TECHNOLOGY AND INNOVATION AS DRIVERS OF ENTREPRENEURIAL DEVELOPMENT: A CONCEPTUAL AND LITERATURE-BASED APPROACH

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This paper explores the fundamental aspects of technology and innovation in entrepreneurship, highlighting their essential role in business development and success. The study begins with a synthesis of relevant literature, providing a solid theoretical framework on the interdependence between technology, innovation, and entrepreneurship. It analyses how technology and innovation support entrepreneurs by enhancing competitiveness, adaptability, and sustainable value creation. The chapter on technological entrepreneurship emphasises the characteristics and strategies of entrepreneurs leveraging emerging technologies to develop innovative products and services. Innovation is discussed as a key factor for entrepreneurial success, highlighting the benefits of effective innovation strategies as well as potential risks or drawbacks. Different types of innovation are analysed in terms of their impact on decision-making processes and organisational performance. Finally, the paper examines the further expansion of technological entrepreneurship and innovation, focusing on emerging trends and the role of innovative strategies in helping companies adapt to rapid changes in economic and technological environments.

***Keywords**: entrepreneurship, innovation, technological entrepreneurship, innovation strategy, competitiveness.*

JEL Classification Codes: L26, O31, O32

1. INTRODUCTION

In recent decades, entrepreneurship and technological innovation have become two of the most debated and analysed economic and social phenomena. They are no longer seen merely as tools for individual or organisational development, but rather as true catalysts of global economic progress. In a world shaped by rapid transformations, accelerated digitalisation, and intense competition, the ability to generate innovative ideas and transform them into viable business models is essential for creating added value and maintaining competitiveness.

According to the Global Entrepreneurship Monitor (2023), approximately 14.2% of the adult population worldwide is involved in early-stage entrepreneurial activities, confirming the upward trend of this phenomenon. At the same time, investments in research and development (R&D) have reached record levels: OECD data (2022) show that member states allocated on average 2.7% of GDP to innovation and technological development, with Japan and South Korea even surpassing the 3% threshold. These statistics reflect not only the strategic importance of innovation for governments and companies, but also the growing pressure on entrepreneurs to capitalise on opportunities offered by digital transformation and the transition to a green economy.

In the academic literature, Schumpeter (1934) was one of the first scholars to highlight the role of the entrepreneur as an "agent of change," capable of turning innovative ideas into products and services with economic and social impact. Later, researchers such as Brem (2011) and Burgelman et al. (2004) emphasised that the relationship between entrepreneurship and innovation is not linear but rather complex, involving both significant risks and substantial benefits. For example, a report published by Investopedia (2019) shows that the failure rate of start-ups remains very high – nearly 90% do not survive in the long term, with 21.5% failing in their first year. However, it is precisely this uncertainty that generates the premises for new forms of adaptation, perseverance, and creativity.

Another defining aspect of the contemporary era is the role of entrepreneurial ecosystems. The concept of "entrepreneurial ecosystem" refers to the set of institutional, cultural, and economic factors that foster private initiative and support the innovation process. Universities, research centres, governments, and private investors play complementary roles in this process. Programs such as Horizon Europe or Start-Up Nation are concrete examples of public policies and European initiatives designed to stimulate the emergence and growth of innovative start-ups.

Furthermore, globalisation and digitalisation have contributed to the creation of a borderless entrepreneurial environment. New technologies, ranging from artificial intelligence and blockchain to the Internet of Things and biotechnology, offer unprecedented opportunities for entrepreneurs who are able to identify niches and propose disruptive solutions. According to the World Economic Forum (2022), more than 70% of business leaders believe that emerging technologies will completely reshape business models over the next decade.

Thus, technological entrepreneurship is not only an expression of an innovative spirit but also a necessity in addressing global challenges: climate change, energy transition, digitalisation of education, and the adaptation of labour markets. It represents a dynamic process that involves opportunity recognition, resource mobilisation, risk-taking, and the creation of sustainable solutions. In an interconnected global economy, technological entrepreneurs are not only economic actors but also agents of social and cultural change.

In conclusion, entrepreneurship and technological innovation form an inseparable tandem with a major impact on economic development, competitiveness, and societal progress. Their analysis requires a multidisciplinary approach, integrating economic, technological, social, and political perspectives to shape future directions of action.

In the first part, this article synthesises the relevant literature on technology, entrepreneurship, and innovation, providing a conceptual foundation for understanding their interconnections and impact on economic development. The discussion begins by reviewing previous research to highlight how technological innovation has become a global driver of new business opportunities and employment creation. It then examines the role of technology and innovation for entrepreneurs, emphasising how these elements enhance competitiveness, productivity, and the ability to identify and exploit emerging opportunities. The subsequent section focuses on technological entrepreneurship, exploring how entrepreneurs combine knowledge, resources, and creativity to develop new products, enter new markets, and generate economic value. Following this, the article addresses innovation as a key factor for entrepreneurial success, discussing its implementation, challenges, and contribution to sustained growth. Finally, the analysis expands on the broader implications of techno-entrepreneurship and innovation, considering future directions and potential applications, thereby establishing a

comprehensive framework for understanding the dynamic relationship between technology, innovation, and entrepreneurial development.

