Shahid Bahonar University of Kerman

Journal of New Studies in Sport Management

Online ISSN: 2717 - 4069

Homepage: https://jnssm.uk.ac.ir

Iranian Scientific Association of Sport Management

Identifying the Factors Affecting the Establishment of Knowledge-Based Sports Companies Based On Electronic Knowledge: A Qualitative Analysis

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ARTICLE INFO

Article type:
Original article

Article history:
Received: 7 May 2022
Received in revised form: 8 June 2022
Accepted: 21 June 2022
Publish online: 10 September 2022

Keywords:
Electronic
Grounded theory
Knowledge-based company
Qualitative research
Sport

ABSTRACT

The main purpose of the present study was to determine the factors affecting the establishment of sports knowledge-based companies based on electronic knowledge. To pursue this aim, Glaser's grounded theory was used as the qualitative research method. 16 in-depth and semi-structured interviews were conducted with academic and industry experts in the field of sports using purposeful and snowball sampling methods. Data analysis was performed in three stages: open coding, axial coding, and selective coding, and the preliminary list of factors was identified through initial library studies. The 105 values affecting the development of sports knowledge-based companies based on electronic knowledge were extracted through the open coding process. The final pattern was created using the results of axial coding, which revealed the identification of 12 subcategories, falling into two main categories: intra-organization (human resources, management, marketing, legal, and financial factors) and extra-organization (educational/creativity and innovation factors, economic, cultural-social, infrastructure, legal, policy-making, and support/protection). According to the findings of the study, the professional and comprehensive view of managers and scientific and executive officials on these mentioned factors can change the ecosystem of sports entrepreneurship in Iran, providing the necessary context and infrastructure, as well as the sports community's interest in entrepreneurship and the formation of knowledge-based companies. This is, of course, accompanied by long-term job opportunities for activists in this sector as well as the development of new and inventive ideas, goods, and services.

How to Cite: Nasr Esfahani, D., Rahbari, S. (2022). Identifying the Factors Affecting the Establishment of Knowledge-Based Sports Companies Based On Electronic Knowledge: A Qualitative Analysis. *Journal of New Studies in Sport Management*, *3*(3), 530-543. DOI: 10.22103/JNSSM.2022.19466.1087

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DOI: 10.22103/JNSSM.2022.19466.1087

Introduction

With the advancement of the humanities, the application of knowledge in all aspects of human life has been expanded. In the new paradigm, knowledge is no longer an isolated part of society; it now serves as the foundation of approaches and instruments, as well as determining how we live. In the economic sphere, the role of knowledge in achieving sustainable development goals has been considered more important than before. In fact, knowledge has today become a stimulus that drives all sectors of the economy (Dubina, Carayannis, & Campbell, 2012). The worldwide approach of countries to the knowledge-based economy also demonstrates the acceptance of the role of knowledge and technology in economic development (Kumar, 2003). This approach has the potential to maximize the utilization of existing capacities in the country's universities and scientific institutes, as well as sustainably employ scholars and graduates (Ibnouf, Dou, & Knight, 2014; Sum & Jessop, 2013). In this regard, one of the first major works done in the countries was the establishment of knowledge-based enterprises as productive entrepreneurs in science and technology parks. Among all the resources available to these companies, knowledge is the most important strategic resource, as well as the long-term cornerstone. Commercialization of scientific achievements and their presentation in the professional fields; development of a knowledge-based economy; synergy of science and wealth; localization of knowledge and technology; diversification of national revenue sources; diversification of economic investment fields; growth of human resources in knowledge-based fields; and achievement of scientific and economic goals fall under this umbrella field of goals of these companies (Aghmiuni, Siyal, Wang, & Duan, 2020; Salem, 2014). Governments regard these companies as major sources of both wealth and job creation, with immense and rapid growth potential when compared to other industries, which in turn affect economic development. Knowledge-based companies bridge the gap between academia and industry by transferring technology from the former to the latter. The logical consequence of this transition is the development of science-based innovation capabilities in a variety of fields. Ergo, knowledge-based companies can launch new products, resulting in economic expansion and new job opportunities.

