

Exploring new perspectives of technological and marketing capabilities emergence in high-tech startups

Alessandra Costa
University of Messina
Veronica Marozzo
University of Messina
Tindara Abbate
University of Messina

Cite as:

Costa Alessandra, Marozzo Veronica, Abbate Tindara (2024), Exploring new perspectives of technological and marketing capabilities emergence in high-tech startups . *Proceedings of the European Marketing Academy*, 52nd, (119599)

Paper from the 53rd Annual EMAC Conference, Bucharest, Romania, May 28-31, 2024



Exploring new perspectives of technological and marketing capabilities emergence in high-tech startups

Abstract:

High-tech startups foster economic growth and innovation, even if the pressuring challenges, especially in their first years, impose building up a solid base of capabilities to achieve a sustainable competitive advantage. Through a systematic literature review, this paper combines concepts from the resource-based view, the dynamic capability perspective, and the contingency theory, to develop a level-based conceptual framework, that categorizes organizational capabilities into zero, first and second-order, each impacting on startups' outcomes. It reveals the need to balance exploitation and exploration activities to be responsive to market turbulences and support both incremental and radical adjustments, to manage strategic operational changes. The framework provides a theoretically grounded base for understanding the role of marketing and technological capabilities in high-tech startups' innovation, growth, and survival. It also offers practical insights to successfully follow a capability-driven approach for the long-term success of high-tech startups.

Keywords: marketing & technological capabilities, high-tech startups, systematic literature review.

Track: Marketing Strategy & Theory

1. Introduction

High-tech startups are beneficial to countries because of their ability to boost innovation and higher levels of wealth. These firms are more likely to grow, promote new organizational forms, and spur innovation activities (Conway & Hemphill, 2019). Although their survival has become a rare condition in the ecosystem (Sevilla-Bernardo, Sanchez-Robles, and Herrador-Alcaide, 2022), in recent years the importance and the economic impacts of these companies on societies have been addressed by many researchers (Adjei, 2021) as their importance has spread worldwide. However, high-tech startup survival research is still in its embryonal phases and integrates theories and concepts from marketing, management, finance, and sociology, by underlying the interdisciplinary and the complexity of such phenomenon (Azeem & Khanna, 2023). Existing literature on these firms has focused on the identification of several factors improving their conditions of survival, especially in their first years of foundation (Manwaring, Weirup, and Belachandra, 2021), when they strongly suffer from a lack of resources (i.e., economic, human) to experiment novelties and succeed in the markets (Marcon & Ribeiro, 2021). High-tech startups maximize their survival rate when they manage properly large and both heterogeneous and complementary technical teams (Adjei, 2021). Almost simultaneously, these resources need to be transformed or reconfigured to fit changing business environments (Zahra, 2021). In this way, of particular interest is the capability perspective of innovation, which emphasizes the firm's ability to innovate and develop a competitive advantage, and that is closely related to firms' resources and capabilities that support organizational innovativeness (Eng & Okten, 2011). Recently the existing literature has highlighted how firms can achieve a competitive advantage based on a combination of core technological and marketing capabilities (Song, Droge, Hanvanich, and Calantone, 2005). Technological capabilities act as the foundation for increasing firms' ability to absorb and use external technical knowledge or create new technology by themselves (Tzokas, Kim, Akbar, and Al-Dajani, 2015; Ahn, Kim, and Lee, 2022). They are related to the firm's ability to perform any technical function or activity within the firm's boundaries, such as using technology, solving technical problems, developing new product and manufacturing processes that could promptly offer new benefits and create value for customers (Di Benedetto, DeSarbo, and Song, 2008). On the other hand, marketing capabilities refer to the firm's ability to predict and adapt to customer changes, thus staying aligned with market needs (Elsharnouby & Elbanna, 2021). Clearly, high-tech startups particularly depend on technology for their success (Ahn et al., 2022) and as technological capabilities are difficult to

imitate within the existing organizational structure, developing technological capabilities could provide a solid base for the creation of long-term competitive advantages. Moreover, since in their first years of operativity, high-tech startups could suffer from lower legitimacy, less structured operational activities, and greater resource constraints, having strong marketing capabilities could help in reducing their odds of failure (Patel, Feng, and Guedes, 2021). In addition to each of these direct effects, technological and marketing capabilities could operate in an integrated way, leading to different organizational scenarios and related outcomes (Prašnikar, Lisjak, Buhovac, and Štemberger, 2008). Despite the increasing research interest in capabilities and entrepreneurship of the past decade, a research gap on how exactly capabilities emerge and develop in high-tech startups remains to be addressed (Ahn et al., 2022), even if it could help in explaining, at least in part, the survival conditions of these newborn companies (Teixeira, Moura, Lopes, Marconatto, and Fischmann, 2021). With this in mind, this paper aims to bridge the capabilities perspective to the survival, innovation, and growth processes of innovative high-tech startups, through a systematic literature review that allows the conceptualization of a new level-based capability framework.