2. THE SYNTHESIS OF THE RELEVANT RESEARCH LITERATURE

This paper further analyses three significant aspects: technology, entrepreneurship, and innovation. Ulijn and Brown (2004) underline that when we refer to technological innovations, we do not focus only on the start-ups, where an estimation denotes that 75% of the new jobs and employment are created here. Technological innovation represents a global phenomenon.

In order to reach economic development, the main objective is represented by the creation of jobs. According to Lalkaka (2001), "in the 1950s […] was a widespread belief that state-sponsored industrialisation would generate enough employment to absorb excess agricultural labour and new additions to the work force". That is to say that seven decades ago, there were not as many industrial sectors within the developing countries as there are nowadays, meaning that the state-owned industries did not offer productive employment opportunities.

In addition, it can be noted that, at present, the recognition level of entrepreneurship as a tool for creating jobs and impacting economic growth has increased internationally. As the population increased in the last years, reaching almost eight billion people, the workforce must be proportionally increased because there are countries where unemployment is high. One of the reasons for this indicator is given by the lack of jobs.

Technological entrepreneurship was seen as a significant source of innovative and good jobs by Lalkaka (2001). In other words, when technology had not yet arisen as an industry, it was well-known that when it evolves, it will have a considerable impact on economic growth and employment rates worldwide.

Although the development of an innovative idea may lead an individual to pursue entrepreneurship, it does not necessarily ensure success. Moreover, many of these start-ups fail, highlighting the need for a resilient mindset capable of withstanding negative outcomes.

An entrepreneur represents the key that leads the economy to continuous innovation. Schumpeter (1934) describes the entrepreneur as an individual who gains an idea, which is furthermore turned into economic knowledge. For example, we can mention the automotive industry, where the cars did not emerge until the entrepreneur Ford in America and Benz in Germany transformed their technical knowledge and innovative ideas into viable, finished products. Moreover, this is just an example. We can go further into each industry to denote that entrepreneurial innovation was a factor in expanding markets and industries.

As the paper focuses on showing the correlation between entrepreneurship and innovation, these two fields were seen from different perspectives and were treated with different economic approaches for many years. Innovation is considered to be an important factor within the competition of companies in general, while entrepreneurship represents an important factor for accelerating economic growth, according to Brem (2011).

Schumpeter (1934) offers one of the first and most famous definitions of innovation, which are presented below:

- ✓ introduction of a significant improvement within the quality of an existing product or service;
- ✓ introduction of a new method of production;
- ✓ opening of new markets, in new territories;
- ✓ conquest of a new source of supply of raw materials and consumables;
- ✓ creation of new types of industrial organisations.

Therefore, it can be observed that all types of innovation include the word "new"; thus the innovation does not need to represent only something new, an invention, or a creation. Innovation can also be described, as Ford (1996) mentioned in his publication, "innovation is commonly defined in terms of tangible entities that can be utilised by different people on different occasions." Therefore, innovation represents an implementation of creative ideas which add value not only to the products or services to which it is applied, but also to the respective company.

To gain a clearer understanding of the concept of technological entrepreneurship, attention may be directed toward its two primary perspectives. Burgelman (2004) defines technology as the representation of knowledge, both theoretical and practical, encompassing skills, competencies, and artefacts that contribute to the development of products and services, along with their associated production and delivery systems. Furthermore, the concept of entrepreneurship refers to the identification and exploitation of opportunities that have not yet been explored or developed. It involves the creation of new resources or the innovative recombination of existing ones to facilitate the development and commercialisation of new products, thereby enabling firms to access new markets and serve new clients (Hitt, 2001).

Entrepreneurship can be seen as a job requiring creative and innovative traits, as people within this field are ready to take risks to another level and invest heavily in their ideas. Although this is true, much more comes with the entrepreneurship concept, and it is essential to know that entrepreneurship and its derivatives are much more complex. Furthermore, even when an entrepreneur develops a strong idea, it does not necessarily ensure market success.

The startup failure rate remains a significant concern for entrepreneurs and investors alike. Studies indicate that about 90% of startups fail, with varying rates depending on their stage and industry. Early-stage ventures are especially fragile, often struggling with a lack of product-market fit, insufficient funding, and ineffective marketing strategies. Alarmingly, 70% of startups close their doors within two to five years, and 10% don't even survive their first year (Figure 1).