The sports industry's worth and potential have grown in recent years as a result of increased interest and participation from athletes and fans around the world. Advances in technology have also had a profound impact on this growth, bringing in significant revenue to this industry. Along these lines, the application of technology in athletic equipment design, as well as the advancement of technical expertise and new materials, has drastically impacted sport at all levels, from low-level recreational activities to elite-level competitive sports (Shalaby & Saad, 2020; Sum & Jessop, 2013). This has manifested itself in a variety of ways, from the creation of new sports to the facilities needed to perform them, the equipment used by athletes in competitions to the training support provided by teams to prepare athletes for competitions. The bottom line is that this equipment has quickly become a necessity for sports activists at all levels and in all sports, empowering sports managers to maximize productivity (Ratten, 2019). Engineering and technology are going to play an even bigger part in the future, not only in improving athletes' performance in training and competition but also in entertaining and enhancing participants' safety (Cooper et al., 2018; Fuss, Subic, & Mehta, 2008). One of the engineering branches that deeply penetrates most aspects of the sports industry is electronic engineering. "Smart" equipment based on electronic knowledge as the most important tool has evolved in sports. An example of such equipment is the Video Assistant Referee system, which enables referees to make better decisions (Lago-Penas, Gómez, & Pollard, 2021). It will apply only to key decisions, such as the validity of goals, red cards, offside, penalties, and mistaken identity. An electronic automated timing system is employed to measure the performance times of athletes in a great number of sports, increasing accuracy in time measurements of sports performance (Haugen & Buchheit, 2016). On-field cameras and electronic tracking systems embedded into players' apparel primarily track their positions and statistics in real-time (Leser, Baca, & Ogris, 2011). This equipment assists team coaches and managers to record and assess the physical and tactical behavior of players' performances. Scoreboards and video technology also make competitive events more enjoyable and exciting for the spectators. Most professional athletes' sporting performances, such as exercise stress

testing, cardiovascular evaluation, strength and fitness evaluation, and biomechanical analysis, are typically measured using electronic equipment (James & Petrone, 2016). Sensor tools are often used to track player heart rate, field positions, fatigue, rehabilitation, and injury prevention. Sensor technologies also help to accurately determine the position of the ball at a given time (Aroganam, Manivannan, & Harrison, 2019). Virtual Reality equipment can improve players' mental learning, visualization, and decision-making (Tsai, Pan, & Hu, 2020). Virtual imaging systems introduce virtual imaging, including its Virtual World Record Line in professional swimming trials and events. The Hawk-Eye Line-Calling System uses high-performance cameras to track the trajectory of the ball and display its path as a moving 3D image (Whitehurst, 2021). Combining electronic knowledge with the Internet of Things (IoT) is expected to be embraced by professional organizations across many different sports for the next 10 to 20 years.

Science and technology parks have been established in Iran for many years as a social institution and part of the chain of economic development based on knowledge and technology, in line with other countries around the world, in order to create more revenue by supporting elites and idea owners, providing economic growth and creating sustainable jobs. Science and technology parks have contributed to the establishment of knowledge-based companies by creating a support network of idea owners and prominent entrepreneurs in various fields, allowing these companies to coordinate academic research with the demands of the industry. Consequently, knowledge will be the source of discovery and commercialization. Knowledge-based sports companies are a new and creative response to a demand for physical wellness that generates value. With the initial investment, these knowledge-based enterprises dream up new solutions and ideas in the field of sports activities and seek to extensively offer their creative products or services in target markets (Ratten, 2011).

However, knowledge-based enterprises in the field of sports in our country have not been able to adequately respond to the demands of industry and commerce. As a result, identifying the factors affecting the performance of knowledge-based sports companies is critical. Using a qualitative approach and a theory derived from data by the Strauss and Corbin method, Pirjamadi, Honari, Kargar, and Shabani bahar (2019) identified the growth and sustainability factors of knowledge-based sports companies in Iran. Based on the research findings, structural, governmental, hard infrastructure, and public-private partnership cooperation policies are the main causes. The skills of knowledge-based sports companies, political factors, financial and managerial factors, including background factors and sports exhibitions and conferences to create creative ideas, integration of companies, consultants, and branding are among the intervening factors in this study. Mohammadkazemi, Hosein nia, and Habibi (2019) Conducted a study on the applications and requirements of utilizing "crowdfunding" platforms in established service and sports enterprises. The requirements identified for the use of crowdfunding were also divided into three categories: the characteristics of the aggregator organization, the technological characteristics, and the environmental characteristics in which the aggregator organization conducts business. Hosseini, Mokhtari Dinani, and Rezaei Pandari (2021) Did a study in Lorestan province with the aim of proposing a model of effective factors for sports entrepreneurship. The findings reveal that structural factors (monitoring, control and assessment, scientific-educational and research), environmental factors (socio-cultural and technological, economic-commercial and political-legal), and behavioral factors (personality traits and specialized characteristics) have a direct impact on sports entrepreneurship. In line with this finding, Khanmoradi, Sajjadi S. N., and Zoroastrians (2019) show that the paradigm of establishing a knowledge-based sports company comprises six dimensions (obstacles, drivers, capacities of the sports industry, sports entrepreneurship, knowledge-based sports entrepreneurship, and results). According to Gozalzadeh, Dana, and Afshari (2020) organizational and marketing factors with a higher level than the average are in good condition, while economic factors, technology, and humans are in unfavorable conditions in knowledge-based organizations due to their lower average than the standard level of 3. Economic factors were shown to be the most essential factor in enhancing the performance of knowledge-based enterprises in sports, while technological aspects were found to be the least important factor. Taking into account these different points, it is of great importance to identify the factors affecting the establishment of sports knowledge-based companies based on electronic knowledge. We attempt to examine these factors from the

perspective of academic and industry experts, in order to project future lines of work in the thriving sports industry.

