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Economic Intelligence and Scientific Innovation: A Synergy Model for Competitiveness and Sustainability

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Abstract: In today's fiercely competitive economic landscape, economic intelligence (EI) and scientific innovation have emerged as pivotal drivers for enhancing competitiveness and ensuring the longevity of organizations. This research delves into the intertwined nature of economic intelligence and scientific innovation, emphasizing how EI offers strategic insights to steer scientific research, while scientific innovation enriches economic intelligence with real-world data and specialized expertise. This synergy fosters a deeper comprehension of the competitive milieu, stimulates innovation, and facilitates well-informed strategic choices, ultimately bolstering competitiveness and fostering the sustainability of organizations.

Keywords: Economic intelligence; scientific research; innovation; strategic decision.

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1 Introduction

In an ever-changing economic environment, scientific research and innovation are essential pillars of an organization's competitiveness and sustainability. Within this context, Economic intelligence (EI) is emerging as a strategic asset for optimizing these critical processes. Economic Intelligence, with its systematic approach to gathering, analyzing, and leveraging pertinent information, offers a valuable framework for guiding strategic decisions and fostering innovative capacity. However, to fully harness EI's potential in scientific research, it is imperative to develop a robust theoretical model that elucidates and formalizes the relationship between these two domains.

This study seeks to comprehensively explore the synergy between Economic intelligence and scientific innovation, identifying potential synergies and elucidating underlying mechanisms. To achieve this, we propose the development of a theoretical model that integrates key concepts of economic intelligence with the dynamics of

scientific innovation. This model will establish a solid conceptual foundation for analyzing and comprehending how EI can effectively support and enhance scientific research.

By establishing a sound theoretical model to elucidate the interplay between Economic intelligence and scientific innovation, this study aims to provide valuable insights for bolstering organizations' competitiveness and sustainability. By integrating EI into the scientific innovation process, we aspire to cultivate an environment conducive to long-term prosperity, where scientific research and innovation are central drivers of economic and social advancement.

2 Theoretical and conceptual aspects

Economic Intelligence (EI) and scientific research are pivotal elements for economic and technological advancement. A comprehensive understanding of their theoretical and conceptual underpinnings is essential to appreciate their interconnection and their profound impact on innovation and competitiveness.

2.1 Economic intelligence

Economic intelligence (EI) is a strategic process aimed at collecting, analyzing and exploiting relevant information to guide decision-making in a competitive environment (Kalika & Pecqueur, 1997). This multi-dimensional discipline encompasses strategic intelligence1, competitive analysis, knowledge management and technology transfer (Guilhon, 2000). Houillon (2009) emphasizes that the practice of EI requires ethical management of information and effective integration into corporate strategies.

Economic intelligence can help to focus scientific research on priority and promising areas by identifying market needs, emerging trends and innovation opportunities (Gilad & Gilad, 2009). By using strategic and technological intelligence techniques, organizations can anticipate market developments and adjust their research programmers accordingly (Prescott & Miller, 2002).

In addition, EI can facilitate collaboration between researchers and private sector players, by encouraging the transfer of knowledge and technology between universities, research laboratories and companies (Chesbrough, 2003). This collaboration can lead to fruitful partnerships and applied research projects that meet the real needs of industry while stimulating innovation (Teece & Pisano, 1994).

In conclusion, economic intelligence is a multidimensional concept that has been defined and interpreted in different ways by different authors over time. To better understand this diversity of perspectives, we have compiled a selection of definitions of economic intelligence proposed by different researchers and practitioners in the field. These definitions reflect the nuances and varied aspects of economic intelligence, highlighting its importance in different contexts and sectors.

1. **Table:** Some definitions of economic intelligence.

Authors	Definition of a Relationship
Dufour & Chiffoleau (2002)	Economic intelligence drives innovation by identifying opportunities and anticipating threats in the marketplace, enabling organizations to make strategic decisions to support scientific research.
Héritier & Dubois (2008)	Economic intelligence facilitates collaboration and the transfer of knowledge between researchers and companies, thereby contributing to innovation and the advancement of scientific research.
Forcadell & Guadamillas (2002)	Economic intelligence provides researchers with relevant information on the market, competitors and technological trends, which fuels innovation and stimulates scientific research.
Blay-Fornarino et al. (2005)	Economic intelligence supports scientific research by identifying potential partners, facilitating collaborations and promoting knowledge transfer, leading to increased innovation.

