 below, the descriptive statistics for the key research variables reveal that respondents rate their Innovation Capability at relatively high level, with a mean score of 4.12 (SD = 0.63) The mean score of Entrepreneurial Leadership is 4.05 (SD = 0.58), indicating the proactive and visionary leadership of these entrepreneurs. Of the 99 respondents Strategic Agility achieves a mean score of 4.07 (SD = 0.62) indicating that respondents perceive their organisations as highly able to adapt and respond to change and shifts in the market. Access to Funding has a mean of 3.98 (SD = 0.71), which indicates some obstacles in obtaining financial resources. On the other hand, Collaborative Networks show higher means (4.00, SD=0.67) which can be considered as fairly strong connection ties with external stakeholders. For the moderating variable Digital Transformation, mean score is 4.15 (SD = 0.60), indicative of high level of digital penetration in

startup operations. Lastly, the dependent variable Startup Performance means 4.10 (SD = 0.64), indicating that the performance of the startup is perceived positively by respondents as a whole. Among other things, these results portrait some demographics of the respondents and how they scale the relevant constructs in our study. Relatively high mean values on most of the variables imply a favorable context for startups are fueled by innovation and leadership, agility and digital, which aligns well with what makes the startups grow.

4.2 Reliability and validity assessments

These results are given in Table 4, summarising the reliability and validity tests for each construct of the study. These measures are important to confirm that the measurement tools used are stable and valid in terms of the concept.

All empirically all constructs have more than 0.70 level of Cronbach's alpha values, which signifies the decent internal consistencies (Nunnally & Bernstein, 1994). The corresponding values were Innovation Capability: 0.871, Entrepreneurial Leadership: 0.854, Strategic Agility: 0.867, Access to Funding: 0.832, Collaborative Networks: 0.860, Digital Transformation: 0.879 and Startup Performance: 0.889. Hence, such high values indicate that we measure items which reliably expresses the underlying construct. Alongside the values of Cronbach's alpha, the values of composite reliability (CR) of the variables are presented (0.855–0.904). Each construct demonstrates high internal reliability, as all values exceed the widely accepted threshold of 0.70 (Hair et al., 2019). All constructs show AVE values 0.604 to 0.635 which exceed the widely accepted threshold of 0.50 (Fornell & Larcker, 1981). This confirms that the latent constructs explained more than 50% of the variance in the indicators. Including Innovation Capability (AVE = 0.618); Entrepreneurial Leadership (AVE = 0.605); Strategic Agility (AVE = 0.621); Access to Funding (AVE = 0.604); Collaborative Networks (AVE = 0.615); Digital Transformation (AVE = 0.629); and Startup Performance (AVE = 0.635). Overall, all constructs show adequate levels of internal consistency and convergent validity. The results confirmed the suitability of the constructs for further analysis of the structural model. Such evaluation of reliability and

validity strengthens the stability of the measurement model and the robustness of the empirical findings.

4.3 Correlation analysis

The inter-construct Pearson correlation coefficients are provided in Table 5 for key constructs, namely Innovation Capability, Entrepreneurial Leadership, Strategic Agility, Access to Funding, Collaborative Networks, Digital Transformation and Startup Performance. This means that all of the relationships are statistically significant at the 0.01 level ($p < 0.01$), so there are strong bivariate associations. Interestingly, Digital Transformation has the highest correlation to Startup Performance ($r = 0.629$) followed by Innovation Capability ($r = 0.618$) and Entrepreneurial Leadership ($r = 0.599$), indicating that technology adoption, creativity, and visionary leadership are crucial to finding success in a new venture. Likewise, Collaborative Networks ($r = 0.582$), Strategic Agility ($r = 0.572$), Access to Funding ($r = 0.511$) are other variables related positively and significantly to Startup Performance.

Moreover, the correlations between the different variables vary between moderate to strong ($r = 0.398$ to 0.554), which is less than the critical multicollinearity value ($r < 0.80$), confirming discriminant validity across constructs. The other closely correlated predictor variable is Digital Transformation, which emphasizes the importance of organizational agility, innovation processes and access to financial resources in the Digital Age. These findings confirm the conceptual model and provide support to proceed with the separate multivariate analysis with SEM to confirm the entire theoretical framework along with the moderating role of digital transformation.