Methodology

The present section is devoted to describing the research method employed in this study. The fundamentals of this qualitative research lie in the grounded theory method with Glaser (1992) emerging approach. This study was conducted in 2021.Sixteen sports-sphere academic and industry experts participated in this study. For theoretical sampling, the purposive and snowball sampling methods were used. Semi-structured and in-depth qualitative interviews continued until data saturation was reached. The relevant research literature, on the other hand, was gathered using library methods, such as a review of valid documents, books and dissertations, scholarly articles, and the World Wide Web. Interviews lasted between 30 and 50 minutes. After each interview's implementation and preliminary coding, they were referred to again to check the reliability and validity of the researcher's interpretation of the interviewees' statements. Collecting data from people who have as much experience as possible in the fields of sports and industry entrepreneurship, especially in the field of knowledge-based companies, helps increase the validity of the data. Analyzing qualitative data from interview transcripts has been done in three stages: open coding, axial coding, and selective coding. The first stage is to go through the data and break it down into pieces to examine closely and compare for relations, similarities, and dissimilarities. Different parts of the data are marked with appropriate labels or 'codes' to identify them for further analysis. The core codes will be refined during subsequent analysis phases. In the later stages of coding, the researcher focuses on defining the most significant higher-level codes and sorting the lower-level codes created during the initial coding phase.

Also, to test the reliability of this study, the retest reliability method was used, which refers to the degree of compatibility of data classification over time. This index can be calculated when a coder encodes a text at two different times. To calculate the reliability of the retest from among the interviews conducted, several interviews were selected as a sample and each of them was re-coded in a short and specific time interval; Then, the codes specified in the two time intervals for each of the interviews are compared and through the amount of agreement and disagreement in the two coding stages, the stability index for that research was calculated. In each interview, codes that are similar at two intervals are identified as agreement and dissimilar codes as disagreement. Holsti (1969) Proposed the following proposed index to calculate the retest reliability between researcher codings at two time intervals:

$$\text{Percentage of intra-subject agreement} = \frac{\text{Number of agreements} * 2}{\text{Total number of codes}} * 100\%$$

During the research and the coding of the interviews, the researcher recoded several interviews as a sample over a period of 20 days. By referring to the initial codes extracted from those interviews and their re-codes, Table 1 was obtained.

Table 1. Percentage of reliability of retest

Row	Title Interview	Number of Total Codes	Number of Agreements	Number of Non-Agreements	reliability of retest (Percent)
1	P1	21	10	8	95٪
2	P2	7	3	2	85٪
3	P3	7	3	2	85٪
		35	16	12	88٪

As can be seen in the table above, the total number of codes in two 20-day intervals was 35, the total number of agreements between the codes in these two times was 16, and the total number of

failures in these two times was 12. The retest reliability of the interviews in this study was 88%. Due to the fact that the reliability rate was more than 64%, so the reliability of the coding was confirmed.

Results

Table 2 summarizes demographic information related to the descriptive research questions of the interviewees. From the table, it is clear that t*he gender* of *respondents* was unevenly distributed in the sample, with *males* and *females* constituting, respectively, *81* and *19* percent of the *respondents*. 38% of the respondents are males and 19% are females. Forty-five *percent* of *respondents* have a master's degree, and 55% have a *doctoral* degree. 38 percent of *respondents aged less than* 35 *years, 37 percent* between 36 and 44, and 25 percent of *respondents* older than *45*. Among the participants, 32 percent had less than 10 years of experience in the sports industry, about 49 percent had 11 to 15 years of experience, and 19 percent had more than 15 years of experience.

Table 2. Descriptive statistics for the respondents' demographic characteristics

Variable	Category	f	Percent
Gender	Female	3	19
	Male	13	81
Education	Master's degree	7	44
	Ph.D	9	56
Age Group (year)	<35	6	37.5
	36-44	6	37.5
	>45	4	25
Work tenure in the field of entrepreneurship and knowledge-based companies (year)	<10	5	31
	10-15	8	50
	>15	3	19

From the perspective of academic and industry experts, factors affecting the establishment of sports knowledge-based companies based on electronic knowledge can be classified into intra-organizational factors and extra-organizational factors. It is vividly apparent that the intra-organizational factors include human resources, management, marketing, legal and financial factors. Extra-organizational factors include educational/creativity and innovation, economic, cultural-social, infrastructure (technical/ technological infrastructure), legal, policy-making (governance), support/protection factors. Codes pertinent to sub-components of these factors are outlined in Table 3.