Source: Attaman P, 2000

[1] A unit that collects strategic information in order to anticipate developments and innovations (LESCA, Humbert, 2004).

This table presents different perspectives on the relationship between economic intelligence, innovation and scientific research, providing an overview of the various ways in which these concepts interact.

2.1.1 Economic intelligence process

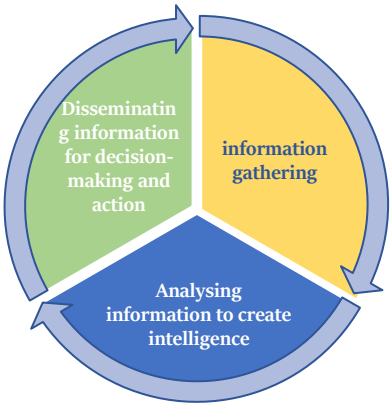
Economic intelligence is an essential strategic process for organizations in an ever-changing competitive environment. There are several key stages in this process, from gathering and analyzing strategic information to using it to inform decision-making.

First, gathering information is a fundamental step in business intelligence. It involves actively monitoring relevant sources of information, such as the media, sector reports, specialist databases and social networks. This can be done systematically using strategic and technological intelligence tools (Gilad & Gilad, 2009).

Once the information has been collected, it needs to be analyzed to extract relevant insights. Information analysis can include techniques such as market analysis, risk assessment, stakeholder mapping and competitor analysis. This stage transforms raw data into actionable knowledge (Prescott & Miller, 2002).

Finally, the strategic information obtained must be used effectively to influence decision-making within the organization. This may involve selectively disseminating information to relevant stakeholders, formulating strategic recommendations based on the insights gained and implementing action plans to capitalize on the opportunities identified (Blumentritt & Johnston, 2003).

Figure 1: Intelligence cycle



Source: (Bernat, 2001)

In short, the business intelligence process is based on an iterative and continuous cycle, where each stage contributes to the collection, analysis and use of strategic information to guide organizational decisions[2].

2.2 Scientific research

Scientific research is the fundamental basis of the quest for knowledge and understanding of the world around us. This section explores in depth the theoretical and conceptual aspects of scientific research, providing valuable insights into its processes, methodologies and contributions to society.

Scientific research relies on rigorous methodologies and systematic processes to generate new knowledge. Latour and Woolgar (1979) provide a detailed overview of how scientific knowledge is constructed in laboratories, highlighting the importance of social interactions and validation processes in the construction of scientific facts.

Kuhn (1962) proposes the theory of scientific revolutions, suggesting that science progresses through paradigm shifts, where new theories replace old ones and thus transform our understanding of the world. This perspective underlines the dynamic nature of scientific research and the importance of moments of rupture in the development of scientific knowledge.

In contrast, Feyerabend (1975) challenges traditional scientific methodologies, arguing for a more flexible and pluralistic approach to research. In his view, a diversity of perspectives and approaches is essential to foster innovation and creativity in science.

2.3 The theoretical relationship between economic intelligence and scientific research

Understanding the relationship between economic intelligence (EI) and scientific research is of crucial importance in the context of innovation and economic development. This section aims to deepen our understanding of this relationship by exploring the underlying theoretical foundations.

According to this perspective, developed by researchers such as Richard Nelson and Sidney Winter in their book "An Evolutionary Theory of Economic Change", EI and scientific research can be seen as interconnected components of a wider system. In this system, EI encompasses the processes of gathering, analyzing and using strategic information to support decision-making in an economic context, while scientific research generates new knowledge and innovations that contribute to economic growth and competitiveness (Nelson & Winter, 1982).

Similarly, scientific research benefits from EI by focusing its efforts on areas of strategic interest to the economy and society. By using EI principles such as business intelligence and competitive analysis, researchers can identify the priority needs of industry and society, directing their work towards practical and applicable solutions (Keenan et al., 2011).

The interactions between EI and scientific research are multiple and bidirectional. For example, the results of scientific research can inform EI strategies by identifying new business opportunities or anticipating market trends. Similarly, the needs and challenges encountered in the context of EI can guide scientific research priorities, focusing on areas of innovation relevant to the organization (Marchand & Tremblay, 2006).