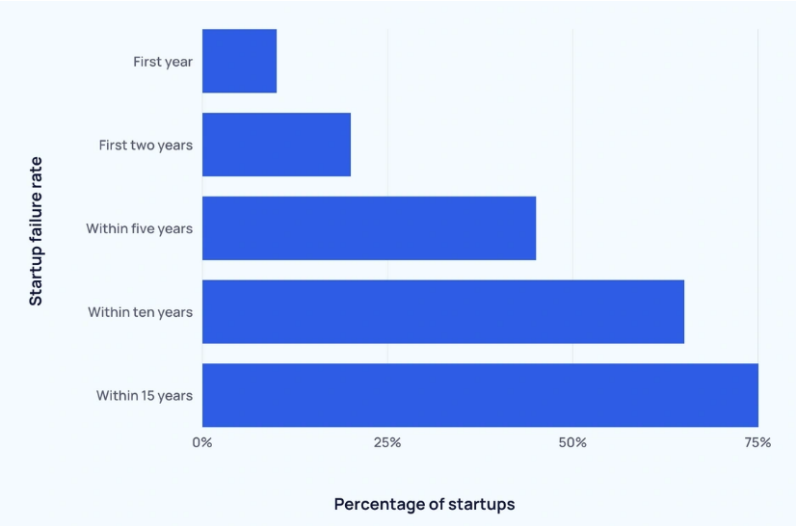

Figure 1. Startup failure rates

Source: Website, *Startup failure stats*. https://explodingtopics.com/blog/startup-failure-stats

Nevertheless, there might be a chance for entrepreneurs to fail in the first year of implementing their ideas. Thus, it is possible to succeed for many years and fail unexpectedly. One significant trait of a skilled entrepreneur is perseverance. This trait develops the creativity and innovation of the entrepreneur, which will bring them to a new concept that may have more success than the previous one. Furthermore, this is a continuous process of an entrepreneur; if we combine it with technology, success is imminent.

3. THE ROLE OF TECHNOLOGY AND INNOVATION FOR ENTREPRENEURS

In order to evaluate and describe the activity of a technological entrepreneur from the first idea that emerged until their current activity, it is mandatory to perform several analysis techniques.

Conditions required for starting a business

In general, the primary condition for starting a business is the existence of an opportunity. However, it is equally important to identify a situation as an opportunity. A prior entrepreneurial experience is desirable, but very few individuals will have it. (Blaga, 2021) Researchers, particularly in the United States, argue that opportunities inherently exist within the business environment, and entrepreneurs merely need to identify and capitalise on them. In contrast, European scholars argue that opportunities are not pre-existing but are created through the entrepreneurial process.

Individuals perceive, analyse and understand what is happening in the business environment. However, we can see that no matter how this issue is dealt with, most are inclined to appreciate that opportunities are not created but exist. The primary distinction lies in how individuals perceive and recognise them. In particular, it is about individuals. *They discover what is going on around them, understand it, and in this way, identify opportunities.* As regards the main conditions that an individual must meet to decide to open a firm, Baron and Ensley (2006) consider the following:

1. A positive financial forecast was developed based on robust fundamental calculations.
2. Favourable expert analyses and evaluations are available in this domain.
3. The business concept demonstrates a high degree of novelty.
4. There exists a market and a consumer base ready to adopt the new product or service.
5. The entrepreneur possesses a strong market intuition and confidence in the potential success of the idea.

4. TECHNOLOGICAL ENTREPRENEURSHIP

Technological entrepreneurship can be described as a complex, continuous phenomenon covering almost all industries and markets worldwide. Moreover, according to Petti (2009), technological entrepreneurship can be further defined as an amalgam of the following concepts:

- Development of new technologies or identification of existing technologies that have not yet been fully utilised.
- Recognition and exploitation of opportunities arising from the application of technology to market needs.
- Advancement and practical implementation of technology.

- Establishment of a new business.

Therefore, using the above definitions, technological entrepreneurship can be imagined as perceiving, finding, and, in any case, making innovative changes from technological developments. The opportunities arising from an entrepreneurial point of view represent a possible creation of future artefacts that may be transformed into technological applications or products combined with technology.

Technological entrepreneurship can be understood as a coordinating process between innovative individuals and market needs. Importantly, the emphasis lies on the process itself. From this perspective, technological entrepreneurship does not solely result from naturally talented individuals; rather, it emerges from the interaction of deliberate individual and collective actions within favourable conditions that allow talented people to contribute effectively. Instead of being purely a matter of natural abilities, these enabling conditions can be influenced, managed, and guided to foster successful entrepreneurial outcomes.

This forms the basis for defining technological entrepreneurship as a process that links technological and innovation development with business creation. It begins with the recognition, or even the generation, of the potential business value of discoveries and technologies, continues with alignment to existing and prospective market needs, and ends with the transformation of emerging opportunities into new products, services, and enterprises.

