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The growth code of SMEs in the digital wave: how innovation, initiative, and management ability drive growth hacking capabilities

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Abstract

Purpose – This study aims to investigate the development of growth hacking capability (GHC) in small and medium-sized enterprises (SMEs) and its impact on organisational performance, drawing on the resource-based view (RBV) and dynamic capability theory (DCT).

Design/methodology/approach – Using a hybrid analytical approach that combines structural equation modelling and artificial neural network, 392 respondents across 51 SMEs in China's service and manufacturing sectors were surveyed.

Findings – The findings reveal that innovation (ß = 0.354), initiative (ß = 0.299) and management capability (ß = 0.176) significantly enhance GHC, which, in turn, directly improves organisational performance (ß = 0.342). Although organisational agility does not directly impact performance, it contributes indirectly through GHC. The findings highlight the strategic importance of data-driven decision-making in digital transformation and confirm the mediating role of GHC as a dynamic capability.

Research limitations/implications – This study is limited by its exclusive focus on Chinese SMEs, thus, suggesting the need for future research that conducts cross-national comparisons and longitudinal analyses.

Practical implications – Practically, SMEs are encouraged to foster an innovative culture, adopt forward-looking strategic planning and enhance managerial data literacy to cultivate GHC. Theoretically, the integration of the RBV and the DCT offers a novel lens for examining organisational capabilities in the digital era.

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Originality/value – This study introduces GHC as a mediating variable, clarifying how innovation, initiative and managerial capability affect SME performance in digital contexts. It extends the RBV and the DCT to illustrate performance mechanisms.

Keywords Growth hacking capability, Organisational performance, Innovativeness, Proactiveness, Organisational agility

Paper type Research paper

1. Introduction

In recent years, the digital economy has profoundly transformed how organisations compete, communicate and create value (Lu *et al.*, 2023). In particular, small and medium-sized enterprises (SMEs) find themselves in a complex and dynamic strategic environment that poses unprecedented challenges: They are under increasing pressure to respond to accelerated technological changes, shifting consumer preferences and intensified global competition (Cristofaro *et al.*, 2025). They face intense competition from their peers and must counter the cross-industry disruptions brought by industry giants (Giordino *et al.*, 2025).

Amid these disruptions, Growth hacking capability (GHC) offers a structured yet adaptive approach for organisations to compete using data-informed innovation. It uses iterative testing across multiple customer interaction phases (Ellis and Brown, 2017). Starting from early brand awareness, through decision-making, and ending with long-term loyalty, GHC maintains its focus on continuous innovation (Bargoni *et al.*, 2024). Through continuous learning, organisations can capture market feedback in a timely manner and transform their experiences into reusable growth strategies. Such organisations are highly responsive to market needs and are capable of driving innovation within their industry by setting examples for others. Moreover, by leveraging real-time consumer data, organisations can shorten innovation cycles, reduce risks and improve their strategic responsiveness (Xu *et al.*, 2023).

Global integration driven by digital technologies is reshaping economic structures in developing nations by promoting industrial upgrading, digital entrepreneurship and the transformation of SME capabilities. Being a core engine of economic growth, SMEs urgently need to break through development bottlenecks via digital transformation (Li *et al.*, 2023). To this end, the establishing GHC is particularly critical – at its core, it is data driven and, through technological iteration and marketing innovation (e.g. social media analytics), it helps organisations precisely understand customer needs, forecast market trends and formulate diverse competitive strategies (Bargoni *et al.*, 2024). GHC involves using real-time insights from user-generated content, including customer reviews, social media feedback and online discussions. These insights enable organisations to rapidly test product ideas and optimise interaction points such as website navigation, onboarding processes and customer support, thereby enhancing their competitive advantage (Hafezieh *et al.*, 2023). However, frequent updates to digital tools, along with shifting market conditions, demand that enterprises become more agile. SMEs can achieve long-term development in the context of digital transformation only if they consistently improve their GHC flexibility (Cannas, 2023).

In the context of rapid digital economic development and constant changes to the market environment, organisations with significant technological progress can integrate fragmented market information and quickly respond to consumer demands (Bani-Melhem *et al.*, 2025). Organisations are increasingly relying on digital platforms and intelligent programmes, including recommendation engines, customer service chatbots, automated marketing systems and behavioural prediction models. This data-driven operating model has become a core element of modern business competition. By using advanced data analysis methods with AI tools, firms can better predict market movements and satisfy specific customer needs (Santoro *et al.*, 2024).

Digital-driven growth hacking strategies use data from the entire customer life cycle to build a quantifiable conversion funnel model that can serve market management practices (Bargoni *et al.*, 2024). Organisations continuously conduct rapid comparative experiments to evaluate effective growth paths, obtain continuous feedback loops for strategy improvement and form dynamic adaptive capabilities (Cavallo *et al.*, 2024). The SMEs that use GHC achieve this goal by analysing the market, driving sales, promoting customer engagement and providing customer support; moreover, they conduct advanced data analysis and use digital platforms to enhance organisational value. Moreover, big data-driven market planning capabilities have reshaped product management and are an important factor affecting GHC (Wu *et al.*, 2024).

Despite its growing relevance, GHC remains under-theorised, particularly in relation to organisational capabilities such as agility and innovation. This study aimed to highlight the importance of examining how external conditions and GHC influence organisational outcomes. It explored GHC as a strategic asset that integrates innovation, proactiveness and managerial coordination to drive adaptive growth in digitally dynamic environments. Moving beyond its origins as a tactical marketing tool and drawing on the resource-based view (RBV) and dynamic capabilities theory (DCT), this study highlights how GHC mediates the transformation of latent capability into market-effective actions. Without integrative mechanisms such as GHC, the empirical findings suggest that organisational agility may not translate into performance gains. This study, thus, reframes GHC as both a theoretical construct and a practical lever, thereby contributing to capability theory and offering guidance for digital-era strategic management.

2. Literature review

2.1 Theoretical background

Organisations rely on tangible and intangible resources (Barney, 1991) to formulate strategies, enhance performance and achieve competitive advantages in the market. The effective implementation of GHC also depends on internal environmental factors (Aragón-Correa and Sharma, 2003; Wade and Hulland, 2004). The RBV underscores the value of an organisation's internal resources, with a particular focus on organisational skills. Such internal factors influence organisational strategy, and they significantly affect the overall performance (Grant, 1991). When implementing growth hacking strategies, organisations must combine various assets from different operational areas. Effective integration across production and marketing supports long-term success and aligns with the performance goals outlined in the RBV (Abubakar *et al.*, 2025).

While the RBV focuses on leveraging the existing internal resources to achieve sustained competitive advantages, the DCT emphasises the organisational ability to continually adapt, innovate and renew its capabilities to effectively respond to changing environments (Teece *et al.*, 1997). While the RBV views innovation and managerial skills as valuable static assets, the DCT highlights the importance of an organisation's ability to reshape its resources dynamically to sustain competitive advantage in an evolving environment.

