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Presenting a Framework of Drivers and Strategic Factors in the Comprehensive Model of Intellectual Capital and Competitive Advantage in Startup Companies

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A B S T R A C T

The objective of the present study is to propose a framework of drivers and strategic factors within the comprehensive model of intellectual capital and competitive advantage in startup companies. This research is applied in nature and employs a descriptive-analytical approach. The methodology is qualitative. The statistical population consists of academic experts and managers of startup companies, from whom 12 individuals were selected using the snowball sampling method until reaching theoretical saturation. The data collection tool is a semi-structured interview developed based on theoretical foundations. Data analysis was conducted using thematic analysis. The findings of the qualitative phase of the research are explained in the form of two main categories and eight subcategories. The identified drivers include the following indicators: human capital, innovation capital, customer capital, and infrastructure capital. The identified strategic factors are as follows: achieving balance and optimizing the collaboration-competition mix in the industry, membership in science and technology parks and incubators, employing lean production processes, and implementing technology-based competitive strategies.

Keywords: *Intellectual Capital Drivers, Competitive Advantage, Startup Companies, Strategic Strategies.*

1. Introduction

The concept of competitive advantage, first introduced by Porter in the 1990s, has evolved into a contemporary framework for understanding the dynamics of international trade. Modern international trade theories emphasize real-world considerations such as competition, the imperfect scale of economic activities, and innovative technologies. These theories also incorporate socio-political and institutional factors, highlighting the disparity between developed and developing nations. For instance, the advanced economies of the global North are typically innovators, while the global South often acts as imitators. However, emerging trade theories address the technological gap reduction between these regions and underscore the role of governmental policies in fostering economic competitiveness (Currie, 2020). Competitive advantage has thus become a cornerstone for explaining why certain

companies or nations outperform others in global markets (Adama & Okeke, 2024; Al-Kahtani, 2024).

Competitive advantage refers to a firm's ability to achieve superior performance compared to its industry peers, delivering higher value to customers. This value manifests in two primary forms: differentiation and cost leadership, which are central to the competitive advantage framework. Two prominent theories underpin this concept: industrial organization theory and resource-based theory. Industrial organization theory focuses on external market forces, as exemplified by Porter's Five Forces model, arguing that market pressures shape business strategies, which in turn determine competitive advantage. By contrast, the resource-based theory views a firm as a collection of tangible and intangible assets. These assets, when effectively utilized, become competencies that guide the firm toward sustained competitive advantage and profitability (Morris, 2019). These perspectives collectively highlight how firms navigate external pressures and leverage internal strengths to outperform competitors.

Competitive advantage can take various forms based on its sources and sustainability. For example, firms can achieve situational advantages through ownership or access to resources, while dynamic advantages arise from organizational capabilities like knowledge and innovation. Additionally, advantages may be homogeneous, stemming from similar resources and methods across competitors, or heterogeneous, arising from unique capabilities and practices that differentiate a firm in the market (Haseeb et al., 2019; Sölvell, 2015). These dimensions are further categorized into tangible and intangible advantages, with the former derived from physical assets like machinery and the latter from abstract elements such as organizational culture or intellectual property. A firm's ability to transition from temporary to sustained advantage is critical, as seen in cases like Coca-Cola's enduring brand equity or Sony's innovation in product miniaturization (Shah Nazari et al., 2023). These classifications provide a structured understanding of how firms achieve and maintain a competitive edge in increasingly complex markets.

Intellectual capital has consistently been identified as a key factor in driving competitive advantage across various industries. Studies have shown that intellectual capital significantly enhances sustainable competitive performance and positively impacts resource acquisition (Amin et al., 2023). In the banking industry, components such as customer satisfaction, internal processes, financial metrics, and learning and growth have been directly linked to improved performance metrics, emphasizing the role of intellectual capital in gaining a competitive edge (Hosseini Aliabad & Abdoli, 2023). Furthermore, the strategic integration of intellectual capital, particularly in dynamic industries like hospitality and banking, has emerged as a vital approach for profitability and sustaining competitive advantage in an increasingly hyper-competitive market (Seifollahi & Ebrahimi Kharajo, 2023). Knowledge management and intellectual capital are closely intertwined, influencing competitive advantage through mechanisms such as knowledge distribution and retention. For instance, studies employing methods like AHP have highlighted the disproportionate impact of specific dimensions, such as relational and organizational capital, on competitive performance, demonstrating the nuanced interplay between intellectual capital dimensions and knowledge-sharing processes (Javan Amani & Akbari, 2022). These findings align with international perspectives, where components like human capital efficiency (HCE), structural capital efficiency (SCE), and capital employed efficiency (CEE) have been identified as critical drivers of organizational performance. These elements, collectively measured by value-added intellectual coefficient (VAIC), are moderated by factors like revenue diversification, further solidifying the strategic role of intellectual capital in organizational success (Nguyen et al., 2023).