Table 3. Factors affecting the establishment of sports knowledge-based companies based on electronic knowledge

Main categories		Subcategories	Main concepts
Intra-organizational factors	**1**	**Human resources factors**	Access to technical staff such as electronic engineers and professional programmers to implement startups, access to experienced non-technical staff with business knowledge, an increase in capable vendors of technical equipment, team members with stable personalities (retain and increase motivation, focus, etc.), proper cooperation within the team, team members with high skill, access to specialized academic people in physical education and sports sciences in different branches, access to coaches of different sports, access to managers of sports clubs, access to people with experience in the sports industry, proper coordination between sports groups, the collaboration between experts across relevant fields, coordination and cooperation among human resources in sports and engineering
	2	**Management factors**	Management team strength, the direct participation of *founders* in *inventor teams*, the right outsourcing of work,

			the adoption of the right strategies, the proper design of the business model, the ability to develop and scale, choosing the right business model, having alternative plans, coordination of managers and consultants of companies
	3	**Marketing factors**	Market access, transparency, and access to comprehensive information about supply and demand market (access to the market database), marketing and market research and market analysis, identification and attention to customer needs, access to foreign markets, production and delivery of products and appropriate services, creativity in providing products and services, formulating the right steps in creating the product, recognizing the designed product lifetime, continuity of appropriate and functional products, fit of the designed product with the market, distribution of goods or services at the right time, paying attention to customer feedback, correct estimation of market size, paying attention to market needs, appropriate strategies in dealing with competitors, paying attention to competitors' activities, confronting competitors, paying close attention to new related markets, holding and attending trade and conferences for marketing products and finding sales partners, developing creative ideas, branding
	4	**Legal factors**	Up-to-date legal issues, familiarity with legal issues, benefiting from qualified people and consultants in the legal fields, integration of companies and legal advisors, the existence of a legal system governing knowledge-based companies and start-up businesses, intellectual property rights, earning licenses and relevant certificates
	5	**Financial factors**	Financing and investment, high liquidity of knowledge-based companies, proper allocation of financial resources, correct valuation of goods and services, transparency of how to value knowledge-based companies, increasing the number of institutions and investment unions such as crowdfunding institutions, venture capital firms, and other institutions, awareness and high risk of private sector investors, awareness of new investments through startups and knowledge-based companies, access to credit, tax system, subsidies, and tax incentives, pricing method with an appropriate revenue model, ability to predict revenues and costs
Extra-organizational factors	1	**Educational/ creativity and innovation factors**	High-quality and tailored university education to the needs of knowledge-based companies, holding skill-based training workshops for knowledge-based companies considering engineering branches, modeling of successful foreign knowledge-based companies and their localization, knowledge-based and interdisciplinary conferences to generate creative ideas such as startup weekends, etc., holding workshops focusing on creativity and innovative sports opportunities, the existence of training centers in the field of creativity and sports innovations relevant to engineering disciplines
	2	**Economic Factors**	Increase of liquidity in society, people's high purchasing power, long-term economic growth, job creation, GDP, interest rate, macroeconomic and microeconomic indicators

3	**Cultural-social Factors**	Cultural and social issues, having an entrepreneurial spirit among families, accepting entrepreneurship as a career path and lifestyle among people, having a culture of success in knowledge-based groups, people's awareness of sports Iranian knowledge-based companies' services, public trust in the services of knowledge-based companies, community acceptance of new and practical ideas, respect for entrepreneurs in society, changing attitudes towards failure at work and employment, creating business development networks and new sports jobs
4	**Infrastructure (technical/ technological infrastructure)**	Access to technical infrastructure, high quality of communication and information infrastructures such as bandwidth, internet speed, and data centers, reduction in the price of information technology and communication infrastructure services in the country, suitable infrastructures for exploiting new technologies such as cloud computing, IoT, big data analysis, and mobile communications, and the geographical focus of the industry
5	**Legal Factors**	Legal issues, the existence of appropriate laws and legal restrictions for the implementation of new knowledge-based companies, enforcement of the law in various fields such as intellectual property rights and tax exemptions, the complexity of laws and regulations, the facilitation of laws and rules for developing sports knowledge-based companies
6	**Policy-making (governance) Factors**	Government policy-making and governance in the *entrepreneurial ecosystems*, the existence of clear and comprehensive planning to support knowledge-based companies, government financial support for knowledge-based companies, non-interference and government ownership in the country's *entrepreneurial* ecosystem, formulation of government support policies for sports businesses
7	**Support /Protection Factors**	Existence of support institutions, inter-organizational cooperation, an increase in the number of companies that provide technical services and support to knowledge-based companies, an increase in motivation in large companies to cooperate and partner with knowledge-based companies, institutional support of sports businesses, particularly knowledge-based businesses, through government centers