Innovative organisations break away from tradition and develop new products, services and marketing models, thereby providing the creative source for growth hacking strategies. (Yoshikuni and Dwivedi, 2022) – for example, ByteDance's development of personalised recommendation algorithms significantly enhanced its product competitiveness (Wang *et al.*, 2022). Proactive firms can forecast market trends and plan new business opportunities in advance to seize the initiative in growth hacking, much like Tesla's pioneering efforts in the electric vehicle market that have driven industry transformation (Khan *et al.*, 2024). Managerial capabilities ensure the rational allocation of resources and the effective execution of strategies, thereby facilitating the implementation of growth hacking strategies and helping organisations

achieve their growth targets (Kevill *et al.*, 2021). Moreover, agile organisations can swiftly adapt to market shifts and modify their growth strategies accordingly, thereby enhancing their competitive position.

This study used the combined framework of the RBV and the DCT. The RBV suggests that capabilities such as innovativeness and managerial skills are central to building long-term competitive strength (Barney, 1991). In comparison, the DCT underlines the need for organisations to keep learning and reshaping their resources to develop strong responses to market changes (Teece, 2007). GHC integrates the two theories, representing the static capability of using existing resources (e.g. innovativeness) as well as the dynamic process of continuous optimisation through experimental iterations and agile decision-making (e.g. dynamic resource reallocation).

2.2 Growth hacking capability

Growth hacking has been conceptualised as a data-driven and iterative experimental methodology designed to accelerate organisations' growth trajectory (Cristofaro *et al.*, 2025). Theoretically, GHC has multifaceted significance. Firstly, it supports the development of dynamic capabilities through the combined use of data-driven analysis, innovative practices and continuous learning within an organisation. This combination helps firms respond flexibly when facing market shifts (Bani-Melhem *et al.*, 2025; Giordino *et al.*, 2025). Secondly, it reduces the risk of innovation failure across the market, organisational, project and product dimensions by emphasising an experimental feedback loop to manage innovation risks (Bargoni *et al.*, 2024). In practice, GHC is implemented using various strategies. Bohnsack and Liesner (2019) categorised 34 growth hacking models based on two dimensions: the intensity of resource investment and the expected time delay before observable outcomes. In addition, GHC is supported by micro-foundations such as rapid prototyping in lean start-ups, customer feedback loops and cross-functional team collaboration (Foggetti *et al.*, 2025).

2.3 Innovativeness

Organisations' innovativeness, a core dynamic capability, helps them gain a competitive advantage through systematic change and adaptation. While previous studies mainly emphasised product innovation (Siguaw *et al.*, 2006), Garcia and Calantone (2002) argued that innovativeness should encompass broader dimensions, such as process innovation (optimising supply chains and introducing automation, for instance) and business model innovation (reconfiguring value propositions or profit models, for instance) (Baden-Fuller and Haefliger, 2013). In the digital era, innovativeness increasingly reflects the integration of advanced technologies and data-driven strategies – for example, leveraging customer analytics to tailor services or redesign experiences. Such data-informed innovation is essential for creating sustainable competitive advantages (Wong and Ngai, 2024). Innovativeness is multifaceted, requiring an organic combination of novel ideas, experimental practices and creative stimulation processes. It also fosters an organisational environment conducive to risk-taking, continuous improvement, iterative testing and the rapid development of new business functions. In volatile markets, organisations that embed data-guided innovation and embrace uncertainty are more likely to adapt and thrive. Innovative companies, thus, constantly seek opportunities to continuously improve their products and services (Garrido-Moreno *et al.*, 2024).

2.4 Proactiveness

From the perspective of the DCT, proactiveness is more than a behavioural trait – it is a capability that organisations use to sense changes in their external environment, seize emerging

opportunities and reconfigure their internal resources accordingly. Externally, proactive organisations scan the market to detect early signals of shifts in consumer preferences, technological advancements or regulatory trends. Internally, they foster innovation, encourage cross-functional collaboration and cultivate a culture that supports rapid experimentation. This triad – sensing, seizing and reconfiguring – is central to organisational adaptability in volatile markets. Proactiveness strengthens the sensing component of dynamic capabilities by enhancing an organisation's awareness of unarticulated needs and nascent market trends (Hashem *et al.*, 2024).

Proactiveness also supports the seizing process by accelerating internal decision-making and reducing the inertia associated with organisational change. In challenging business environments, proactive organisations can quickly launch products or services that adapt to market changes (Choi *et al.*, 2024). As such, proactiveness serves as a dynamic mechanism that links external insights with internal adaptability, contributing directly to an organisation's innovation capacity and long-term competitiveness (Cavallo *et al.*, 2024).

2.5 Managerial capabilities

Managers with strong capabilities in strategic planning, resource coordination and data-driven decision-making are essential for resource coordination and long-term planning. Their capabilities support decision-making, resource allocation and goal setting. In times of crisis, such as economic downturns or sudden market shifts, these managers can pivot strategies, ensuring that the organisation remains resilient. They can also shape market strategies by adapting to changes and maintaining competitiveness (Issah *et al.*, 2023).

Moreover, such managers can foster an organisational culture that enables growth hacking strategies. By analysing data, testing and iterating, organisations can grow rapidly. In fast-changing markets, these capabilities are crucial for leveraging growth hacking resources. Data-driven decisions and an agile structure can also help organisations respond quickly to changes in the market. However, overreliance on traditional skills may limit innovation, harming organisational outcomes and rigid hierarchical decision-making can delay the approval process for innovative ideas and curtail an organisation's ability to generate truly groundbreaking solutions, ultimately affecting innovative outcomes (Pedraza-Rodríguez *et al.*, 2023).

Management capabilities are also necessary for driving digital transformation, as they influence planning, coordination and resource allocation throughout the process. By strategically allocating resources, managers can enhance the market competitiveness of their organisation. The survey of CEOs by Cho *et al.* (2024) revealed that predicting customer behaviour through data modelling can transform empirical decisions into evidence-based scientific decisions and effectively enhance managerial capabilities.

2.6 Organisational agility

An organisation's ability to swiftly adjust its strategies based on real-time market signals allows it to navigate evolving market conditions. This adaptability ensures effective operation within a dynamic and complex ecosystem. It comprises two key dimensions: market agility and operational agility. An organisation's market adaptability enables it to precisely assess industry trends. By actively addressing customer demands, organisations can continuously refine and enhance their products and services. Operational agility refers to an organisation's flexibility in adjusting its internal operations to align with external market conditions. In growth hacking practices, organisational agility is leveraged to reasonably allocate resources and significantly enhance the effectiveness of growth hacking initiatives. Market agility enables organisations using GHC to sensitively capture new market demands and potential opportunities and rapidly launch innovative

products and services to boost market competitiveness (Dimple and Tripathi, 2024). Operational agility enables organisations to build flexible and efficient internal processes and accelerate the implementation of growth hacking strategies. Organisational agility, thus, lays the foundation for the effective deployment of GHC, not only helping organisations cope with market uncertainties but also paving new paths for continuous innovation and high-quality development.

2.7 Organisational performance

An organisation's ability to achieve its strategic objectives can be assessed using its productivity and market position. Organisational performance serves as a key measure in this evaluation (Wu *et al.*, 2024), and enhancing this measure typically relies on clear strategic planning, optimised resource allocation and effective execution mechanisms. Organisations often rely on financial indicators and qualitative benchmarks to evaluate outcomes, which include profitability, growth in sales volume, share in the target market, client satisfaction levels and overall efficiency of operations. With the support of GHC, organisations can optimise resource allocation through data-driven methods, quickly validate business hypotheses and continuously improve products and services through iterative processes, thereby enhancing their performance (Giordino *et al.*, 2025).