In this context, the concept of intangible assets entered management literature and became a central topic. Intellectual capital and understanding its elements and characteristics as intangible assets and a key component of the value chain received attention and were recognized as unparalleled competitive advantages. To achieve this, identifying an organization's intellectual capital is crucial, and its measurement and monitoring should be prioritized by organizational leadership. Various models and frameworks for measuring intellectual capital are available, which can be tailored to the type and size of the organization. Accurate measurement and monitoring of an organization's intellectual capital can significantly aid in guiding its success. If intellectual capital is developed and its manifestation is fostered within the organization, it will undoubtedly lead to greater value creation in competitive strategy development and evolve into a unique competitive capability, posing significant challenges and sometimes discouraging competitors from engaging in competition. Therefore, considering the importance and necessity of intellectual capital, the present study aims to propose a

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framework for intellectual capital and competitive advantage in startups.

2. Methods and Materials

2.1. Study Design and Participants

The present research was conducted using a mixed-method approach. The first part was exploratory and conducted through exploratory factor analysis; hence it is descriptive and correlational, carried out using a survey method with a systematic approach. The second part was qualitative and focused on the opinions of experts; that is, it was conducted with an attitudinal approach from experts. The statistical population in the first exploratory part included sports management professors, ideators, inventors, entrepreneurs, entrepreneurship instructors, and sports business professionals who were sufficiently familiar with the concepts of ideation, innovation (invention), entrepreneurship, and branding, and had adequate experience in sports business activities. From this population, 178 individuals were selected as the research sample. The sampling method in this phase was a combination of non-random snowball sampling and purposive non-random sampling. The statistical sample in the second part, which involved research modeling, included 16 experts in the field of sports business and entrepreneurship, half of whom had experience in innovation or invention and had experienced all stages of innovation and invention management from ideation to branding and commercialization. Among them, 8 were professors in the fields of sports management, entrepreneurship, and business management, and 8 were inventors and sports entrepreneurs. The sampling method in the qualitative section was non-random and purposive.

2.2. Data Collection

The data collection tool in the quantitative section was a valid and reliable 66-item researcher-made questionnaire that examined the factors influencing the management of sports innovations and inventions with an attitudinal approach. Such a questionnaire had not existed before and had not been used in research. The researcher, through the study of information sources such as books and numerous articles related to the topic, extracted various variables and developed the tool. The first section of the questionnaire included 3 demographic questions about the sample members' profession, education level, and their familiarity with the management of sports innovations and inventions. The preliminary questionnaire in the main section included 84 questions, of which 12 were removed during brainstorming sessions with experts and 6 were removed during exploratory analysis due to low factor loadings, leaving 66 questions.

2.3. Data Analysis

In the present study, to ensure the accuracy and reliability of the results, the technical characteristics of the questionnaire were evaluated in two sections: validity and reliability, using various criteria. Cronbach's alpha and composite reliability were used in the reliability section, and construct validity (in two parts: convergent and divergent validity) was assessed in the validity section. In the present study, to determine the validity of the questionnaires, face and content validity were initially used, for which the questionnaires were approved by the supervising professors and 7 experts in sports management and entrepreneurship, and necessary corrections were made. To measure reliability, Cronbach's alpha coefficient was used, and the research questionnaires were appropriate in this regard.

For the description and analysis of data in the quantitative section, Cronbach's alpha, exploratory factor analysis focusing on KMO indicators and Bartlett's test, and in the quantitative section, correlation estimation between variables were used, with all statistical analyses performed using SPSS and Smart PLS software.

3. Findings and Results

According to the demographic information, the majority of the experts interviewed were male (73%), with the minority being female (27%). Based on work experience, 9% of participants had 5–10 years of experience, 64% had 11–20 years, and 27% had more than 20 years of experience. In terms of education, 91% held doctoral degrees, while 9% had master’s degrees.