Considering the key elements mentioned above, we can advance three main components of technological entrepreneurship, as presented in figure 2 below:

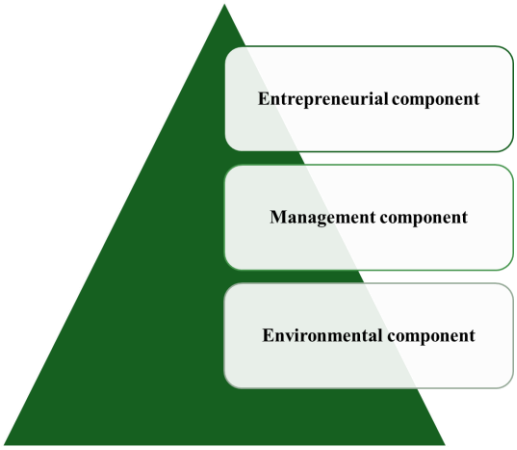

Figure 2. Technological Entrepreneurship Components

Source: Authors' contribution

The first one, the entrepreneurial component, represents the arrangement of activities that people and companies perform to distinguish and identify the particular and problematic capability of arising technologies, innovations, and business opportunities that may not be evident to other people.

Going further to the second component, management, this can be described as the referral to the activities performed by people and companies to build up a convincing offer of quickly entering a market, perhaps with a demonstrated plan of action, to exploit business opportunities discovered.

Finally, we focus on the environmental component, which represents a set of formal and informal supporting foundations, institutions, and assets that create the proper conditions for technology-based actions. These variables incorporate public policies, laws and regulations, resource endowments and industry standards, communities, and supportive public or private institutions.

5. INNOVATION AS A KEY FACTOR FOR ENTREPRENEURS

There are two possibilities in which a company is capable of developing new technology: internally and externally. Research and development are performed internally, while purchasing the respective technology is performed externally. These activities present both advantages and disadvantages, each demanding distinct skill sets. While some companies may engage in both internal and external development efforts, an organisation is more likely to enhance its capabilities predominantly in one domain, either internally or externally.

Innovation refers to the process by which an entrepreneur or a company develops new technologies, products, or services. This concept separates "innovation", which usually occurs internally due to situations where a company gains new technology or a process from an external source. Creating new technology can be affected either positively or negatively by the company's efforts to encourage creativity and innovation. For that reason, developing a new product may take time, which may be denoted as a disadvantage in terms of competition within the market. On the other hand, if the company is willing to purchase new technology, acting externally, it would be much easier and faster to enter the market.

Several companies use both approaches mentioned above, innovating through internal processes and developing technology through external sources. Thus, each of these companies will concentrate and improve on one area more than the other one. It is considered challenging for companies to develop both internal and external processes equally, as numerous factors must be balanced to create an environment that enables the successful generation and adoption of innovation.

Companies are likely to engage in a wide range of ongoing innovation initiatives. These efforts represent a part of the complete integration of attempts to create a new technological product or service. Therefore, for internal innovation planning, a concern arises from the question, "Should we innovate or not?". Entrepreneurs and companies are most likely to address this question.

When an innovative strategy is created, it may bring several benefits. Thus, drawbacks may also arise, with their impact on the company depending on the strategy adopted to address these challenges. The entrepreneurs should balance these benefits and the drawbacks, trying to discover the best outcome for the company. If the entrepreneur has a solid, innovative strategy, the respective individual has researched the pros and cons of their innovative idea.

5.1. Benefits resulted from a good innovation strategy

For the entrepreneur to determine if their innovation strategy is appropriate, they must examine and analyse the potential benefits and drawbacks from a realistic point of view.

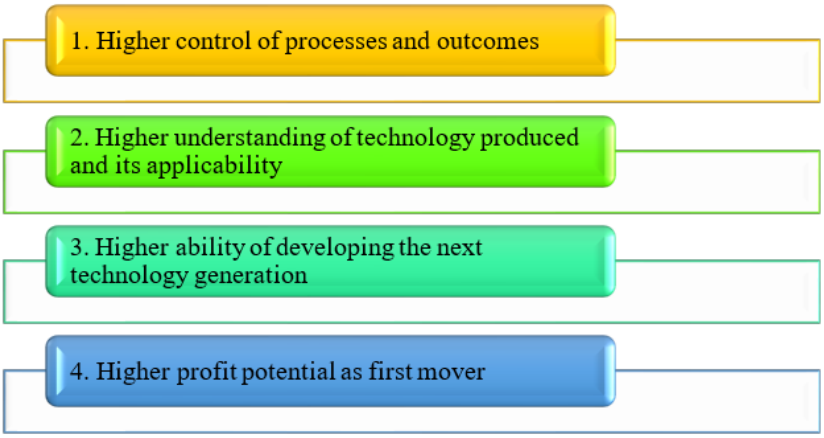

Figure 3. Benefits of innovation strategy implementation

Source: Authors' contribution

Figure 3 highlights four main benefits. The initial three are outcomes that can result from the innovation-related creative process.