3. Methodology

3.1 Research framework

A thorough review of the literature formed this study's foundation (Figure 1). The proposed framework was built on resource-based theoretical insights to analyse the key factors influencing organisations. A conceptual model was developed to illustrate how internal conditions influence GHC. The analysis explored how internal conditions, including innovativeness, proactiveness, managerial capabilities and organisational agility, shape business outcomes and drive strategic effectiveness.

3.2 Research hypotheses

In line with the core tenets of the RBV, GHC functions as a data-driven dynamic ability that offers organisations a sustained competitive advantage by integrating heterogeneous internal and external resources (Bresciani *et al.*, 2024). It enhances organisational performance by using automated experimental frameworks to optimise the customer journey funnel, thereby enabling cost-effective and precise customer acquisition and improving the financial performance of SMEs (Giordino *et al.*, 2025). For instance, PayPal used simulation modelling to select optimal growth strategies, thereby significantly reducing market validation cycles (Cavallo *et al.*, 2024). From a dynamic capabilities perspective, GHC builds an iterative loop of testing and learning that significantly enhances organisational adaptability. Empirical evidence shows that GHC's impact is fully mediated by marketing capabilities and disruptive innovation, particularly in rapidly changing technological environments (Joshi *et al.*, 2025). Moreover, by reconfiguring resource portfolios using the multiplier effect of intellectual capital, GHC fosters cross-departmental collaboration that breaks down data silos and reduces the likelihood of innovation failure (Bargoni *et al.*, 2024), although attention must be paid to the potential data privacy risks associated with rapid iterative experimentation (Gerlich *et al.*, 2025). The following hypothesis was, thus, proposed:

H1. GHC positively impacts organisational performance.

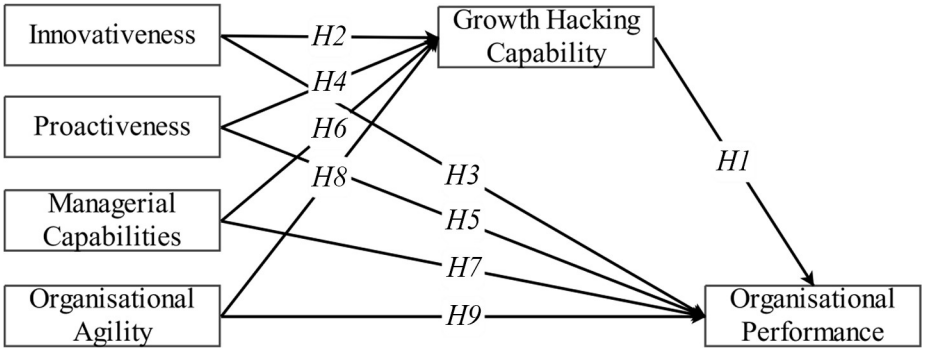

Figure 1. Conceptual model constructed by the author
Source: Figure by authors

Using innovation capabilities, organisations implement new and transformative approaches and perform better. Innovation influences an organisation's strategic processes and choices and shapes its culture, which drives sustainable development. Organisations with a strong spirit of innovation can maintain high-level strategic decision-making in dynamic market environments by continuously exploring and implementing new growth strategies to enhance their market competitiveness (Yoshikuni and Dwivedi, 2022).

Over time, highly innovative organisations tend to adopt more forward-looking strategies to improve their operational efficiency and market adaptability. They focus on optimising growth strategies by integrating data analysis, user behaviour research and agile experimentation to achieve more precise market positioning and customer growth. As a core driver in the practice of growth hacking, innovativeness motivates organisations to continuously optimise their resource allocation and marketing models to enhance their market influence (Li and Gao, 2022). The following hypothesis was, thus, formulated:

H2. Innovativeness positively influences GHC.

By introducing innovative offerings that address customer demands, organisations with a strong innovative spirit are more likely to achieve higher performance. This strategy helps them maintain and strengthen their competitive edge. An innovative culture fosters new forms of internal collaboration and significantly boosts organisational performance. When innovation outcomes are transformed into competitive advantages, innovativeness positively affects organisational performance, effectively driving its improvement (Rana *et al.*, 2024). Moreover, innovativeness helps organisations accurately capture market demand and optimise their products and services, thus, further strengthening their competitive edge and enhancing their overall performance (Kim *et al.*, 2024). The following hypothesis was, thus, proposed:

H3. Innovativeness positively influences organisational performance.

Proactiveness is considered an essential resource that organisations use to gather valuable customer information and insights and anticipate future market changes accurately. A proactive culture fosters the identification of new market opportunities and supports the development of strategies that enhance competitiveness (Al-Mamary and Alshallaqi, 2022). Organisations that possess a proactive mindset are more likely to adjust their growth hacking

approaches. Moreover, proactiveness enables employees to engage in decision-making processes and actively support organisational growth – such involvement drives changes in the organisation (Mehmood *et al.*, 2024). The following hypothesis was, thus, proposed:

H4. Proactiveness positively influences GHC.

Proactive organisations dynamically integrate resources such as data analytics, thereby enhancing their adaptability to the environment. Proactiveness has a strong mediating effect in the context of managing supply chains (Gunawan, 2024). However, the partial mediation of risk-taking, coupled with its negative relationship with big data capabilities, highlights the importance of carefully balancing risk strategies.

The case studies of family-owned organisations indicate that the characteristics of the organisational context can moderate the effectiveness of proactiveness, thereby improving organisational performance (Kuckertz *et al.*, 2024). According to the case studies of Tunisian organisations, the impact of proactiveness on entrepreneurial marketing performance varies with organisational size (Ouragini and Lakhal, 2023). For SMEs, integrating opportunity openness with proactiveness is essential for achieving strong outcomes – this combination is crucial for their overall success (Kusa *et al.*, 2021).

Proactiveness also drives innovation behaviours (such as new product development) through a technology-oriented approach and supports the transformation of innovation performance into market performance. This indicates that the realisation of its value depends on the transformation of organisational capabilities. Enhancing proactiveness allows organisations to improve their performance and achieve superior results through advanced technological applications (Schulze *et al.*, 2022). The following hypothesis was, thus, proposed:

H5. Proactiveness positively influences organisational performance.

The influence of managerial capabilities on GHCs can be analysed by integrating the dynamic capabilities perspective and the RBV. As the core dimension of managerial capabilities, data-driven innovation capabilities directly enhance an organisation's dynamic response ability to market signals by constructing a real-time customer insight system and an agile decision-making mechanism. This is the underlying logic of rapid iteration in growth hacking (Alghamdi, 2024).

The managerial capabilities concerning big data analysis, through the mediating effects of strategic synergy and social capital, help organisations transform their data assets into dynamic capabilities, forming a unique A/B testing methodology and user lifecycle management system. These two aspects constitute the core technical framework of growth hacking (Gao and Sarwar, 2024).

By deeply embedding into the operational processes, continuous customer analysis capabilities enable organisations to systematically implement the optimisation of the customer acquisition funnel based on behavioural data. This data-driven transformation at the operational level serves as the organisational guarantee for the implementation of growth hacking (Hossain *et al.*, 2023).