To analyze the qualitative data, thematic analysis was employed, specifically using the thematic network method. After transcribing the interviews, coding was conducted. During the theoretical coding phase, the data were meticulously reviewed, relevant phrases, concepts, and categories were identified, and their dimensions and characteristics were determined for evaluation. The main unit of analysis for theoretical coding and thematic network creation consisted of the concepts derived from the

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interviews. These concepts were labeled by the researcher directly from the transcripts and generated from the statements provided during the interviews. In total, 152 initial codes were extracted, though not all extracted codes were considered valid.

Following the preparation of tables as part of the qualitative data analysis from the interviews, the concepts were grouped into higher-level, more abstract categories to complete the analysis based on thematic analysis. Categorization involved grouping concepts to prevent confusion. Concepts were compared repeatedly with one another, both within and across the dataset, to extract overarching categories. Related concepts were grouped under broader themes, and titles were assigned based on existing theories or the derived research concepts. Through this iterative comparison process, similar responses from the interviews were organized, and similar concepts were extracted. Close statements were merged, and themes were grouped into two main categories.

The purpose of the thematic network is to establish relationships among the generated categories. This is typically done using a paradigmatic model, which aids theorists in the theory-generation process. Table 1 presents the basic, organizing, and global themes under the two main categories. Unrelated themes were excluded, and some related themes were merged, resulting in eight final organizing themes.

Table 1

Presentation of Basic, Organizing, and Global Themes

Organizing Themes	Basic Themes
Drivers Influencing the Intellectual Capital and Competitive Advantage Model in Startups	Human Capital Index: Implementation of key success factors, value creation per employee
	Innovation Capital Index: Ability to create new businesses, develop quality products, drive growth, improve productivity
	Customer Capital Index (Relationships): Increased connections, enhanced trust, customer repeat purchases, quality and efficiency of distribution channels
	Infrastructure Capital Index: Efficiency, effectiveness, application of key success factors, distribution effectiveness
Strategies Influencing the Intellectual Capital and Competitive Advantage Model in Startups	Achieving balance and optimizing the collaboration-competition mix in the industry
	Membership in science and technology parks and incubators
	Implementation of lean production processes
	Application of technology-based competitive strategies

4. Discussion and Conclusion

In this qualitative study, the identified drivers influencing the intellectual capital model and competitive advantage in startups include: Human Capital Index (implementation of key success factors, value creation per employee), Innovation Capital Index (ability to create new businesses, develop high-quality products, drive growth and development, improve productivity), Customer Capital Index (relationships: increasing the number of connections, building trust, encouraging repeat purchases, enhancing the quality and efficiency of distribution channels), and Infrastructure Capital Index (efficiency, effectiveness, application of key success factors, effectiveness in distribution).

The strategic factors identified as influencing the intellectual capital model and competitive advantage in startups include: achieving a balance and optimal mix of collaboration and competition in the industry, membership in science and technology parks and incubators, implementation of lean production processes, and adopting technology-based competitive strategies.

The concept of human capital stems from the idea that there are no substitutes for knowledge and learning, innovation and creativity, capabilities, and competencies in organizations. These must all be aligned with the competitive logic and organizational environment and pursued rigorously. Human capital serves as a critical source of innovation and strategic renewal for organizations. Higher levels of human capital are often associated with greater productivity and higher compensation or benefits. Chen et al. argue that human capital, as a foundation of intellectual capital, encompasses factors such as employee knowledge, skills, capabilities, and attitudes, leading to improved performance, customer acquisition, and increased profitability for companies. This knowledge and skill reside in employees' minds, meaning

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that their intellectual potential is essential for the organization. If organizations fail to effectively leverage the intellectual capabilities of their employees, this knowledge cannot be activated or translated into market value. On the other hand, this intangible resource is recognized as one of the most value-generating assets of companies and a key factor in wealth creation.

As a result, the development and management of intellectual capital have become critical requirements in the business landscape, with the transition to a knowledge-based economy driving a paradigm shift away from the industrial economy. This shift has ushered in an information- and knowledge-based economy founded on intellectual capital. Simply put, intellectual capital can be viewed as a knowledge package comprising intangible and hidden resources, principles, cultures, behavioral patterns, capabilities, competencies, structures, relationships, processes, and knowledge-driven mechanisms.