For example, understanding how a product or process was developed, including which activities succeeded or failed during the development process, provides valuable insights for an innovative company. Such information can guide the future evolution of the innovation or product, as the firm gains a deeper comprehension of its design and implementation.

Moreover, the innovative company gains a clearer understanding of the steps required to develop a product more efficiently. In this way, the firm can leverage the knowledge obtained through the innovation process to its advantage, one that competitors may find difficult to replicate. These first three benefits provide the company with a competitive advantage by enabling it to build internal capabilities around the emerging innovation, whereas rival firms would need substantial effort and coordination to compete effectively.The fourth benefit of internal innovation, as mentioned above, is achieving first-mover status in the market. This advantage differs from the previous three, as it is influenced more by external factors. A first-mover refers to a company that enters the market or promotes a product, service, or technology before its competitors. Being the first often leads to competitive advantages such as customer loyalty and brand recognition.

These four advantages may pose a significant threat to competitors, as they are often difficult to match or surpass. For example, when a technological product or service involves high switching costs, customers tend to remain highly loyal to the original provider, having already invested in its supply. Additionally, the level of convenience and support provided can make customers hesitant to transition to another company. For example, this factor contributed to IBM's sustained competitive advantage in the computer market for many years. During the 1950s to 1980s, many organizations that required computers were led by executives who were not entirely comfortable with the technology. IBM's exceptional level of customer support helped these managers feel to gain confidence in using IBM computers and systems, thereby fostering strong customer loyalty and reinforcing the company's dominant market position.

5.2. Disadvantages of innovation

When referring to innovation, the first things coming to our minds are the benefits because innovation is commonly correlated with the concept of "new" which has always been attractive to customers. Thus, there may be several reasons not to embrace the internal innovation strategy. Therefore, we mention three main potential disadvantages that may need to be taken into consideration:

Figure 4. Disadvantages of internal innovation

Source: Authors' contribution

The first disadvantage is the time required to develop an internal innovation idea. Therefore, when a new product is purchased, the availability of that product will be immediate for the company. Although, if the development is created internally, the process may even take years of continuous development of the new processes and introduction of the product in the market.

The second disadvantage, which is expected in the entrepreneurial field, is the risk of failure in developing the right product at the right time. There is required rigorous research on the market field of the product, the competitors, and potential customers, for which is recommended to perform several analysis tests, such as Porter's Five Forces, SWOT Analysis, and others.

Finally, there is a higher risk of a competitor entering the market first, which may obtain faster and better acknowledgment of its products. Therefore, it is essential to constantly analyze the current situation of the market before entering it, its competitors, and what products they offer, and perform a comparison which will have. As a result, further development of our product.

Companies that currently hold a significant position in their industries have achieved this status through sustained and rigorous innovation efforts, from product conception to market introduction. However, many of these firms have also faced numerous failures throughout their journey to develop the right product at the right time and successfully bring it to market.

In conclusion, for this analysis of the benefits and drawbacks of implementing an innovative idea, a new product or service, the entrepreneurs must have a comprehensive understanding of these factors, which may affect the entire production process. This understanding should focus not only on the technological field but also on all market's operational parts, such as competitors, customers, and the environment. In other words, the entrepreneur must search and apply all opportunities that may come along with their further

analysis to be efficient and effective. These opportunities must be correlated with the strengths and abilities of the company.

5.3. Types of innovation

As discussed, following the internal innovation concept, once the appropriate strategy is determined, it is essential to determine further what type of innovation must be pursued. Therefore, we can classify innovations from several approaches. Thus, the most common approach is from the product and process innovation perspective, according to White and Bruton (2010).

A. Product Innovation

There are many organizations for which product innovation represents the center of their Research and Development department efforts. Thus, Research and Development may occur separately from the company, and it is most likely that nowadays to be spread throughout the company. For an entrepreneur, the Research and Development process may be performed internally or externally by hiring one or more experts to obtain the best results. The types of innovation efforts discovered here are presented in figure 5.

A.1. Basic Research – Pure Research and Development

This type of innovative effort involves generating new knowledge, which may be novel to the entrepreneur or undiscovered previously. Although such research carries inherent risks, when undertaken at the right moment, it can yield substantial rewards, including the development of new technologies or innovative business models.