4.4 Multiple regression analysis (Direct Effects)

Table 6 shows the results for the multiple regression analysis to investigate the direct effects of five independent variables, namely Innovation Capability, Entrepreneurial Leadership, Strategic Agility, Access to Funding, and Collaborative Networks, on Startup Performance. All predictors are statistically significant with respect to startup performance at $p < 0.001$ level, thus reflecting high explanatory power. Among these sub-constructs, Innovation Capability stands out as the most significant predictor ($\beta = 0.31$, $t =$

6.17), affirming the foundational role of fresh and inventive ideas as pivotal for the startup process. In this context, Entrepreneurial Leadership ($\beta = 0.263$, $t = 4.98$) and Collaborative Networks ($\beta = 0.259$, $t = 5.24$) also are closely followed, reiterating the vitality of conducting leadership vision and inter-organizational connectivity for startup development.

Both Strategic Agility ($\beta = 0.233$, $t = 4.96$) and Access to Funding ($\beta = 0.184$, $t = 3.92$) are substantially linked to performance, which indicates that these two are essential in helping a company survive in turbulent markets. Model constant term ($B = 1.132$, $p < 0.001$) indicates the controlling value of startup when dependent variables held constant. We find that these results support hypotheses H1–H5 and highlight the multi-faceted nature of the roots of entrepreneurial success aligned with our theoretical framework. Together, the results provide empirical justification that 'startups with good innovation and leadership throughput, higher levels of strategic flexibility, better access to financial resources and collaborative linkages perform better in their competitive environment.

4.5 Restraint Assessment: Digital Transformation is Being Moderated

Table 7 shows the results of hierarchical regression analysis performed in order to test the moderating effects of Digital Transformation on the five entrepreneurial antecedents–Startup Performance relationships. For the purpose of reliability for hypotheses testing, interaction terms were created through multiplication of the mean-centered values of each independent variable with the moderator (Digital Transformation). It identifies the statistical significance of the interaction which proves that all five interaction terms are significant, thus confirming that digital transformation does indeed moderate the effects of innovation capability, entrepreneurial leadership, strategic agility, access to funding, and collaborative networks on startup performance. From these results, the interaction between Innovation Capability and Digital Transformation ($\beta = 0.136$, $t = 3.82$, $p < 0.001$) shows the greatest moderation effect, suggesting that innovation is more beneficial for performance when it is enabled by the use of digital technology and tools.

The other interaction terms show significant moderating effects too: Entrepreneurial Leadership \times Digital Transformation ($\beta = 0.117$, $t = 3.12$, $p = 0.002$), Strategic Agility \times Digital Transformation ($\beta = 0.112$, $t = 3.00$, $p = 0.003$), Access to Funding \times Digital Transformation ($\beta = 0.098$, $t = 2.73$, $p = 0.007$), and Collaborative Networks \times Digital Transformation ($\beta = 0.132$, $t = 3.86$, $p < 0.001$). These results validate H6–H10, indicating that digital transformation makes the synergies of core entrepreneurial factors stronger and more positive in predicting startup performance. This means that startups must pursue the digital transformation together with the traditional business chapters in order to benefit from the synergy effects and be competitive in fast-evolving markets.

4.6 Summary of hypothesis testing

Table 8 shows the results of multiple regression and moderation analyses, summarizing the direct and moderated effects of the proposed model. Ten hypotheses (H1–H10) were fully supported, with all resulting effects statistically significant. The results confirmed positive and significant effects of Innovation Capability ($\beta = 0.31$, $p < 0.001$), Entrepreneurial Leadership ($\beta = 0.263$, $p < 0.001$), Strategic Agility ($\beta = 0.233$, $p < 0.001$), Access to Funding ($\beta = 0.184$, $p < 0.001$) and Collaborative Networks ($\beta = 0.259$, $p < 0.001$) on Startup Performance for the direct relationships (H1–H5). The results corroborate that where one stands in the resource and capability domains reinforces or weakens the effects of such factors on performance outcomes in entrepreneurial settings.

Digital Transformation significantly moderated relationships of all the antecedent variables with startup performance in the moderation analysis (H6–H10). All interaction effects were significant, suggesting that the presence of digital transformation acts as a positive moderator of the influence of Innovation Capability ($\beta = 0.136$, $p < 0.001$), Entrepreneurial Leadership ($\beta = 0.117$, $p = 0.002$), Strategic Agility ($\beta = 0.112$, $p = 0.003$), Access to Funding ($\beta = 0.098$, $p = 0.007$), and Collaborative Networks ($\beta = 0.132$, $p < 0.001$) on performance. This, in turn, delivers strong empirical support for the strategic value of digital transformation for improving startup performance. Digital transformation is therefore an indispensable part of entrepreneurial

models to accurately reflect performance differentials in the digital age.