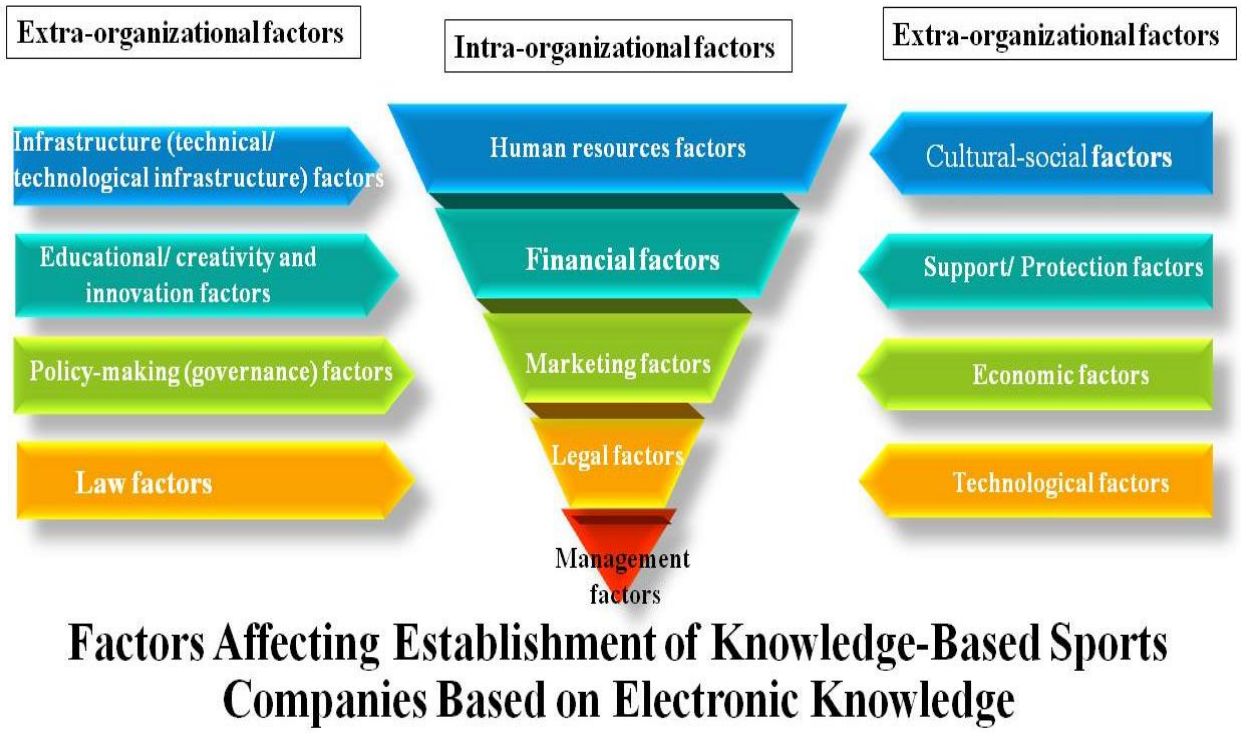

Figure1. Factors Affecting Establishment of Knowledge-Based Sports Companies Based on Electronic Knowledge

Discussion and Conclusion

The purpose of this work was to identify factors influencing the establishment of knowledge-based sports companies based on electronic knowledge using the grounded theory method and Glaser's emerging approach. Our study begins with 16 in-depth and semi-structured interviews with academic and industry experts in this field. Open coding, axial coding, and selective coding were used to analyze qualitative data. The results extracted from Table 2 reveal that components of external factors such as educational/creativity and innovation factors, economic, cultural-social, infrastructure (technical/technological infrastructure), legal, policy-making (governance), financial support, as well as components of internal factors such as human resources, management, marketing, legal, and financial factors, play major roles. As a starting point, an account of the analysis of the influencing factors follows.

High quality and tailored university education to the needs of knowledge-based companies, holding skill-based training workshops for knowledge-based companies considering engineering branches, modeling of successful foreign knowledge-based companies and their localization, knowledge-based and interdisciplinary conferences to generate creative ideas such as startup weekends, etc., holding workshops focusing on creativity and innovative sports opportunities, and the existence of training centers in the field of creativity and sports innovations relevant to engineering disciplines were categorized as educational, creativity and innovation factors. In this vein, Hosseini et al. (2021) introduced scientific-educational factors as effective factors in sports entrepreneurship in Lorestan province. Tari and Porhelm (2020) Presented a structural model of the factors impacting the survival and growth of start-ups. However, the effect of market knowledge and network capabilities on the survival and growth of these companies was not confirmed by the study. As is well known, commercialization is the process of transforming theoretical knowledge in academic institutions into some types of economic activities, and the ultimate mission of technology parks is to be able to adapt the results of academic research to the needs of industry and thus to fill the vacuum between industry and academia (Khanmoradi et al., 2019). The economic factor was classified by the codes of increase in liquidity in society, people's high purchasing power, long-term economic growth, job creation, GDP, interest rate, and macroeconomic and microeconomic

indicators. Findings from the research of Askarian, Ganj Khanlu, and Tahmasebi (2019) revealed that the budget deficit significantly crowds out private investment in the sports manufacturing business. In this regard, Gozalzadeh et al. (2020) found that economic factors were the most essential component in enhancing the performance of knowledge-based firms in sports, whereas technological aspects were the least important factor. In another study, Azimzadeh, Pitts B., Ehsani, and Kordnaeij (2013) showed that personal factors (personality, experience, and entrepreneurial skills), environmental factors (politics, economics, culture, and social and technology), and financial factors (resources, loans, and salaries) should all be considered in the creation of sports startups. Knowledge-based companies are acknowledged by governments as key sources of revenue and employment, and eventually as a factor affecting economic progress. Recognizing the growing importance of science and technology in economic development, and its logical consequences, as well as the critical importance of creating society's capacity to produce science-based innovation, and the critical role of knowledge-based companies in the economy and the spread of technology in the network. The relevance of such companies in today's society is highlighted by innovations.