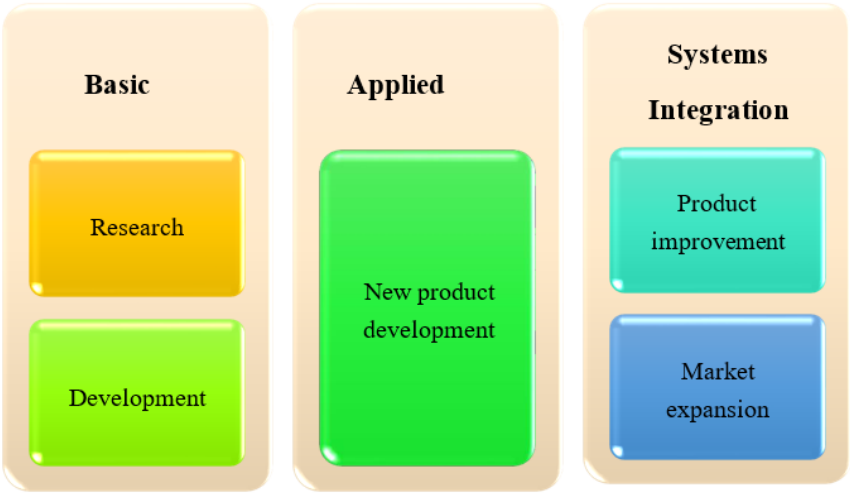

Figure 5. Types of innovation efforts found in R&D process

Source: Authors' contribution

Basic research is fundamentally risky, but it has the potential to provide significant rewards, such as leading to new products or ways of doing business. An innovation strategy aims to create value for the firm and its customers. This goal cannot be forgotten even in basic research. Thus, academic institutions, government agencies, and specialized research labs typically focus on basic research because the value creation for these entities is typically not determined by monetary profit. To illustrate, consider the investigation of laser physics. This

area was developed from work by Albert Einstein and is based on absorption, spontaneous emission, and stimulated emission of electromagnetic radiation. Initially, this research was undertaken to extend our knowledge of how radiation and light interact, not to make products. The basic research in this domain did not immediately lead to new products. Basic science is motivated by the broad curiosity of the researcher, not specific product interests.

A.2. Applied Research – New Product Development

A company then builds on the basic research and conducts applied research. Applied research utilizes the new knowledge developed by basic research to create new products. The development of new products may allow a firm to reposition itself strategically in the industry or to strengthen its prospective market position. As a result, the firm is expected to attain some level of competitive advantage.

Applied research aims to add value to the firm and its customers in the marketplace. The risks of applying this type of research innovation are less than those in basic research, and the probability of success and high reward is moderate. To continue our illustration of laser physics, basic research established the foundation with principles that most individuals do not understand. However, the applications that have emerged from that technology are numerous and familiar to many laser printers, laser knives used in surgery, barcode scanners, and laser light shows.

A.3. Systems Integration Research – Product Improvement or Market Expansion

This third type of R&D is the most incremental. Systems integration aims to support existing business improvements in established products or open new markets with an existing product. This type of integration has low risks and associated rewards. Most risks are negative; not changing can lead to strategic disadvantages.

Many firms refer to this form of innovation as *tweaking*, as it involves refining the way the organization structures and utilizes its existing knowledge to enhance efficiency and effectiveness. Systems integration primarily focuses on the alignment among various organizational components and on improving their compatibility with existing knowledge bases. For instance, medical imaging represents applied research that evolved from fundamental studies in particle physics. Subsequent systems integration research and incremental innovation, or tweaking, followed this foundation. This process has ultimately contributed to advancements such as improved laser printers, enhanced light displays, and more precise surgical laser instruments.

B. Process Innovation

The purpose of process innovation is to increase the efficiencies or the effectiveness of an organization. Changes in processes require the organization and individuals to adapt to the innovations, which can lead to opposition in the organization. However, if properly applied, process innovations offer the organization and its personnel opportunities to improve the organization's value and to continue the organization s viability. Thus, process innovations help to improve the output-to-input ratio of the firm.

The most common actions addressing process innovation are new product development, restructuring, reengineering, and value destruction.

6. FURTHER EXPANSIONS OF TECHNO-ENTREPRENEURSHIP AND INNOVATION

Technological entrepreneurship has become a significant driver of economic and social stability and progress in the last ten years. In order to develop new ventures, generate value, validate and implement new business ideas, entrepreneurs need a competitive business

environment. We name it the entrepreneurial technology ecosystem. Entrepreneurial new venture competitiveness depends on the entrepreneurial ecosystem structure and components.