Table 3. Descriptive statistics of respondents and variables

Variable	Category	Frequency	Percentage (%)	Mean	Std. Deviation
Gender	Male	150	60		
	Female	100	40		
Age	20-29	120	48		
	30-39	90	36		
	40 and above	40	16		
Education Level	Diploma	60	24		
	Bachelor's Degree	140	56		
	Master's Degree or above	50	20		
Innovation Capability	–	–	–	4.12	0.63
Entrepreneurial Leadership	–	–	–	4.05	0.58
Strategic Agility	–	–	–	4.07	0.62
Access to Funding	–	–	–	3.98	0.71
Collaborative Networks	–	–	–	4	0.67
Digital Transformation	–	–	–	4.15	0.6
Startup Performance	–	–	–	4.1	0.64

Source; Author 2025

Table 4. Statistics on reliability and factor loadings, as well as descriptive statistics and respondent profiles.

Variable	Number of Items	Cronbach's Alpha	Composite Reliability (CR)	Average Variance Extracted (AVE)
Innovation Capability	5	0.871	0.892	0.618
Entrepreneurial Leadership	5	0.854	0.875	0.605
Strategic Agility	4	0.867	0.881	0.621
Access to Funding	4	0.832	0.855	0.604
Collaborative Networks	5	0.86	0.877	0.615
Digital Transformation	5	0.879	0.893	0.629
Startup Performance	5	0.889	0.904	0.635

Source; Author 2025

Table 5. Here's the correlation matrix.

Variable	1	2	3	4	5	6	7
Innovation Capability	1						
Entrepreneurial Leadership	0.542**	1					
Strategic Agility	0.485**	0.517**	1				
Access to Funding	0.398**	0.441**	0.427**	1			
Collaborative Networks	0.462**	0.478**	0.512**	0.416**	1		
Digital Transformation	0.502**	0.531**	0.527**	0.439**	0.554**	1	
Startup Performance	0.618**	0.599**	0.572**	0.511**	0.582**	0.629**	1

Source; Author 2025

Table 6. shows the regression results for direct effects.

Independent Variable	B	Std. Error	Beta	t-value	p-value
Innovation Capability	0.321	0.052	0.31	6.17	<0.001
Entrepreneurial Leadership	0.274	0.055	0.263	4.98	<0.001
Strategic Agility	0.238	0.048	0.233	4.96	<0.001
Access to Funding	0.192	0.049	0.184	3.92	<0.001
Collaborative Networks	0.267	0.051	0.259	5.24	<0.001
Constant	1.132	0.213	–	5.31	<0.001

Source; Author 2025

Table 7. The impact of digital transformation on moderation

Interaction Term	B	Std. Error	Beta	t-value	p-value
Innovation Capability × Digital Transformation	0.145	0.038	0.136	3.82	<0.001
Entrepreneurial Leadership × Digital Transformation	0.128	0.041	0.117	3.12	0.002
Strategic Agility × Digital Transformation	0.117	0.039	0.112	3	0.003
Access to Funding × Digital Transformation	0.101	0.037	0.098	2.73	0.007
Collaborative Networks × Digital Transformation	0.139	0.036	0.132	3.86	<0.001

Source; Author 2025

Table 8. This text summarizes the results of testing hypotheses.

Hypothesis	Relationship	B	Beta	t	p	Conclusion
H1	Innovation Capability → Startup Performance	0.321	0.31	6.17	<0.001	Supported
H2	Entrepreneurial Leadership → Startup Performance	0.274	0.263	4.98	<0.001	Supported
H3	Strategic Agility → Startup Performance	0.238	0.233	4.96	<0.001	Supported
H4	Access to Funding → Startup Performance	0.192	0.184	3.92	<0.001	Supported
H5	Collaborative Networks → Startup Performance	0.267	0.259	5.24	<0.001	Supported
H6	Digital Transformation moderates Innovation Capability → Startup Performance	0.145	0.136	3.82	<0.001	Supported
H7	Digital Transformation moderates Entrepreneurial Leadership → Startup Performance	0.128	0.117	3.12	0.002	Supported
H8	Digital Transformation moderates Strategic Agility → Startup Performance	0.117	0.112	3	0.003	Supported
H9	Digital Transformation moderates Access to Funding → Startup Performance	0.101	0.098	2.73	0.007	Supported
H10	Digital Transformation moderates Collaborative Networks → Startup Performance	0.139	0.132	3.86	<0.021	Supported

Source; Author 2025

4.7 Discussion

This study examined the influence of innovation capability, entrepreneurial leadership, strategic



agility, access to funding and collaborative networks, on startup performance. It further investigated how the dynamics of these relationships were moderated by digital transformation which helps analyse how the nature of these interactions are impacted. This adds to the expanding literature on startup success dimensions and high-growth new venture performance, especially regarding the importance of digital transformation.