3 Applications of economic intelligence to scientific research

The integration of business intelligence (EI) into scientific research offers new perspectives for stimulating innovation and competitiveness. This section explores the various applications of EI to scientific research, highlighting its implications and potential benefits.

3.1 Emerging trends in scientific research

Economic intelligence (EI) plays an essential role in the strategic direction of scientific research by identifying emerging trends and facilitating in-depth competitive analysis. According to Keenan et al (2011), economic intelligence is crucial for anticipating future developments in scientific research. By closely monitoring technological advances and competing innovations, researchers can better understand market opportunities and threats, thereby guiding their investment and research decisions.

Competitive analysis, highlighted by Tidd and colleagues (2001), and technological intelligence, emphasized by Cooke (2002), play a crucial role in maintaining innovation in scientific research. In addition, the work of Makridakis (1997) highlights the use of EI methods such as scenario analysis to anticipate future trends. Rothwell and Zegveld (1985) also stress the importance of understanding competitive advances in order to strategically position research efforts. In conclusion, the integration of business intelligence provides an essential framework for guiding strategic decisions and maximizing the impact of scientific research on innovation and competitiveness.

3.2 Positioning and strategic competition

In the field of scientific research, positioning and strategic competition play a crucial role in determining the impact and relevance of research work. According to Mintzberg et al (1998), an in-depth competitive analysis is essential for understanding the forces at play in the research field and for establishing effective strategies for maintaining a competitive advantage.

By evaluating competing research, researchers can adjust their efforts to better position themselves in the scientific marketplace. Barney (1991) emphasizes the importance of unique resources in maintaining a competitive advantage, while Chesbrough (2003) stresses the need for collaboration to accelerate innovation. Prahalad and Hamel (1990) highlight the essential skills needed to dominate a field, while Grant (1996) emphasizes the alignment of research efforts with organizational objectives. Finally, Chesbrough (2006) promotes open innovation to stimulate creativity. By adopting a strategic vision and exploiting opportunities for collaboration, researchers can strengthen their impact and contribute to the advancement of knowledge.

3.3 Knowledge management and technology transfer

In scientific research, knowledge management and technology transfer are essential levers for maximizing the impact and relevance of research work. According to Davenport and Prusak (1998), knowledge management is

the identification, capture, sharing and effective use of knowledge within an organization. This approach aims to create an environment conducive to learning and innovation, thereby encouraging better use of available intellectual resources.

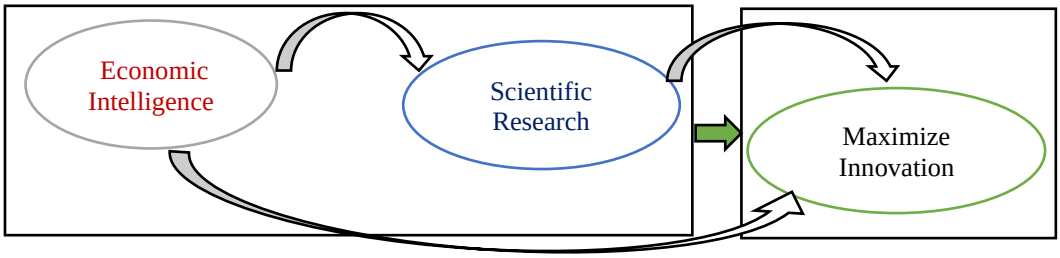
Technology transfer is the process by which scientific and technological knowledge is disseminated and applied in different contexts. Teece and Pisano (1994) highlight the importance of this process in economic and social development, emphasizing that technology transfer enables knowledge to be converted into economic value, thus contributing to growth and progress.

Knowledge management and technology transfer are crucial in scientific research to enhance the value of results and encourage their adoption. According to Grant (1996), successful organizations capitalize on their knowledge base and disseminate it effectively to remain competitive and stimulate innovation. Similarly, Chesbrough (2003) stresses the importance of openness and collaboration in accelerating the pace of innovation by encouraging the sharing of knowledge and technologies. Thus, by creating a culture of sharing and establishing strategic partnerships, organizations strengthen their capacity to innovate and meet contemporary challenges, thereby contributing to economic and social progress.