The level of resource commitment, an important indicator of managerial capabilities, determines whether an organisation can break through data silos and establish cross-functional growth teams. This structural change is key for growth hacking to be upgraded from a tactical tool to a strategic capability (Grandhi *et al.*, 2020). The following hypothesis was, thus, proposed:

H6. Managerial capabilities positively influence GHC.

Managerial capability is fundamental for synthesising organisational resources and achieving strategic results. This capability stems from the RBV (Barney, 1991) and helps organisations mobilise, respond and adapt resources to changes in the environment. Cerviño *et al.* (2025) and other studies suggest that managerial capability enhances SME performance, although its reach may be constrained by institutional rigidity. More than achieving operational effectiveness, managerial capability connects routine IT usage with more proactive strategic agility, thus, enabling the use of digital resources for innovation objectives (Chen *et al.*, 2024).

During periods of economic upheaval, the impact of managerial capability is especially significant. It has been shown to enhance financial performance by optimally allocating R&D spending in uncertain situations (Qin *et al.*, 2024). In addition, it transforms intellectual capital into dual-innovation frameworks by elevating market-cue perceptions and decision-making processes (Farzaneh *et al.*, 2022). In that sense, as a dynamically coordinating force, managerial capability drives growth hacking by integrating internal competencies with rapid mock-up workflows and adaptive refinement. The following hypothesis was, thus, formulated:

H7. Managerial capabilities positively influence organisational performance.

As noted by Barney (1991), organisations can gain a competitive advantage by acquiring and using valuable, rare, inimitable and non-substitutable resources. However, organisational performance does not stem from resources alone; the way in which these resources are deployed also plays a critical role. Organisational agility is a reconfigurable response to resource realignment, often viewed as a higher-order dynamic capability. This response is considered adaptive in nature (Zhu and Li, 2023).

Growth hacking, as an unconventional approach focused on rapid growth through iterative testing, requires the immediate application and integration of knowledge, technology, marketing intelligence and human resources. With agility foresight, organisations streamline their processes to access real-time data and transform their existing assets into meta capabilities for action at a moment's notice – it is essential for executing growth hacking strategies (Franco *et al.*, 2023). The following hypothesis was, thus, proposed:

H8. Organisational agility enhances the effectiveness of GHC.

Organisational agility may also drive the innovation and optimisation of business models to achieve superior performance. As a manifestation of dynamic capabilities, organisational agility is a critical factor in transforming RBV resources into GHC (Dimple and Tripathi, 2024). Highly agile organisations can effectively identify opportunities in their target markets and obtain the necessary resources to enhance their competitiveness. Agility also enhances an organisation's value-creation capability, thereby sustaining and improving its performance. By increasing agility, organisations can expand their competitive actions and achieve better market performance (Fosso Wamba, 2022). Further empirical analysis is needed to examine how organisational agility influences business outcomes. The following hypothesis was, thus, proposed:

H9. A higher level of organisational agility contributes to improved operational outcomes.

4. Data analysis

4.1 Survey, administration and data

China has always been at the forefront of digital economic development, with enterprises rapidly adopting innovative ideas and technologies. The increasing application of GHC

offered abundant real-life cases and data support for this study. SMEs, with their limited size and capacity, face fierce competition in the market, which drives them to implement GHC as a means of overcoming development challenges and achieving significant growth. SMEs are crucial to the national economy, contributing to job creation and wealth generation and impacting the economy's vitality and stability. Examining the application of GHC in SMEs would not only help SMEs attain high-quality development but also offer valuable insights for promoting macroeconomic prosperity.

A comprehensive literature review focusing on Chinese SMEs was conducted. The SMEs in the service and manufacturing sectors were selected as research subjects. A validated self-administered questionnaire was sent to the senior executives, including those responsible for marketing and sales. Data were gathered through online and email surveys, and the collection took place in March 2025.

4.2 Measurements

To ensure measurement reliability and construct validity, all the items were sourced from well-established empirical studies. The scales were carefully chosen based on their alignment with the study's focus and their prior validation in similar research contexts. The wording of the items was slightly modified to better reflect the specific characteristics of SMEs, with a focus on improving their clarity and contextual fit. All the variables were measured using a five-point Likert scale. GHC was assessed using 21 items adapted from Bresciani *et al.* (2024), originally developed to capture the strategic use of digital marketing and innovation-driven growth approaches. Innovativeness was measured using four modified items based on Giordino *et al.* (2025), reflecting the extent to which an organisation can not only generate novel ideas but also successfully transform them into practical outcomes. To evaluate organisational performance and proactiveness, scales were adopted from Mikalef *et al.* (2023); the organisational performance captured business effectiveness in volatile environments, while the proactiveness gauged an organisation's forward-looking orientation and ability to seize emerging opportunities proactively. Moreover, managerial capabilities and organisational agility were measured using the instruments derived from Wu *et al.* (2024), with managerial capabilities reflecting leadership competence and strategic decision-making and agility capturing an organisation's capacity to respond swiftly and effectively to external volatility. Together, all the instruments offered a multidimensional perspective on how organisational competencies and behavioural strategies collectively shape adaptability and performance in uncertain business contexts.

4.3 Structural equation modelling analysis

This study used partial least squares structural equation modelling (PLS-SEM) to examine the proposed model, which is anchored in the RBV and the DCT. PLS-SEM is suitable for modelling complex causal relationships and assessing the latent constructs within theoretically grounded frameworks, thus, enhancing the empirical robustness of the analysis (Hair *et al.*, 2017). Data analysis was conducted using SmartPLS 4.0. To evaluate the model fit and address potential measurement biases, the goodness-of-fit index and common method bias (CMB) tests were applied. Following the recognised methodological guidelines, the model's reliability and convergent validity were assessed using Cronbach's alpha and average variance extracted (AVE) (Cheung *et al.*, 2024). Structural path analysis was conducted to validate the hypothesised relationships between the constructs and provide empirical support for the model's internal consistency and theoretical coherence. The model's predictive ability was also analysed.

4.4 *Artificial neural network analysis*

The synergy between innovation and management capabilities, as pointed out by Karhade and Dong (2021), may affect the interpretation of the results. Artificial neural network (ANN) analysis was also conducted to simulate the working mechanism of neurons in the human brain, revealing the relationship between variables and demonstrating strong predictive ability (Albahri *et al.*, 2021).

Using the neural network module in SPSS V27, the causal and compensatory relationships between innovativeness, proactiveness, managerial capabilities, organisational agility, GHC and organisational performance were examined. Through sensitivity analysis, the ANN further identified the importance and dynamic weight of each variable, enhancing the understanding and predictive capability of complex causal relationships.

The integration of SEM and ANN upholds theoretical rigour, enhances the robustness of the study and progressively adds practical value through data-driven insights. This approach aligns with the growing emphasis on mixed methods in management research, offering a more comprehensive and nuanced understanding of complex business phenomena (Rahman *et al.*, 2024).