2. Theoretical Underpinnings

2.1 An integrated framework of high-tech startups survival, innovation and growth processes

The complexity of startups' survival, innovation and growth paths can be explained based on Salazar's (2020) framework, which summarizes and combines three different approaches: the resource-based view (RBV), the dynamic capability perspective, and the contingency theory. While the RBV underpins the notion of technological and marketing capabilities for developing a competitive advantage (Prašnikar et al., 2008; Eng & Okten, 2011), the dynamic capabilities framework helps individuate the combinative and transformative mechanisms of those capabilities, and the theory of contingency allows to consider how startups' lifecycle phases compel them to seek and manage different resources and capabilities over time. This combined framework is better suitable in the high-tech startup domain. In their first years of foundation, developing capabilities requires resources and learning processes, and this could be detrimental given the severe short-term constraint of survival in startups (Patel et al., 2021). In that regard, Heydebreck, Klofsten, and Maier (2000) categorized the innovation support services that new tech-based companies require into four categories: technology-related, market-related, financial-related, and soft services. Moreover, Zang and Li (2017) identified a U-shaped relationship between technological and marketing capabilities and

firms' ambidexterity, that further enhances organizational performances. Innocenti and Zampi (2019) highlighted the need for high-tech startups to use R&D resources to increase their innovation capacity, especially in highly dynamic sectors demanding agility in adaptation processes (Balboni, Bortoluzzi, Pugliese, and Tracogna, 2019) and an intensive use of social and networking capital (Scarmozzino, Corvello, and Grimaldi, 2017).

2.2 A capability perspective of marketing and technological capabilities in high-tech startups

To succeed, startups need to properly manage their resources and capabilities, in combination with or co-existing with firms' assets and knowledge. Following Eng and Okten (2011) the internal resources stocks represent the starting point upon which to build a sustainable competitive advantage. Marketing and technological capabilities are obviously part of these organization capabilities, which also generate competencies rooted in daily processes and routines useful for innovation activities. The foundation of marketing capabilities can be traced to market orientation and the generation of market intelligence, which allows to anticipate and meet changing customers' needs while renewing the entire organization's structures and performances (Kongrode, Aujirapongpan, and Ru-Zhuc, 2023). Also, technological capabilities are becoming increasingly important because responding to dynamic market changes requires the development of new products and processes heavily nested in new technologies (Tzokas et al., 2015), that activate repeated cycles of explorative and exploitative innovation activities (Rosenkopf & Nerkar, 2001).

3. Research Method

To explore a such complex and multidimensional phenomenon, this study relies on a systematic literature review (SLR) approach. After formulating the research problem, a preliminary investigation on Web of Science (WoS) was conducted to individuate the main studies focusing on both technological and marketing capabilities in the context of high-tech startups. We then identified the 27 keywords useful for the search string: (((("dynamic capab*" OR "enterprise* capabilit*" OR "compan* capabil*" OR "firm* capabil*" OR "operational capabil*" OR "organiz* capabil*") OR (("marketing capability" OR "marketing capabilities" OR "dynamic marketing capab*" OR "marketin capac*") OR ("technological capabilit*" OR "technolog* capabil*" OR "dynamic technolog* capab*" OR "techn* capabilit*" OR "digital capabil*" or "digit capab*")))) AND (("startup*" OR "start?up*" AND "high?tech" AND "innovative") OR ("high?tech start?up*" OR "innovative high-tech start-

up*" OR "innovative high tech start-up*" OR "innovative high-tech startup*" OR "techno* start-up*" OR "high-technology start?up*" OR "technology-based start?up*")))). These keywords were used in all possible areas (i.e., titles, keywords, abstracts, and full text) and resulted in a total of 127 publications. After applying various filters (Document type as full-length articles and book chapters, subject areas as Business and Management, language as English) and excluding duplicates as well as non-available articles, we got 83 articles. Finally, after a manual screening to verify the adherence of each article to the topic addressed in our study, we finally selected 52 articles, to examine technological and marketing capabilities on startups' survival, innovation and growth.