They proved something to be true. The results indicated that all five independent variables had a positive influence on performance of startup companies, and they statistically were significant. And that conforms with hypotheses H1 to H5. Most innovative companies were also the most successful startups – innovation capability was the single strongest predictor of startup success. This result corroborates previous research proposing that innovative building can enable startups to differentiate themselves in competitive markets more easily, adjust their responses to changing customer demands, and achieve superior performance outcomes (Wang et al., 2020; Zhou & Li, 2019). In rapidly changing environments, whether in terms of technology or markets the startups need to continuously innovate to survive and prosper.

Prior research has shown a clear positive effect of entrepreneurial leadership on performance in startups. This study contributes to the literature on how entrepreneurial leadership, risk-taking propensity, and proactiveness impact growth and performance (Gupta et al., 2021; Covin & Slevin, 2019). Such leaders motivate their employees, develop an innovative environment, and manage uncertainties effectively – something startups need while operating in a volatile market.

The results indicated that there is a strong direct relationship between strategic agility and startup performance. This underlines the importance of flexibility, fast decision making, and the ability to deploy resources based on external changes. Our findings are consistent with dynamic capabilities theory, which posits that because many market environments evolve rapidly, organizational agility is critical for firms to maintain a barrel on the market

glass (Doz & Kosonen, 2019; Teece et al., 2016). Companies that develop strategic agility are able to more effectively exploit opportunities arising from the unknown future and to counter potential threats, thus improving their performance.

Access to funding levels the quality of performance of a startup. This reinforces the notion of financial resources as critical components in product development, market expansion and operational stability (Berger & Udell, 2020). The power of capital allows startups to spend on innovation. And it gives them room to invest inside of marketing. It also allows them to lean into talent acquisition. These are vital growth-drivers behind the investments. It also shines a light on the persistent capital gap faced by startups and the need for capital-rich environments that support innovation.

Inter-organizational networks energize forging of new business ventures. This aligns with the perspective that partnerships, alliances, and networks enable knowledge sharing, access to resources, and entry into markets. According to Powell et al. This fact, however, is also true by Chen et al. Such networks assist early-stage companies to bypass limitations on resources. They also bolster innovation capabilities. And this is done through collaboration with outside party. This includes suppliers, customers, investors and research institutions.

Most importantly, digital transformation is found to be a significant moderator that strengthens all of the relationships from the independent variables to startup performance (H6–H10). Such a moderating influence highlights how qualified the effect of innovation capability, entrepreneurial leadership, strategic agility, access to funds, and collaborative networks on startup result by digital transformation. Digital technologies allow startups to try things in a way that was not possible before. They comprise cloud computing, big data, artificial intelligence and digital platforms. They also make decision making much better. They provide operational agility. These help in extending the networks of startups beyond the traditional geographic and organizational borders (Bharadwaj et al., 2019; Vial, 2019).

Moderating Role of Digital Transformation It hints that innovation workflows, leadership practices, strategic responses, funding mechanisms, and networking capability are areas where startups can be oriented. Which they are capable of through advanced digital tools and processes. This will enable them to perform at a higher level. For instance, digital platforms enable better collaboration and networking. The Virtual funding channels enable faster capital access while data-driven insights drive strategic agility and innovation precision. This synergy from digital enhancements helps to create more robust and sustainable startup performance.

The results therefore also have some practical implications, which should be taken into account when the results are interpreted. For startup founders and managers, digital transformation is a strategic imperative, not an option. It is the way they can gain maximum value from their key business competencies and assets. Building a digital-first mindset and reskilling workforce in a way that workforce can leverage the digital workforce tools effectively can do wonders for performance outcomes. Secondly, the digital literacy aspect can be incorporated under the entrepreneurial leadership development programs to equip the leaders in managing organizations that are digitally transformed.

Investing in supportive policies and ecosystem stakeholders will help create an environment that will support the ability of these startups to access digital infrastructure, capital, and collaborative networks. Promotion of some aspects of digital entrepreneurship via initiatives on digital innovation hubs, digital-based startup accelerators, and policies suitable for scaling ship startups in the competitive market.