5. Results

Sales personnel, marketing managers and CEOs were surveyed to capture the perspectives of multiple SMEs in the manufacturing and service industries regarding internal capabilities, GHC and organisational performance. Survey invitations were sent to the supervisors of nearly 100 enterprises. Based on the feedback regarding positions, only 13 questionnaires were completed by CEOs and seven by chief information officers. Responses were obtained from over 20 enterprises, with an enterprise response rate exceeding 20%. In total, 392 questionnaires were returned, and 349 were deemed valid and used for analysis after validation, resulting in an effective response rate of 89%.

The sample comprised 349 respondents, covering various characteristics of Chinese SMEs, as shown in Table 1. Regarding gender, 68.19% were male and 31.81% female, with the dominance of male respondents possibly related to the higher proportion of males in SME management. Regarding age, 44.13% were aged between 18 and 25, 32.66% between 26 and 35 and 23.21% over 35, indicating a sample primarily composed of young to middle-aged individuals, possibly reflecting the SMEs' preference for younger management teams. Regarding enterprise size, 45.15% of the SMEs used between 1 and 50 people (with 28.94% having 1–10 employees, 23.21% having 11–20 and 16.91% having 21–50), 17.19% had 51–250 employees and 13.75% had more than 250, indicating that most of the SMEs are small in size, possibly because smaller enterprises are more inclined to adopt growth hacking strategies under limited resources. Regarding position distribution, 66.76% of the respondents were managers, 11.75% directors and 9.17% senior vice presidents, which is in line with the survey requirements, as middle managers are more directly involved in GHC implementation.

To assess potential CMB, Harman's single-factor test was first performed (Kock *et al.*, 2021). The first unrotated factor accounted for 44.972% of the total variance, which is below the commonly accepted threshold of 50%, suggesting that CMB is not a major concern. To further validate this, the approach of Liang *et al.* (2007) was used: A common latent factor was introduced to the measurement model. All the substantive factor loadings (Ra) were significant, while most of the method factor loadings (Rb) were not. The average Ra^2 was 0.742998, and the average Rb^2 was 0.005897, yielding a Ra^2/Rb^2 ratio of 125.989, which exceeds the recommended benchmark of 100. There is, thus, no evidence of significant CMB

Table 1. Sample descriptive statistics

Variable	Options	Freq.	%	Cum.
Gender	Male	238	68.19	68.19
	Female	111	31.81	100
Age	18∼25	154	44.13	44.13
	26∼35	114	32.66	76.79
	36 or more	81	23.21	100
Years	1∼5	199	57.02	57.02
	5 or more	150	42.98	100
Indus	Services	244	69.91	69.91
	Manufacturing	89	25.5	95.42
	other	16	4.58	100
Employee	1∼10	101	28.94	28.94
	11∼20	81	23.21	52.15
	21∼50	59	16.91	69.05
	51∼250	60	17.19	86.25
	251 or more	48	13.75	100
Position	CEO/president	13	3.72	3.72
	Chief information officer	7	2.01	5.73
	Head of digital strategy	23	6.59	12.32
	Senior vice president	32	9.17	21.49
	Majordomo	41	11.75	33.24
	Manager	233	66.76	100
Total		349	100	

Source(s): Authors' own work

in the data. While using self-reported measures may inherently carry some risk, such bias does not threaten the validity of the findings.

5.1 Overall model validation

The multidimensional measurement framework's fit was evaluated using confirmatory factor analysis (Marsh *et al.*, 2014), and the results revealed significant improvements as the factor structure became more complex. The initial single-factor framework demonstrated a serious lack of fit. The standardised root mean square residual (SRMR) reached 0.11, while the root mean square error of approximation (RMSEA) was 0.115, both exceeding the critical thresholds. In addition, the comparative fit index (CFI) remained at 0.699, and the Tucker–Lewis index(TLI) was 0.684, failing to meet the acceptable standards. The chi-square value divided by the degrees of freedom resulted in 5.609, significantly deviating from the ideal range. These findings suggest a systematic bias between the theoretical framework and the observed data.

As the factor dimensions expanded to six factors, the model fit improved in a stepwise manner: The SRMR dropped to 0.027 (below the strict standard of 0.05), the RMSEA improved to 0.02 (an excellent level) and the CFI and TLI increased to 0.991 and 0.990, respectively, exceeding the strict threshold of 0.95. The normed fit index (NFI = 0.931) also met the commonly accepted threshold of 0.90. The chi-square/degrees of freedom ratio (1.142) approached 1, satisfying the principle of model parsimony. Although the chi-square test remained statistically significant ($p = 0.002$), it is sensitive to small differences under large sample conditions and should be evaluated alongside other parameters.

The overall fit results of the PLS-SEM indicated that the SRMR of the saturated model and the estimated model were consistent, and other indices such as d_ULS, d_G and NFI reached high levels (with SRMR = 0.032 < 0.08 and NFI = 0.916 > 0.9), further verifying the robustness of the model in terms of data fit and theoretical explanation.

5.2 Outer model verification

Regarding reliability and convergent validity, the constructs demonstrated high internal consistency and stability. The loadings for the GHC indicators were all above 0.835, with the loading for gh1 at 0.887; its Cronbach's α reached 0.983, composite reliability (CR rho_c) reached 0.984 and AVE was 0.747, which sufficiently proves the consistency of the measurement items and the explanatory power of the latent variable, as shown in Table 2. The loadings for innovativeness ranged between 0.839 and 0.872. The Cronbach's alpha reached 0.88, while rho_c was 0.917 and AVE measured 0.735. These results confirm strong reliability and convergent validity. The indicators for managerial capabilities demonstrated loadings ranging between 0.79 and 0.833. The Cronbach's alpha reached 0.869, while rho_c was 0.905 and AVE measured 0.656. These findings demonstrate strong measurement reliability and validity. The loadings for organisational agility and organisational performance were stable between 0.826 and 0.862 and 0.889 and 0.911, respectively, with Cronbach's alpha values of 0.894 and 0.941, CR rho_c of 0.922 and 0.955 and AVE of 0.703 and 0.81, respectively. The loadings for proactiveness fell within the range between 0.885 and 0.91. The Cronbach's alpha reached 0.919, while rho_c measured 0.942 and AVE was 0.804. These results indicate strong reliability and convergent validity. Overall, all the constructs met the required standards – Cronbach's alpha ≥ 0.70, CR well above 0.7 and AVE greater than 0.65 – thereby proving the stability and explanatory power of the measurement tool and laying a solid foundation for subsequent analysis.

The discriminant validity was then assessed. The results from the Fornell–Larcker criterion and the Heterotrait–Monotrait Ratio (HTMT) tests confirmed that all the constructs maintained strong independence (Rönkkö and Cho, 2022). The assessment based on the Fornell–Larcker criterion demonstrated that the AVE's square root exceeded the corresponding correlation values for all the constructs (Table 3). This confirms that the discriminant validity values (0.864 for GHC, 0.857 for innovativeness, 0.810 for managerial capabilities, 0.838 for organisational agility, 0.900 for organisational performance and 0.896 for proactiveness) were greater than the correlations with other constructs, demonstrating clear differentiation between the constructs. Further examination of the HTMT ratios revealed that the ratios between the constructs were below the common threshold (e.g. 0.537 between GHC and innovativeness, 0.382 between GHC and managerial capabilities, 0.322 between GHC and organisational agility, 0.574 between GHC and organisational performance and 0.442 between GHC and proactiveness). Other HTMT values were also low. These results indicate that cross-loading among variables is not a concern. Each construct exhibited strong discriminant validity, thus, confirming that the measurements aligned well with their intended theoretical concepts. This provided a reliable basis – both empirically and conceptually – for further SEM and hypothesis testing.