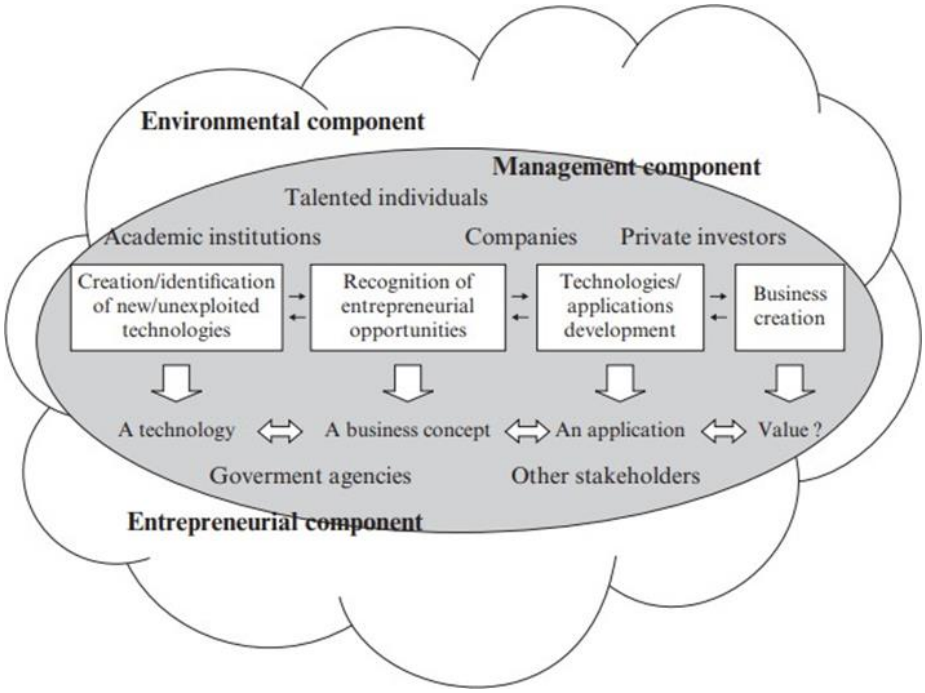

Figure 6. Systemic view of technological entrepreneurship

Source: Petti, C., 2009

Our research presents the main levels of the information technology industry linked with technology entrepreneurial ecosystems. In the second part of our research, we present the entrepreneur's perception of the information technology entrepreneurial ecosystem in the west region of Romania. Our objective was to find out the entrepreneur's point of view about the opportunities and influences they perceive in the regional entrepreneurial ecosystem.

As discussed previously, technological entrepreneurship represents a complex concept. This interesting phenomenon requires deep consideration before reaching definitive conclusions, whether they concern the product or its environment. Moreover, we have briefly described the three main components of technological entrepreneurship, which are presented in figure 6.

Figure 6 illustrates the key considerations of technological entrepreneurship in relation to its components, activities, outputs, and actors.

Promoting Technopreneurs

As the entrepreneurship expansion continues to develop in the tech industry, several steps must be established and implemented, both by external and internal institutions, from the government to the companies themselves, to reduce the possible risks that may arise from not having a sustainable regulation policy and community.

Therefore, the following steps should be taken into consideration in order to promote and have a healthy environment for the technopreneurs, figure 7:

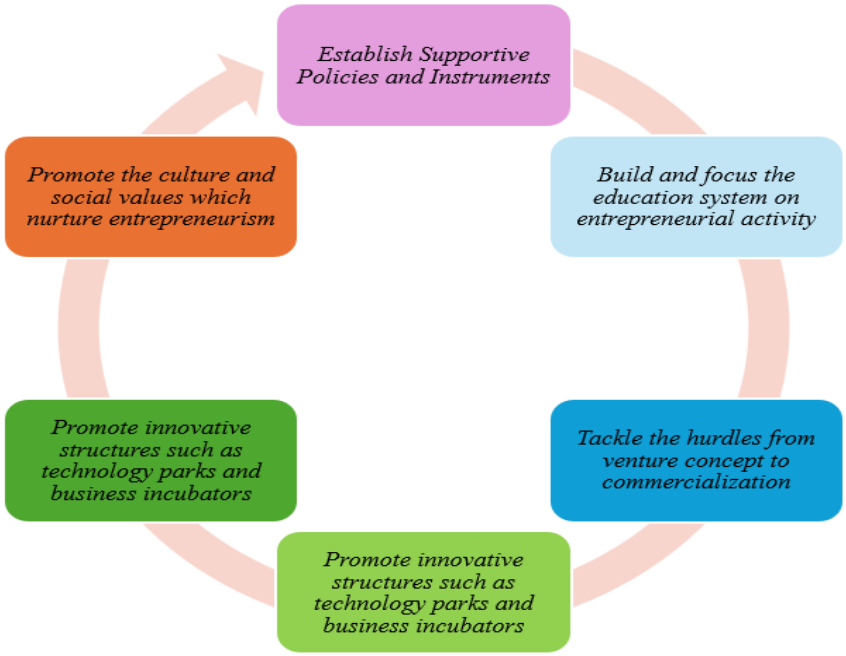

Figure 7. Steps to promote a healthy environment for entrepreneurs

Source: Authors' contribution

A. Establish Supportive Policies and Instruments. Governments are responsible for developing education, research, health care, the entrepreneurial infrastructure, the long-term national competitiveness strategy, and the policy environment to enable a business to do what it knows best, that is, create productive enterprises, employment, and income. Governance calls for shared responsibilities through public-private partnerships. As in the OECD industrial nations, business development services must initially be subsidized at varying levels. Promoting entrepreneurial venturing must be an integral component of state strategies for economic growth.

B. Build and focus the education system on entrepreneurial activity. Investments are essential in strengthening the knowledge and research bases, starting at the primary school level, through tertiary education and vocational training, focusing on the individual capacity required to recognize an opportunity and start and grow a business.