Another external factor contributing to the establishment of knowledge-based sports companies based on electronic knowledge is the socio-cultural factor. Cultural-social factors with codes such as cultural and social issues, having an entrepreneurial spirit among families, accepting entrepreneurship as a career path and lifestyle among people, having a culture of success in knowledge-based groups, and so on were other external factors affecting the establishment of sports knowledge-based companies based on electronic knowledge. Sport is inherently a cultural activity that has positive effects on people's lives. With this in mind, the philosophy of sport can also guarantee social values. Mohammadkazemi et al. (2019) Also stated that using the platform of crowdfunding for established businesses provides not only capital for entrepreneurs and businesses, but also new opportunities by supporting certain specific groups (i.e. poor athletes, the disabled, women entrepreneurs, etc.). In this regard, socio-cultural aspects were recognized as one of the elements impacting sports entrepreneurship in Lorestan province by Hosseini et al. (2021) Furthermore, when prioritizing the drivers of influential factors in the development of knowledge-based companies, Mansuri, Vazifeh, and Yusefi Tabas (2017) pointed to the role of cultural and social factors and showed that the risk-taking investment factor is the most important and the possibility of healthy competition in society is the least important.

The infrastructure factor (technical /technological infrastructure) influencing the establishment of knowledge-based sports companies based on electronic knowledge was also coded as follows: access to technical infrastructure, high quality of communication and information infrastructures such as bandwidth, internet speed, and data centers, reduction in the price of information technology and communication infrastructure services in the country, suitable infrastructures for exploiting new technologies such as cloud computing, IoT, big data analysis, and mobile communications, and the geographical focus of the industry. However, technology capability alone is insufficient to gain a competitive advantage. As it turned out, one of the most critical resources for the success of a knowledge-based company is the capacity to offer distinctive products. To compete in the market, new investments must combine and deploy their existing technologies with other resources or complementary capabilities.Ghazizadeh Nouri Naeini and Shahozehi (2020) Identified the factors affecting the development of technology management tools in knowledge-based organizations, including a focus on R&D, the utilization of specialized networks, and delivering services in specialist areas such as Bio and Nano. The most successful variables in the development of technology management tools in knowledge-based organizations are the adoption of new technologies as well as technical and professional abilities. It's worth noting that the establishment of knowledge-based companies in science and technology parks in order to commercialize ideas is one of the country's first significant efforts to turn inventions into technology. Consideration along these lines, it can be pointed out that the ability to connect information technology, infrastructure, and new technology standards is responsible for sport's business development.

The legal factor was categorized with codes such as legal issues, the existence of appropriate laws and legal restrictions for the implementation of new knowledge-based companies, enforcement of the law in various fields such as intellectual property rights and tax exemptions, the complexity of laws and regulations, and the facilitation of laws and rules for developing sports knowledge-based

companies. It should be highlighted that the legislature's creation of proper legislative frameworks helps to improve the business ecosystem and expand innovative and technological activities, reducing concerns about capital waste. By raising awareness about the highly desirable approaches to establish knowledge-based companies and introducing rules, regulations, and certain relevant contracts, the legislation can help to foster innovation in sports technology and ultimately ameliorate the health of society (Mohammadkazemi et al., 2019). However, given the current state of the sports industry, it is expected that the legislature will entrust the ministry of sports and youth or one of the technical departments, such as the *ministry of science, research, and technology*, to take the necessary steps to regulate it with minimal formalities. We note that most knowledge-based businesses have their origins in academia, intending to translate excellent ideas into new commercial prospects while also safeguarding the community from problems like addiction and obesity.

Government policy-making (governance) in the *entrepreneurial ecosystems*, the existence of clear and comprehensive planning to support knowledge-based companies, government financial support for knowledge-based companies, non-interference and government ownership in the country's *entrepreneurial* ecosystem, and the formulation of government support policies for sports businesses were specifically coded in the policy-making (governance) subcategory. The research by Mohammadkazemi et al. (2019) identified the requirements for the use of crowdfunding, including environmental characteristics consisting of government support, law and custom, and public trust.Aladekomo (2004) Also conducted a study entitled "Entrepreneurship development policies in Nigeria". They observed that the misalignment of government and educational policies on entrepreneurship development resulted in an increase in graduate unemployment, lack of motivation, and feelings of frustration and insecurity. To explain this finding, it suffices to say that entrepreneurship represents a strategic phenomenon. Although this phenomenon is the driving force behind managerial change, it is an action rather than a behavior. As a general point, the government must establish an innovative work, strategic and cultural framework. Taking the initiative in managing public affairs and pursuing the development of an innovative culture leads to improved performance. Another point extracted from this section is that to be able to organize social policies and old public service institutions on a regular basis for divestiture, large-scale social initiatives require synchronization with the modern economy (Groenewegen & Langen, 2012). In fact, the elimination and reduction of restrictions and impediments to entrepreneurship, as well as the encouragement of entrepreneurship, are some of the measures that the government can take to support knowledge-based businesses.