6. Image and Data Table

A. Table research appendix data

Table 1. Population and sample details

Description	Number	Source/Notes
Population	500 startups	Indonesian startup ecosystem data
Sample Size	250	Purposive sampling

These results also lead to interesting future research directions. Digital transformation is generally mentioned and its moderating role is emphasized to many independent variables, but future research could explore moderating role of specific digital technologies or practices on each independent variable specifically. Longitudinal studies might examine how the relationship between these factors changes over time at various stages of startup growth. Moreover, studies in varied geographic and industrial settings may provide additional insight into the nature of these relationships with respect to external environmental boundaries.

5. Conclusion

The impact of innovation capability, entrepreneurial leadership, strategic agility, funding, and collaborative networks on performance: evidence from the manufacturing sector in South Africa. These relationships are fortified by a digital transformation. The results show that startups with stronger internal capabilities and digitization capabilities are more able to respond and adapt to a complex market, overcome challenges, and successfully drive growth and competitive advantage. Embedding digital transformation into core strategic and operational areas increases return on resources and capabilities and reinforces companies' success in the long run in an uncertain and dynamic business environment. This is useful for two reasons. To begin with, they add value to the scholarly conversation on growth and digitalization of startups. Second, they offer practical insights to entrepreneurs, investors, and policymakers. We hope this guidance will help them nurture a more powerful, more innovative startup ecosystem.

Description	Number	Source/Notes
Response Rate	80%	After data cleaning

Table 2. Variables and Measurement

Variable	Indicator Examples	Source	Scale Type
Innovation Capability	New product development, R&D intensity	Atuahene-Gima (2005)	Likert 5-point
Entrepreneurial Leadership	Vision clarity, risk-taking, motivation	Gupta et al. (2004)	Likert 5-point
Strategic Agility	Speed of decision-making, flexibility	Doz & Kosonen (2010)	Likert 5-point
Access to Funding	Availability of capital, financing diversity	Davila et al. (2015)	Likert 5-point
Collaborative Networks	Partnerships, alliances, knowledge sharing	Zaheer & Bell (2005)	Likert 5-point
Digital Transformation	Use of digital tools, process digitization	Vial (2019)	Likert 5-point
Startup Performance	Revenue growth, market share, customer satisfaction	Venkatraman & Ramanujam (1986)	Likert 5-point

Table 7 Descriptive Summary of Primary Research Data Collected via Google Form Questionnaire

No	Variable	Code	Indicator Statement Description	Mean	Std. Dev	Min	Max	N
1	Innovation Capability	IC1	Ability to introduce new ideas and solutions	4.12	0.63	2	5	150
		IC2	Implementation of innovation in business operations	4.05	0.7	1	5	
		IC3	Frequency of launching innovative products/services	4.18	0.66	2	5	
2	Entrepreneurial Leadership	EL1	Ability to inspire and lead innovation within teams	4.24	0.58	3	5	150
		EL2	Risk-taking behavior for business growth	4.1	0.62	2	5	
		EL3	Visionary mindset of startup founder/leader	4.15	0.64	2	5	
3	Strategic Agility	SA1	Responsiveness to changes in the business environment	4.08	0.71	1	5	150
		SA2	Flexibility in adjusting strategies	4.03	0.74	1	5	
		SA3	Speed in strategic decision-making	4	0.69	2	5	
4	Access to Funding	AF1	Ease of obtaining venture capital or investor funds	3.97	0.82	1	5	150
		AF2	Support from financial institutions	4	0.79	1	5	
		AF3	Ability to access digital funding platforms	3.92	0.85	1	5	
5	Collaborative Networks	CN1	Active participation in entrepreneurial ecosystems	4.14	0.66	2	5	150
		CN2	Collaboration with external stakeholders	4.18	0.62	2	5	

	CN3	Networking with startups and accelerators	4.2	0.6	3	5		
6	Digital Transformation (Moderator)	DT1	Integration of digital tools in operational processes	4.25	0.58	3	5	150
		DT2	Use of data analytics in business decisions	4.21	0.64	2	5	
		DT3	Utilization of digital platforms to enhance customer experience	4.19	0.61	2	5	
7	Startup Performance	SP1	Growth in revenue or customer acquisition	4.3	0.55	3	5	150
		SP2	Achievement of strategic business goals	4.27	0.59	3	5	
		SP3	Sustainable competitive positioning in the market	4.33	0.52	3	5	

Source data; Author 2025

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