4. Results and discussions: a conceptual capability framework

High-tech startups have to increase their survival rate, by stimulating innovation and growth processes, through organizational capabilities. We employed Winter's (2003) definition of organizational capabilities as high-level routines that are learned and integrated within firms' operativity. Organizational capabilities can be viewed as a set of three hierarchical types of capabilities (Winter, 2003; Ma, Lang, Sun, and Singh, 2021), each involving subsets of transformative mechanisms. Zero-order capabilities allow companies to live in a steady state equilibrium, capitalizing on the existing resources and capabilities to remain on the markets. However, given the high environmental dynamicity, to adjust the equilibrium state in response to external changes, startups activate first-order (or dynamic) capabilities, referring to the firms' ability to orchestrate strategic changes proactively (Oliva, Couto, Santos, and Bresciani, 2019). Moreover, when competing in dynamic environments, startups require flexibility and forecasting capabilities, thus increasing the speed of realignment of the organizational system to the new equilibrium conditions (Pigola, da Costa, van der Poel, and Yamaçake, 2022). This typology of organizational capabilities perfectly combines with Salazar's (2020) framework, which examines the tri-dimensional nature of startups' survival, involving processes of entrepreneurship, technological development, and innovation. Given that startups in their early stage often lack dynamic capabilities (Ma et al., 2021), they only have simple business activities: this means that they have to build up operational capabilities through «high-level routines» enabling alternative paths of survival and growth. In understanding how startups manage those processes, Oliva et al. (2019) have focused on knowledge management, as valuable resources contributing to the achievement of organizational performance. Other scholars pointed out the importance of business process

management (BPM) approaches, useful to adapt organizational management to evolving market needs while still maintaining a fit between operational systems and firms' goals. Carter (2015) individuated ambidexterity as operational capabilities allowing firms to manage the opposing forces of exploration and exploitation activities. By means of structural, contextual, and leadership mechanisms, exploitative innovations boost operational capabilities within the existing firms' technological trajectory and explorative innovations positively impact value proposition (Guo, Yang, and Han, 2019). Therefore, it is proposed that:

Prop. 1: *exploitation and exploration of marketing and technological capabilities (zero-order derivatives) are likely to boost the innovation of high-tech startups.*

Although zero-order capabilities allow the effective balance between explorative and exploitative activities, the dynamicity of the external environment requires companies to continuously reconfigure the mechanisms of zero-order capabilities through cycles of incremental realignments of the firm's focus or rebalance of the exploration-exploitation trade-off, according to the various stages of startups' lifecycle. By linking the capability perspective to the organizational development (OD) theory, as technology and market-related functions presumably follow a typical sequence of exploration and exploitation activities, it is reasonable to assume that in their early years, startups engage in exploration activities to support incremental adjustments. After having built a solid base of knowledge, startups cycle from exploitative to explorative activities, as strategic choices to develop reactive sensing and seizing routines for managing radical innovations (Teixeira et al., 2021). Therefore, it is proposed that:

Prop. 2: *exploitation and exploration of marketing and technological capabilities (first-order derivatives) allow high-tech startups to manage the tensions between incremental and radical adjustments, leading to enhanced growth and survival.*

The short and long-term effects of marketing and technological capabilities are contingent on environmental conditions, that become a boundary condition for innovation capability. This suggests a need for higher-order capabilities, conferring startups superior competitive advantages in flexibility and speed of realignment (Carter, 2015). As zero-order capabilities ensure firms' growth in a stable environment (Ma et al., 2021), when dynamicity increases, startups reconfigure their existing operational capabilities and create new ones via first-order capabilities. Moreover, in highly unstable environments and especially when discontinuous innovations trigger competitive turbulences, first-order capabilities are substituted by second-order capabilities, helping companies maximize their readiness for

unexpected events and increasing their probability for success in proactively addressing change (Utomo & Kurniasari, 2022). Therefore, it is proposed that:

Prop. 3: *second-order marketing and technological capabilities act as flexible, adaptive and complex elements of strategic management, in shaping the operational capability base in any operativity context.*

The conceptual model of the level-base capability framework for high-tech startups' innovation, growth and survival is represented in Figure 1.