From the respondents' point of view, another external factor that appears to be encouraging in the development of knowledge-based sports companies based on electronic knowledge is the support factor. The existence of support institutions, inter-organizational cooperation, an increase in the number of companies that provide technical services and support to knowledge-based companies, an increase in motivation in large companies to cooperate and partner with knowledge-based companies, and institutional support of sports businesses, particularly knowledge-based businesses, through government centers were open codes in this category. Caseiro and Coelho (2019) Use business intelligence as a set of concepts, methodologies, and procedures that not only enhance but also support the business. It is recommended that managers use business intelligence systems to detect business risk and opportunities, predict market trends, estimate competitors' activities, better understand business needs, and improve customer management in order to react faster to problems and accurately estimate the situation against competitors. It is therefore conceivable that it could be a competitive advantage for start-up sports companies (Infodev, 2013). One of the components directly related to the support factor is increasing large companies' motivation to collaborate with knowledge-based enterprises. The term "networking capability", as used in recent research by Mathews, Constanza, Keith J.P., Marilyn, and Rumintha (2015), refers to the organization's capabilities to initiate, develop, and maintain commercial partnerships, as well as expand long-term relationships with customers and other companies. As a result, utilizing network capabilities increases cooperation with other businesses, decreases production costs, offers proper access to foreign information, and opens foreign markets. It is then concluded that we can eliminate potential problems and address *challenges*, *giving* business the highest *chance* of *success* by analyzing each of the managerial, commercial, environmental, and technical factors.

The intra-organizational factors consist of components such as human resources, management, marketing, legal, and financial factors that play a role in developing knowledge-based sports companies based on electronic knowledge. Human resource codes include access to technical staff such as electronic engineers and professional programmers to implement startups, access to experienced non-technical staff with business knowledge, an increase in capable vendors of technical equipment, team members with stable personalities (retain and increase motivation, focus, etc.), proper cooperation within the team, access to people with high skills, access to specialized academic people in physical education and sports sciences in different branches, access to coaches of different sports, access to managers of sports clubs, access to people with experience in the sports industry, proper coordination between sports groups, the collaboration between experts across relevant fields, coordination and cooperation among human resources in sports and engineering. In this context,Koozechian, Ehsani, Azimzadeh, Kordanaij, and Pitz (2014) emphasized the importance of the entrepreneur's personality traits in the success of creating small and medium sports businesses. De Pillis and Reardon (2007) found that personality traits have a positive effect on establishing intention and motivation to start and develop small and medium enterprises.Groenewegen and Langen (2012) Arrive at the very important conclusion that the primary elements for the success of innovative enterprises are the entrepreneur's and innovator's personality traits.

The management factor with open codes of management team strength, the direct participation of *founders* in *inventor teams*, the right outsourcing of work, the adoption of the right strategies, the proper design of the business model, the ability to develop and scale, choosing the right business model, having alternative plans, and coordination of managers and consultants of companies convened in the next category of internal factors impacting the establishment of knowledge-based sports companies based on electronic knowledge. Based on the research findings by Mohammadkazemi et al. (2019) established businesses can utilize crowdfunding as a suitable method for ideation, social responsibility, and direct and indirect financing of desired projects within their organization. The requirements identified for using crowdfunding were also divided into three main axes: the characteristics of the crowdfunding organization, technological features, and the environmental features in which the crowdfunding organization operates. Proper design of the business model was one of the codes of this part of the investigation. Howbeit, Pamela and Patrick (2019) did not utilize a business plan in developing their business (launching a formal classic sneaker trade). Instead, he conducted market research using the least suitable product (a quantity range of classic soccer shoes) and got feedback from customers.

Marketing factor was also categorized by the following codes: market access, transparency, and access to comprehensive information about supply and demand markets (access to the market database), marketing and market research and market analysis, identification and attention to customer needs, access to foreign markets, production and delivery of products and appropriate services, creativity in providing products and services, formulating the right steps in creating the product, recognizing the designed product lifetime, continuity of appropriate and functional products, fit of the designed product with the market, distribution of goods or services at the right time, paying attention to customer feedback, correct estimation of market size, paying attention to market needs, appropriate strategies in dealing with competitors, paying attention to competitors' activities, confronting competitors, paying close attention to new related markets, holding and attending trade and conferences for marketing products and finding sales partners, developing creative ideas, branding. Market knowledge, which is described as the knowledge of prospective customers and competitors, as well as other market aspects linked to a given product category, is divided into various dimensions by Dabrowski, including breadth, depth, tacitness, and specificity (Dabrowski, 2019). Esmaeilpour, Bahrainizadeh, and Ghaedi (2016) Also stated that "market knowledge" means the organization's knowledge of the environment, competitors' behaviors, and customer buying behavior and demands. Managers and employees should have access to this information for analyzing the market and customers, as well as designing products according to market requirements.