C. Tackle the hurdles from venture concept to commercialization. As noted, the main constraints to innovation are mindset, money, management, and market. The message refers to the flow of information essential for acquiring technology and other key inputs. It is essential to secure broad participation and feedback of views at this mid-point, to enrich the dialogue. In the context of global competition, encountering the rigorous forces of world markets serves as a necessary discipline for countries and firms to become competitive.

D. Promote innovative structures such as technology parks and business incubators. The business incubator and technology park are a good form of support for innovation. Its prime purpose is to facilitate the early-stage entrepreneurial firm move its concept through pilot testing and market entry. While most technology-based businesses do not start in tech parks and business incubators, these structures are growing as they do facilitate the processes of technology commercialization and venture creation when carefully designed and prudently managed.

E. Promote innovative structures such as technology parks and business incubators. In most developed countries, entrepreneurs have access to various sources of financing; however, these

are often managed without sufficient consideration of the mindset and specific needs of inventor-innovators. Moreover, information on how to access such funding is not widely disseminated. Support mechanisms that merit further exploration include angel networks and venture catalysts, which provide small amounts of risk capital, royalty arrangements, in which investors receive late payments based on future sales, and voucher schemes, whereby the small business itself is responsible for securing assistance from an accredited list of consultants, rather than relying on donor- or government-designated providers.

F. Promote the culture and social values which nurture entrepreneurship. This is the responsibility of politicians, the community, the media, and others who can influence attitudes. Social values discourage both failure and rapid success, while reinforcing hierarchical structures. The transformation to an entrepreneurial society is taking place and can be accelerated while keeping traditions alive. As the creators of new ventures are typically young men, the reservoir of entrepreneurs can be enlarged by proactively raising the participation of women and those under age 25 and over 45 years.

In conclusion, the implementation of these stages represents a strategic and systemic approach to strengthening the entrepreneurial ecosystem, promoting the development of a knowledge-based economy grounded in innovation and sustainable competitiveness, in which technology, education, and entrepreneurial culture mutually support each other to generate long-term economic and social progress.

7. CONCLUSIONS AND RECOMMENDATIONS

The analysis of technology, entrepreneurship, and innovation highlights their interdependence and the critical role they play in fostering economic growth and job creation. The literature indicates that technological innovation is a global driver of new business opportunities and employment, particularly through start-ups. Entrepreneurship, in turn, functions as the primary mechanism through which innovative ideas are transformed into viable products, services, and market solutions. Historical and contemporary perspectives demonstrate that while state-led industrialization once served as the main source of employment, modern economies increasingly rely on entrepreneurial activity to address population growth and high unemployment rates.

The study’s conclusions reinforce that entrepreneurship, although inherently risky, is essential for economic development. High start-up failure rates underscore the importance of resilience, adaptability, and continuous innovation. Entrepreneurs who effectively combine technical knowledge with creative thinking not only contribute to the growth of their businesses but also stimulate market expansion and industrial development. This highlights the need for cultivating entrepreneurial mindsets that embrace risk, learn from failure, and pursue iterative innovation.

Based on these insights, the first recommendation is to promote technological entrepreneurship. Policymakers and institutions should develop support programs that facilitate access to emerging technologies, provide funding opportunities, and create innovation-friendly regulatory frameworks. By doing so, entrepreneurs are empowered to leverage technology to generate innovative solutions and sustainable employment.

Second, there is a clear need to foster a culture of innovation within businesses and society at large. Entrepreneurs should be encouraged to implement creative ideas that generate

tangible value for products, services, and the wider economy. Initiatives such as innovation workshops, incubators, and collaboration platforms can enhance knowledge exchange and accelerate the practical application of ideas.

Third, entrepreneurial education and mindset development should be prioritized. Training programs should focus on resilience, strategic thinking, problem-solving, and risk management, equipping entrepreneurs with the necessary skills to navigate uncertainty and transform setbacks into growth opportunities. Such programs can help reduce the negative impact of start-up failures and enhance the likelihood of long-term success.

Finally, it is essential to facilitate access to critical resources, including mentorship, professional networks, technical knowledge, and capital. Entrepreneurs who can identify, combine, and exploit opportunities with these resources are better positioned to commercialize innovative products, enter new markets, and scale their businesses. Coordinated support from policymakers, educators, and industry stakeholders is crucial to maximize the impact of entrepreneurship and innovation on economic growth and employment.

By integrating these strategies, economies can harness the synergy of technology, innovation, and entrepreneurship as a powerful engine for sustainable development, market expansion, and the creation of meaningful employment opportunities.

Overall, the findings emphasize that successful technological entrepreneurship relies on a dynamic balance between innovation, strategic collaboration, risk management, and sustainability. Companies that effectively integrate these dimensions are better positioned to achieve long-term growth, influence industry standards, and contribute to a more sustainable and technologically advanced future.

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