The intellectual capital and competitive advantage model in startups functions as a strategic tool that helps these businesses establish and maintain their competitive position in the market. This model consists of four key types of capital: human capital, innovation capital, customer capital, and infrastructure capital.

Human capital plays a pivotal role in the success of startups. It focuses on leveraging employees' skills, knowledge, and capabilities to create added value. Identifying and utilizing key success factors and measuring value creation per employee are critical aspects of this capital. Innovation capital refers to a startup's ability to develop new products and improve processes. This includes creating new businesses, producing market-responsive products, and fostering sustainable growth and development. Investments in innovation enable startups to enhance productivity and remain competitive in the market. Customer capital emphasizes building and maintaining effective customer relationships. Increasing connections and building trust fosters customer loyalty and repeat purchases. Enhancing the quality and efficiency of product distribution channels plays a key role in facilitating product delivery to customers. Infrastructure capital focuses on the efficiency and effectiveness of internal processes and distribution systems. Optimal resource utilization and applying key success factors in business infrastructure are essential for delivering superior services and products.

To effectively harness these capitals, strategic factors such as balancing collaboration and competition, joining science and technology parks and incubators, adopting lean production processes, and using technology-based competitive strategies are critical. These strategies enable startups to leverage new technologies and efficient management techniques to grow and navigate the complexities of the business environment.

The intellectual capital and competitive advantage model in startups yields significant and far-reaching implications across various areas. One primary outcome is increased organizational productivity. By employing skilled and knowledgeable human resources, startups can utilize their resources more effectively, enhancing output and work quality. This fosters faster growth, creates a positive organizational culture, and increases employee motivation.

Another major outcome is the strengthening of innovation within the organization. Focusing on developing new products and improving processes helps startups differentiate themselves in competitive markets and gain unique advantages over their rivals. This innovation manifests in various forms, including improved product quality, cost reductions, or better anticipation of customer needs.

Effective customer relationships are another crucial outcome of emphasizing customer capital. Startups focusing on this area often secure loyal customers, and investments in these relationships contribute to increased sales and improved brand image. Customer loyalty serves as a sustainable advantage in competitive environments. Moreover, efficient infrastructure management stands out as a key outcome. Optimizing processes and utilizing advanced techniques and technologies enable businesses to respond better to market demands and changes. This reduces costs and accelerates product or service delivery.

Ultimately, these outcomes create a positive cycle within startups, where high productivity, continuous innovation, strong customer relationships, and optimized infrastructure reinforce each other, strengthening competitive positioning and ensuring sustainable profitability.

To strengthen intellectual capital and competitive advantage in startups in Tehran, the following prioritized recommendations are proposed, derived from the qualitative findings identified:

1. Precisely define objectives, strategies, and motivations before entering collaborative-competitive relationships, and advise managers to learn from successful collaborations in the industry.

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2. Establish innovative hubs within startups to analyze and monitor innovative ideas or join science and technology parks.
3. Implement lean production strategies by reducing production system lead times and response times from suppliers to customers.
4. Hire, train, motivate, and empower employees to fully serve customer needs.
5. Employ technology-based strategies with minimal initial engagement levels, gradually expanding and deepening these relationships.
6. Carefully select and hire individuals with technical and teamwork skills.
7. Identify key processes that deliver the most value to customers.
8. Re-engineer these processes to improve their features (cost, time, quality, etc.) and enhance the innovation capital index.
9. Document these processes and adopt best practices from domestic and international competitors.
10. Identify target markets and growth points to compete effectively with other industries.

Authors' Contributions

M.S.T. conceptualized the research framework, designed the methodology, and led the data collection process. A.J. contributed to the theoretical foundation, facilitated interviews with industry experts, and assisted in the thematic analysis. Both authors jointly interpreted the findings, developed the proposed framework, and contributed to drafting and revising the manuscript for publication.

Declaration

In order to correct and improve the academic writing of our paper, we have used the language model ChatGPT.

Transparency Statement

Data are available for research purposes upon reasonable request to the corresponding author.

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Declaration of Interest

The authors report no conflict of interest.

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Ethics Considerations

The study protocol adhered to the principles outlined in the Helsinki Declaration, which provides guidelines for ethical research involving human participants.

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