Up-to-date legal issues, familiarity with legal issues, benefiting from qualified people and consultants in the legal fields, integration of companies and legal advisors, the existence of a legal system governing knowledge-based companies and start-up businesses, intellectual property rights, earning licenses, and relevant certificates are all codes of legal factor mentioned by interviewees. To

accept and use crowdfunding systems for knowledge-based sports companies, not only entrepreneurial organizations and interested participants are required, but also supportive and empowering systems such as facilitating laws and regulations, as well as a culture of acceptance of this new way of financing (Infodev, 2013).

The financial factor was coded with codes such as financing and investment, high liquidity of knowledge-based companies, proper allocation of financial resources, correct valuation of goods and services, transparency of how to value knowledge-based companies, increasing the number of institutions and investment unions such as crowdfunding institutions, venture capital firms, and other institutions, awareness and high risk of private sector investors, awareness of new investments through startups and knowledge-based companies, access to credit, tax system, subsidies, and tax incentives, pricing method with an appropriate revenue model, and ability to predict revenues and costs. According to the results of Askarian et al. (2019), boosting current government expenditures, by raising capital expenditures and investment in economic infrastructure has an inertial effect on private investment in sports product manufacturing. Needless to say, the development of knowledge-based companies relies on technical advancement. In other words, technological innovation is the competitive advantage of knowledge-based businesses. It is thus concluded that technology development in knowledge-based companies leads to profitability in new product production and process changes, competition in maintaining and increasing the company's share of the product market, lower production costs, higher product quality, market flexibility, and technological progress. Considering the world's increasing technological advancements and the undeniable role of technology in companies' ability to produce cheaper and higher-quality products, as well as the ability of small and medium-sized knowledge-based businesses to compete, the development and establishment of technology-related centers for these businesses is essential (Mansuri et al., 2017).

As we pointed out earlier, the idea of creating knowledge-based sports companies based on electronic knowledge addresses the demands and challenges of the sports industry as a whole. Based on research principles in the sports industry in areas such as active lifestyles, sports education, and skills by considering new technologies, public sports, championship sports, and professional sports, we can point out challenges such as lack of time as a result of modern lifestyle, the need for physical activity in accordance with diets, education, and culture to change lifestyle and create mobility at work, the possibility of correcting sports movements by beginners, the possibility of continuous monitoring of physical condition during exercise using wearable gadgets, the possibility of coordinating and receiving sports programs from coaches, facilitating receiving online services for repair and maintenance of professional sports equipment, awareness of technological sports facilities and equipment for the disabled, and irregularities in ticket sales in stadiums due to lack of technical capacity. In this regard, solutions are presented such as using applications to train and promote sports activities, using sensors and applications to promote healthy lifestyles and reminders of daily sports and corrective movements, using online platforms to train and modify sports movements in various disciplines, use online platforms and wearable gadgets to monitor the athlete's physical condition, use of software to provide medical or business advice to professional athletes, using online platforms to purchase and order and repair sports equipment, use of online platforms and management dashboards to facilitate the management activities of clubs and sports venues (automatic door systems, modern security and safety systems, locker door systems, modern sports equipment, etc.), using special tools and software to analyze the performance of professional athletes in specific sports, the use of online platforms for buying and selling sports tickets and electronic knowledge at the stadium doors, and checking people when entering, sitting, and care and security activities, etc. As a result, managers' professional and comprehensive views on this issue, as well as the sports community's interest in entrepreneurship and the formation of knowledge-based companies, can change the ecosystem of sports entrepreneurship in Iran by providing the necessary context and infrastructure, as well as interest of the sports community in entrepreneurship and the formation of knowledge-based companies. This is, of course, accompanied by long-term job opportunities for activists in this field as well as the creation of new and innovative ideas, commodities, and services.

As a final note, directly related to the findings of our research, despite the presence of numerous capacities in various fields (such as the presence of prestigious universities, multiple fields of study, specialists in the fields, required materials and equipment, large and parent industrial companies,

numerous inventions in the country, etc.) the establishment of knowledge-based companies in the sports field based on electronics knowledge is limited. Economic and entrepreneurial perspectives have been neglected among professors, students, and activists in physical education and sports sciences, giving rise to a small share in the production of knowledge, the creation and acquisition of wealth and income, the creation of jobs, increasing exports, and competitiveness with foreign competitors, and so on. So, it may be concluded that the managers and authorities should take a closer look at the essential circumstances for promoting productive activities and using the abilities of competent and young experts.

Acknowledgments

The authors would like to acknowledge the all the professors and colleagues who collaborated with us in the research interview process.

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