5.3 Inner model verification

The SEM results revealed variations in the regression coefficients and significance levels across the hypothesised paths. Specifically, *H1* (GHC → OP, $\beta = 0.342$, $p < 0.001$) showed that GHC significantly influences organisational performance, thus, supporting the notion that GHC is a crucial influencing factor (Table 4). *H2* (IC → GHC, $\beta = 0.354$, $p < 0.001$) and *H3* (IC → organisational performance, $\beta = 0.198$, $p < 0.001$) were both significant, indicating

Table 2. Reliability results

Construct	Items	Loadings	Cronbach's alpha	CR rho_a	CR rho_c	AVE
GHC	gh1	0.887	0.983	0.983	0.984	0.747
	gh10	0.849				
	gh11	0.861				
	gh12	0.868				
	gh13	0.872				
	gh14	0.867				
	gh15	0.853				
	gh16	0.872				
	gh17	0.865				
	gh18	0.860				
	gh19	0.875				
	gh2	0.876				
	gh20	0.843				
	gh21	0.869				
	gh3	0.848				
	gh4	0.843				
	gh5	0.874				
	gh6	0.879				
	gh7	0.872				
	gh8	0.882				
	gh9	0.835				
IC	ic1	0.867	0.880	0.882	0.917	0.735
	ic2	0.839				
	ic3	0.850				
	ic4	0.872				
MC	mc1	0.821	0.869	0.873	0.905	0.656
	mc2	0.805				
	mc3	0.799				
	mc4	0.833				
	mc5	0.790				
OA	oa1	0.826	0.894	0.896	0.922	0.703
	oa2	0.843				
	oa3	0.828				
	oa4	0.831				
	oa5	0.862				
OP	op1	0.902	0.941	0.942	0.955	0.810
	op2	0.889				
	op3	0.911				
	op4	0.895				
	op5	0.903				
PS	ps1	0.891	0.919	0.921	0.942	0.804
	ps2	0.885				
	ps3	0.900				
	ps4	0.910				

Note(s): OP = Organisational performance, PS = proactiveness, OA = organisational agility, IC = Innovativeness, MC = managerial capabilities, GHC = growth hacking capability
Source(s): Authors' own work

that innovativeness not only directly enhances GHC but also positively affects organisational performance. *H4* (PS → GHC, β = 0.299, $p < 0.001$) and *H5* (PS → organisational performance, β = 0.159, $p = 0.001$) were significant, demonstrating that proactiveness positively influences both GHC and organisational performance, with a more pronounced

Table 3. Validity results

Fornell–Larcker criterion\HTMT	GH	IC	MC	OA	OP	PS
GH	0.864	0.537	0.382	0.322	0.574	0.442
IC	0.500	0.857	0.314	0.364	0.474	0.233
MC	0.356	0.278	0.810	0.285	0.406	0.204
OA	0.303	0.325	0.251	0.838	0.189	0.148
OP	0.553	0.433	0.371	0.174	0.900	0.398
PS	0.421	0.212	0.186	0.135	0.370	0.896

Note(s): HTMT in the upper-left corner and the Fornell–Larcker criterion in the lower-right corner
Source(s): Authors' own work

Table 4. Hypothesis testing results

Hypothesis	Path	Original sample (O)	Sample mean (M)	Standard deviation (STDEV)	T statistics (|O/STDEV|)	*p*-values
H1	GH → OP	0.342	0.342	0.058	5.866	0.000
H2	IC → GH	0.354	0.354	0.044	8.002	0.000
H3	IC → OP	0.198	0.198	0.053	3.700	0.000
H4	PS → GH	0.299	0.299	0.045	6.668	0.000
H5	PS → OP	0.159	0.160	0.050	3.169	0.001
H6	MC → GH	0.176	0.177	0.045	3.920	0.000
H7	MC → OP	0.180	0.180	0.047	3.843	0.000
H8	OA → GH	0.104	0.106	0.049	2.137	0.016
H9	OA → OP	−0.061	−0.060	0.047	1.305	0.096

Source(s): Authors' own work

effect on GHC. *H6* (MC → GHC, $\beta = 0.176$, $p < 0.001$) and *H7* (MC → OP, $\beta = 0.180$, $p < 0.001$) were found to support the positive effects of managerial capabilities on both GHC and organisational performance.

Regarding organisational agility, *H8* (OA → GHC, $\beta = 0.104$, $p = 0.016$) revealed a modest positive effect on GHC, while *H9* (OA → organisational performance, $\beta = -0.061$, $p = 0.096$) was not significant, indicating that OA does not directly affect organisational performance. This suggests that OA may influence organisational performance only indirectly through mediating variables such as GHC.

Overall, the findings revealed that GHC has a key mediating role in enhancing organisational performance, and innovativeness, proactiveness and managerial capabilities positively affect both GHC and organisational performance, while OA has a relatively limited effect. These findings provide theoretical support for the optimisation of organisations' management strategies.

5.4 Predictive ability

As shown in Table 5, the model demonstrated good predictive performance for both GHC and organisational performance. For GHC, the R-square value is 0.397, indicating that almost 40% of the variance in the target variable was explained by the model. The adjusted

Table 5. R-Square and Q^2_predict evaluation results

Variable	*R*-square	*R*-square adjusted	Q^2 predict	RMSE	MAE
GHC	0.397	0.390	0.379	0.793	0.637
OP	0.390	0.381	0.301	0.841	0.691

Source(s): Authors' own work

R-square is 0.39, which is close to the previous value, suggesting the model's good stability. The values of Q^2_predict and RMSE also suggest that the prediction ability on GHC was stronger. For organisational performance, the R-square value is 0.39, the adjusted R-square is 0.381 and the Q^2_predict is 0.301. Although these values are slightly lower than those for GHC, they still account for a portion of the variance. The model showed strong predictive power for both GHC and organisational performance, which laid the foundation for further analysis using ANN.

5.5 Artificial neural network analysis

PLS-SEM and ANN were used to analyse the causal and compensatory impacts of proactiveness, innovativeness, managerial skills, organisational agility, GHC and organisational performance. Primarily, ANN enhances predictive validity through sensitivity analysis, focusing on the feedforward network's strength. It offers much deeper insights than SEM (Khan *et al.*, 2022). The output layer and activation function both used the sigmoid function. To mitigate overfitting, 90% of the data set was used for training, while the other 10% was used for testing in accordance with Leong *et al.* (2024). Moreover, the model had one input layer, one output layer and two hidden layers to boost prediction accuracy. ANN's primary strength is that it can validate PLS-SEM results as well as construct non-linear relationships. For ANN analysis, variable importance was evaluated using SPSS V27, and the GHC implementation was found to facilitate performance enhancement for SMEs. In addition, the ANN's input data stemmed from the PLS-SEM outputs. As previously noted, ANN analysis was performed to understand the impact of different factors on the implementation and performance improvement of GHC in SMEs. The models are shown in Figure 2.