4 The theoretical model

This article explores the relationship between economic intelligence and scientific research, highlighting how business intelligence can be a key driver for maximizing scientific innovation. By integrating economic intelligence principles and practices into scientific research, organizations can optimize their innovation process, anticipate market trends and strengthen their competitiveness. This model therefore comprises three main areas, each of which is essential to the success of this integration.

Figure 1: Proposed theoretical model



Source: By us

4. 1 Operationalization of variables

The operationalization of the variables of strategic intelligence, competitive analysis, knowledge management and collaboration is of particular importance in the context of scientific research, where the acquisition and management of information are essential to support innovation and the discovery of new knowledge.

Domain 1: Scientific Research Strategies

This first domain can be defined through three main variables. According to Prescott and Miller (2002), strategic intelligence plays a crucial role in an organization's ability to remain competitive in a dynamic environment. It makes it possible to anticipate market trends and make informed decisions, thereby offering a significant competitive advantage. Effective strategic intelligence in scientific research involves constant monitoring of academic literature, patents, conferences and research funding initiatives. This approach enables researchers to identify gaps in existing knowledge and target their research efforts strategically.

In the same vein, Gilad (2009) highlights the importance of technology watch in anticipating technological developments and market needs. This ability to actively monitor the technological landscape enables researchers to stay at the cutting edge of scientific advances and seize emerging opportunities for innovation.

Competitive analysis is also another variable that is part of this dimension. Also has importance for scientific research, particularly in areas where competition for resources and academic recognition is intense. According to Porter (1980), thorough competitive analysis allows researchers to understand the work of their peers, identify

emerging research trends, and position their own work relative to that of the competition. This can be crucial for securing funding, publishing in prestigious journals and establishing successful collaborations.
Finally, effective knowledge management in scientific research involves creating communities of practice, documenting tacit knowledge, and using knowledge sharing tools such as the Nonaka and Takeuchi research databases (1995).

Domain 2: Collaboration and Valorization
The second area, collaboration and valorization, constitutes an essential pillar in the relationship between economic intelligence (EI) and scientific research. This area, measured perhaps by three important variables such as inter-institutional alliances, public-private partnerships and international initiatives, offers immense potential to boost advancements in research.
As Cummings and Kiesler (2007) point out, collaborations between institutions provide the unique opportunity to leverage complementary resources and skills, thereby fostering an environment conducive to interdisciplinary discoveries and advances. Such synergies between researchers make it possible to address complex issues in a more holistic and effective manner.
Furthermore, public-private partnerships, as demonstrated by Adler and Kwon (2002), constitute a fertile ground for knowledge sharing between the public and private sectors. These collaborations allow researchers to access private resources and infrastructure, while companies benefit from scientific expertise to develop innovative technologies and products.
To conclude, international collaborations, as described by Narin et al. (1997), open new perspectives by promoting the exchange of ideas and knowledge on a global scale. These partnerships transcend national and cultural borders, thus enriching the panorama of scientific research and contributing to meeting global challenges.

Domain 3: Ethics and Security
In the context of scientific research, ethics and security play a crucial role in ensuring the integrity and legitimacy of research work. Adherence to ethical standards is essential to ensure the well-being of human participants, prevent conflicts of interest, and maintain public trust in scientific research (Resnik, 2011). Researchers must therefore ensure that their research practices respect fundamental ethical principles, in accordance with institutional guidelines and established professional standards.
At the same time, data and infrastructure security is a major concern in an increasingly digital research environment. Research data, whether sensitive or not, must be protected against unauthorized access, alteration and loss (Pearson et al., 2010). Robust IT security measures, such as implementing firewalls, network monitoring and user awareness, are essential to reduce the risks of data security breaches.

5 Conclusion

In conclusion, integrating business intelligence into the scientific research process offers significant opportunities to strengthen the competitiveness of organizations. By exploiting strategic information, fostering collaboration and optimizing knowledge management, organizations can accelerate their innovation process and adapt effectively to a constantly changing economic environment. However, to take full advantage of this synergy, it is essential that organizations invest in the right infrastructure and processes, while fostering a culture of collaboration and continuous learning. By adopting a proactive and strategic approach to business intelligence, organizations can not only remain competitive in the global marketplace, but also make a significant contribution to the creation of knowledge and the resolution of societal challenges.

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