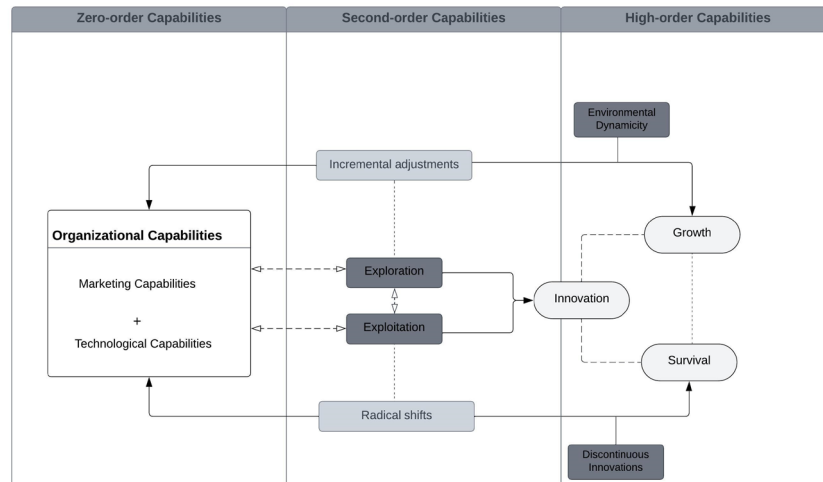


Figure 1. Level-base capability framework for marketing and technological capabilities in high-tech startups.

5. Conclusions

The above proposed arguments reflect a level-based capability perspective for high-tech startups' innovation, growth and survival, which emphasize the existence of a set of three interrelated hierarchical organizational capabilities: zero, first and second-order. The framework considers the management of the tensions between exploitation and exploration activities, that contribute to both the definition of the firms' organizational capability base and the recombination of the existing marketing and technological capabilities that lead to incremental adjustments as well as radical shifts. Zero-order capabilities assume a dynamic nature (second-order capabilities) that influences both short-term growth and long-term survival of startups. Moreover, by conceptualizing organizational capabilities as complex capabilities (second-order), high-tech startups are able to increase their survival rates by acting on a strategic level, thereby shaping the entire organizational system. This hierarchical typology of organizational capabilities offers three primary contributions. From a conceptual perspective, it provides a theoretical background for studying high-tech startups' innovation, growth and

survival from a capability perspective, recognizing the primary role of organizational capabilities in any operativity context. Second, by deconstructing marketing and technological capabilities into different levels, it is possible to examine the *continuum* between exploitation and exploration activities, which allows startups to benefit from continuous realignment of resources and capabilities to strategic focus and the final markets while recombining the entire organizational system to survive in turbulent environments. Third, it advances the literature about startups' survival, innovation and growth paths, going beyond the RBV theory and the dynamic capability perspective. From a managerial viewpoint, this paper allows managers to individuate how marketing and technological capabilities impact startups' competitive advantage, by combining demand-based logic (through marketing capabilities and functions) with an economic logic to weave more complex dimensions of value co-creation processes. However, marketing and technological capabilities represent only a limited representation of organizational capabilities that could affect startups' performances. Additionally, some mediator variables could impact transformative mechanisms from zero to high-order capabilities, that leave space for future research.

References.

Adjei, E. K. (2021). Surviving start-ups: the importance of entrepreneurial capital. *Regional Studies, Regional Science*, 8(1), 239-258.

Ahn, S., Kim, K. S., & Lee, K. H. (2022). Technological capabilities, entrepreneurship and innovation of technology-based start-ups: The resource-based view. *Journal of Open Innovation: Technology, Market, and Complexity*, 8(3), 156.

Azeem, M., & Khanna, A. (2023). A systematic literature review of startup survival and future research agenda. *Journal of Research in Marketing and Entrepreneurship*.

Balboni, B., Bortoluzzi, G., Pugliese, R., & Tracogna, A. (2019). Business model evolution, contextual ambidexterity and the growth performance of high-tech start-ups. *Journal of Business Research*, 99, 115-124.

Carter, W. R. (2015). Ambidexterity deconstructed: A hierarchy of capabilities perspective. *Management Research Review*, 38(8), 794-812.

Conway, T., & Hemphill, T. (2019). Growth hacking as an approach to producing growth amongst UK technology start-ups: an evaluation. *Journal of Research in Marketing and Entrepreneurship*, 21(2), 163-179.

Di Benedetto, C. A., DeSarbo, W. S., & Song, M. (2008). Strategic capabilities and radical innovation: an empirical study in three countries. *IEEE Transactions on Engineering Management*, 55(3), 420-433.