ANN operates similarly to the human brain and consists of multiple processing layers. It begins with an input stage, followed by intermediate computational units and concludes with a final prediction stage. When applying ANN, both SSE and RMSE must be minimised to improve accuracy. Lower values indicate better model performance and reduced prediction errors. To enhance model reliability, a cross-validation approach with 10 iterations was implemented. The data was split, allocating a small portion for evaluation, while the remaining 90% supported training, reducing the risk of overfitting. The sigmoid activation function, as recommended in the literature, was used.

As per the ANN analysis, the model exhibited high robustness in predicting GHC and organisational performance. Model 1's input variables were innovativeness, proactiveness, managerial capabilities and organisational agility, while GHC was its output variable. The RMSE values for training and testing remained close, showing minimal variation. The standard deviations were also low, with 0.003 for training and 0.019 for testing, indicating model stability. The results for Model 2 were similar, indicating excellent generalisation ability (Table 6).

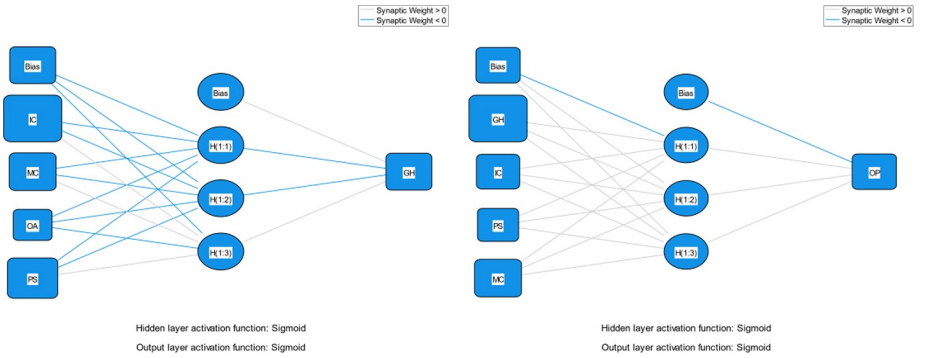

Figure 2. ANN model diagram
Source: Figure by authors

Table 6. RMSE values

	Model 1		Model 2	
	Input	IC, PS, MC, OA	Input	GH, IC, PS, MC
	Output	GH	Output	OP
ANN	Training RMSE	Testing RMSE	Training RMSE	Testing RMSE
1	0.152	0.166	0.163	0.157
2	0.156	0.156	0.194	0.121
3	0.159	0.152	0.161	0.155
4	0.156	0.178	0.165	0.176
5	0.157	0.157	0.163	0.149
6	0.162	0.150	0.159	0.145
7	0.158	0.116	0.158	0.149
8	0.160	0.135	0.157	0.157
9	0.156	0.168	0.166	0.157
10	0.154	0.179	0.165	0.151
Mean	0.157	0.156	0.165	0.152
SD	0.003	0.019	0.011	0.014

Source(s): Authors' own work

Sensitivity analysis further revealed the degree of influence of each input variable on GHC and organisational performance (Table 7). In Model 1, innovativeness had the greatest impact on GHC (average contribution of 0.397), aligning with the RBV's emphasis on the importance of unique resources for gaining a competitive advantage. Proactiveness (0.277) and managerial capabilities (0.222) were found to support DCT, which stresses that the dynamic reconfiguration of resources substantially impacts GHC. Organisational agility had a relatively smaller effect (0.104): Although it is relevant in certain management contexts, its impact on GHC formation appears to be limited. In Model 2, GHC had the biggest impact on organisational performance (0.373), confirming DCT's assertion that dynamic capabilities drive organisational success. In addition, innovativeness (0.259) and managerial capabilities (0.212) strongly influenced organisational performance, while proactiveness had a relatively smaller effect (0.155). These results indicate that the key to enhancing organisational

Table 7. Sensitivity analysis

ANN	Model 1 IC	GH PS	MC	OA	Model 2 GH	OP IC	PS	MC
1	0.340	0.268	0.241	0.151	0.345	0.247	0.161	0.246
2	0.401	0.283	0.215	0.100	0.339	0.301	0.149	0.212
3	0.411	0.252	0.243	0.094	0.346	0.263	0.184	0.208
4	0.408	0.279	0.213	0.101	0.434	0.209	0.175	0.182
5	0.408	0.286	0.203	0.104	0.370	0.294	0.107	0.229
6	0.386	0.333	0.248	0.034	0.447	0.222	0.137	0.194
7	0.381	0.280	0.203	0.137	0.361	0.257	0.174	0.208
8	0.416	0.275	0.237	0.072	0.380	0.236	0.163	0.221
9	0.407	0.251	0.225	0.117	0.342	0.294	0.174	0.189
10	0.412	0.264	0.196	0.128	0.368	0.272	0.126	0.233
Mean	0.397	0.277	0.222	0.104	0.373	0.259	0.155	0.212
SD	0.023	0.023	0.019	0.033	0.038	0.032	0.025	0.021

Source(s): Authors' own work

performance lies in strengthening GHC while focusing on improving innovativeness and managerial capabilities.

Comparing the results from PLS-SEM and ANN revealed complete consistency in how the path coefficients were ranked across both approaches. The normalised relative importance ranking from the ANN matched the ranking of the SEM path coefficients (Table 8). The outcomes from Model 1 illustrate a stable hierarchy in the impact of innovativeness, proactiveness, managerial capabilities and organisational agility on GHC. This confirms the ANN model's ability to accurately represent such structural interrelations. In Model 2, GHC was the strongest driver of organisational performance, followed by innovativeness, managerial capabilities and proactiveness. This order closely replicated the SEM analysis findings. This concordance strengthens the ANN and SEM findings, not only validating the proposed hypotheses but also emphasising the usefulness of including ANN in SEM-based frameworks for added analytical and methodological rigour. Further evaluation of the predictive importance of the ANN model enriched the insights into the drivers of organisational performance.

6. Discussion

6.1 Comparison with previous studies

While organisational agility is widely assumed to enhance performance, its direct impact on GHC was not found to be statistically significant in this study. The study found empirical evidence supporting the RBV and the DCT, reaffirming the role of firm-specific competencies in achieving excellent organisational performance. The findings emphasise GHC as an advanced organisational asset that enables revenue growth and product development while streamlining internal processes, customer interaction and market presence. The findings align with prior research that positioned GHC as a conduit through which marketing agility and operational innovation interplay in a digital setting (Bohnsack and Liesner, 2019).

In addition to confirming the role of GHC as a performance driver, this study contextualises the "how" behind the emergence and functioning of GHC. In particular, the elements of innovativeness, proactiveness and managerial abilities are highlighted as the foundational drivers of GHC. This corroborates the prior studies that associated innovation

Table 8. Comparison between PLS-SEM and ANN results

Path	Original sample (O)/ path coefficient	SEM ranking	ANN normalised relative importance (%)	ANN ranking	Match
Model 1					
IC → GH	0.354	1	100	1	Match
PS → GH	0.299	2	70	2	Match
MC → GH	0.176	3	56	3	Match
OA → GH	0.104	4	26	4	Match
Model 2					
GH → OP	0.342	1	100	1	Match
IC → OP	0.198	2	70	2	Match
PS → OP	0.159	4	42	4	Match
MC → OP	0.180	3	57	3	Match

Source(s): Authors' own work

orientation with experimental tactics and responsiveness to the market (Al-Mamary and Alshallaqi, 2022) as well as directs attention to the actively collaborative role of management to strategically structure resource allocation, data interpretation and interdepartmental teamwork (Nisar *et al.*, 2020). In addition to serving as a growth driver, GHC enhances an organisation's ability to anticipate and respond to market changes.

Moreover, although agility is often believed to improve performance, its direct effect on GHC was not found to be statistically meaningful. This finding, while it does not align with research that highlighted agility's positive role in dynamic markets (Fosso Wamba, 2022), aligns with recent research findings (Wu *et al.*, 2024), suggesting that agility alone may be insufficient in digitally intensive SMEs unless paired with specific enabling mechanisms, such as GHC. This finding reinforces the core premise of the DCT – capabilities must be activated and aligned with strategic routines to generate value.

In this context of our findings, GHC can be considered a mediating mechanism that translates latent agility into market-relevant actions. This nuanced finding, rather than contradicting previous findings, extends the DCT theory by demonstrating that the effectiveness of agility depends on the presence of integrative digital capabilities. This study, thus, offers a contextualised understanding of capability interaction in digitally dynamic environments.

6.2 Theoretical implications

This study contributes to the theoretical development of growth hacking by clarifying its position in the broader discussion on organisational capabilities. While much of the literature considers growth hacking a collection of practical techniques, this study repositions it as a strategic capability that links experimentation, data use and resource integration to firm performance. Grounded in the RBV, this study shows that GHC is more than a tactical tool – it is also a valuable and context-sensitive asset that empowers organisations to adapt and evolve in competitive environments.

By examining GHC using the lens of DCT, this study also challenges the assumption that dynamic capabilities develop primarily through long-term experiential learning. The findings suggest that, in fast-moving and digitally saturated markets, enterprises – particularly SMEs – can intentionally build dynamic capabilities using focused strategies that combine innovation, responsiveness and managerial coordination. In this view, GHC operates as an accelerator of

capability formation, allowing organisations to experiment, learn and adjust in compressed timeframes.

Moreover, this study expands the theoretical understanding of how internal capabilities interact. Rather than examining innovativeness, managerial capability and agility in isolation, this study offers a model in which these elements converge to support growth-oriented behaviour. GHC emerges not as an independent construct but as a reflection of how firms orchestrate their existing strengths in response to uncertainty. This integrated approach sharpens the explanatory power of both the RBV and the DCT, offering a nuanced account of how organisational performance and competitive advantage are created under pressure.

Finally, this study reframes agility's role. While past studies often regarded agility as inherently performance-enhancing, this study indicates that its strategic value depends on how it is activated. Without mechanisms such as GHC to translate potential into action, agility may remain a latent trait. Using this insight, future research can look beyond linear assumptions of capability–performance links and explore how digital-era firms actively configure their internal mechanisms to remain adaptive and competitive in changing environments.

6.3 Managerial contributions

This study offers practical guidance for managers navigating digital transformation and competitive uncertainty. By identifying innovativeness, proactiveness and managerial capability as key drivers of GHC, the study provides a strategic foundation for fostering adaptive, opportunity-sensitive organisations. The organisations that embed innovation into their culture are more likely to sustain growth in dynamic environments. Doing so goes beyond simply investing in an area such as technology or product development – it requires an organisational tolerance of calculated risk, systems that facilitate continuous learning and structural adaptability. Managers are pivotal for this process. Coordinating sufficient motivation and evidence-based decision-making facilitates the achievement of strategy implementation in growth-centred approaches.

Proactiveness augments an organisation's ability to anticipate changes in customer needs. It enables managers to close the insight–action gap by promoting timely market awareness and enabling faster responses. Organisation-wide agility driven by active participation rather than top-down command can be cultivated by establishing structured internal innovation forums or trend-sensing teams.

Equally relevant is the adoption of digital instruments in a manner that complements human judgement instead of substituting it. Data analytics and AI technologies offer powerful leverage for refining marketing and operational strategies, but without clearly understanding them and applying them contextually, their effectiveness is diminished. Digital investment must be coupled with training, talent development and open cultural attitudes.

Finally, this study motivates management to consider GHC not as a collection of disconnected techniques but as an organisational capability that emerges when innovation, responsiveness and coordination unite. The organisations that manage these dimensions as interrelated – rather than linear – are more likely to convert uncertainty into opportunity and create enduring growth trajectories.

7. Conclusion

This study contributes to the literature by offering a thorough conceptual framework and explaining its operational processes using a dual-method analytical approach to GHC. This study integrated SEM with ANN, demonstrating that both innovativeness and proactiveness are critical prerequisites for the development of GHC, which acts as a mediator in amplifying organisational performance. Innovativeness enables organisations to attain competitive

advantages by undergoing profound transformational changes and adopting sophisticated market strategies to engage disruptively with customers and reenvision products. Moreover, proactiveness acts as a strategic resource that enables anticipatory decision-making at the organisational level, thus, empowering organisations to act on emerging opportunities in the face of environmental uncertainties.

As the analysis demonstrated, GHC functions on multiple operational strata, integrating customer lifecycle management with statically responding brand positioning to attain sustainable competitive advantage. More importantly, this study demonstrated the substantial impact of GHC on SMEs by quantifying its effects and revealing that its implementation improves growth efficiency through unconventional marketing coordination and the realignment of dynamic capabilities. By positioning GHC as both a strategic conduit and a performance multiplier, the findings offer valuable, empirically grounded insights that bridge the gap between theoretical constructs and practical implementation challenges within digital-era business ecosystems. These findings offer actionable guidance for managers seeking to leverage GHC as a catalyst for innovation and growth in rapidly evolving markets and illustrate how businesses can use GHC to build and maintain customer relationships.

For policymakers, this study suggests that systemic support is necessary for the digital transformation of SMEs. It is recommended that special funds (e.g. a digital growth subsidy program) be established to reduce the technology procurement costs and that GHC be integrated into SME management training programmes to foster a strategy of experimental growth. Only through a coordinated effort between policymakers and enterprises can SMEs achieve stable and long-term success in the digital economy.

Since this study has some limitations, it offers some directions for future research. One limitation is its focus on SMEs, which may limit the generalisability of findings to larger organisations with different structures, resources and strategic approaches. Future studies could conduct comparative analyses across firm sizes or industries to examine how GHC operates under varying organisational conditions. In addition, while this study focused on six core constructs, other internal environmental factors – such as organisational learning culture, digital mindset and leadership agility – may also shape growth hacking effectiveness and deserve further investigation. Moreover, future research could explore the interaction effects between these factors and external variables, such as market turbulence or regulatory pressure. Finally, given the cross-sectional nature of the data, the causal relationships between the variables remain tentative. Longitudinal designs or experimental studies could offer a more nuanced understanding of how GHC evolves over time and contributes to sustained organisational performance. Incorporating behavioural tracking data or digital tool usage logs could also provide deeper insights into the mechanisms linking GHC practices to performance outcomes.

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