- Elsharnouby, T. H., & Elbanna, S. (2021). Change or perish: Examining the role of human capital and dynamic marketing capabilities in the hospitality sector. *Tourism Management*, 82, 104184.
- Eng, T. Y., & Okten, D. (2011). Exploring a dynamic framework of innovative capability: a theoretical integration of technological and marketing capabilities. *Technology Analysis & Strategic Management*, 23(9), 1001-1013.
- Guo, H., Yang, J., & Han, J. (2019). The fit between value proposition innovation and technological innovation in the digital environment: Implications for the performance of startups. *IEEE Transactions on Engineering Management*, 68(3), 797-809.
- Heydebreck, P., Klofsten, M., & Maier, J. (2000). Innovation support for new technology-based firms: the Swedish Teknopol approach. *R&D Management*, 30(1), 89-100.
- Innocenti, N., & Zampi, V. (2019). What does a start-up need to grow? An empirical approach for Italian innovative start-ups. *International Journal of Entrepreneurial Behavior & Research*, 25(2), 376-393.
- Kongrode, J., Aujirapongpan, S., & Ru-Zhue, J. (2023). Exploring the impact of dynamic talent management capability on competitive performance: The mediating roles of dynamic marketing capability of startups. *Journal of Competitiveness*, (1).
- Ma, H., Lang, C., Sun, Q., & Singh, D. (2021). Capability development in startup and mature enterprises. *Management Decision*, 59(6), 1442-1461.
- Manwaring, M., Weirup, A., & Balachandra, L. (2021). Negotiating the Pandemic Like an Entrepreneur: Lessons from the Turbulent World of Start-Up Ventures. *Negotiation Journal*, 37(2), 193-202.
- Marcon, A., & Ribeiro, J. L. D. (2021). How do startups manage external resources in innovation ecosystems? A resource perspective of startups' lifecycle. *Technological Forecasting and Social Change*, 171, 120965.
- Oliva, F. L., Couto, M. H. G., Santos, R. F., & Bresciani, S. (2019). The integration between knowledge management and dynamic capabilities in agile organizations. *Management Decision*, 57(8), 1960-1979.
- Patel, P. C., Feng, C., & Guedes, M. J. (2021). Marketing capability and new venture survival: The role of marketing myopia. *Industrial Marketing Management*, 93, 307-326.
- Pigola, A., da Costa, P. R., van der Poel, N., & Yamaçake, F. T. R. (2022). New perspectives for dynamic capabilities in meeting needs of startups' survival. *Journal of Entrepreneurship in Emerging Economies*, (ahead-of-print).

- Prašnikar, J., Lisjak, M., Buhovac, A. R., & Štembergar, M. (2008). Identifying and exploiting the inter relationships between technological and marketing capabilities. *Long Range Planning*, 41(5), 530-554.
- Rosenkopf, L., & Nerkar, A. (2001). Beyond local search: boundary-spanning, exploration, and impact in the optical disk industry. *Strategic management journal*, 22(4), 287-306.
- Salazar, J. A. (2020). Organizational resources and survival of startups firms—a qualitative analysis in the Peruvian context. *Academia Revista Latinoamericana de Administracion*, 34(1), 59-87.
- Scarmozzino, E., Corvello, V., & Grimaldi, M. (2017). Entrepreneurial learning through online social networking in high-tech startups. *International Journal of Entrepreneurial Behavior & Research*, 23(3), 406-425.
- Sevilla-Bernardo, J., Sanchez-Robles, B., & Herrador-Alcaide, T. C. (2022). Success factors of startups in research literature within the entrepreneurial ecosystem. *administrative sciences*, 12(3), 102.
- Song, M., Droge, C., Hanvanich, S., & Calantone, R. (2005). Marketing and technology resource complementarity: An analysis of their interaction effect in two environmental contexts. *Strategic management journal*, 26(3), 259-276.
- Teixeira, E. G., Moura, G. L. D., Lopes, L. F. D., Marconatto, D. A. B., & Fischmann, A. A. (2021). The influence of dynamic capabilities on startup growth. *RAUSP Management Journal*, 56, 88-108.
- Tzokas, N., Kim, Y. A., Akbar, H., & Al-Dajani, H. (2015). Absorptive capacity and performance: The role of customer relationship and technological capabilities in high-tech SMEs. *Industrial marketing management*, 47, 134-142.
- Utomo, P., & Kurniasari, F. (2022, January). The Dynamic Capability and Ambidexterity in the Early-Stage Startups: A Hierarchical Component Model Approach. In *Eurasia Business and Economics Society Conference* (pp. 49-61). Cham: Springer Nature Switzerland.
- Winter, S. G. (2003). Understanding dynamic capabilities. *Strategic management journal*, 24(10), 991-995.
- Zahra, S. A. (2021). The resource-based view, resourcefulness, and resource management in startup firms: A proposed research agenda. *Journal of Management*, 47(7), 1841-1860.
- Zang, J., & Li, Y. (2017). Technology capabilities, marketing capabilities and innovation ambidexterity. *Technology Analysis & Strategic Management*, 29(1), 23-37.