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Innovation Financing for Knowledge-Based Startups: New Strategies to Support Growth and Sustainability

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ABSTRACT

This study aims to shed light on knowledge-based start-ups that play a fundamental role in the contemporary economy, relying on innovation, technology, and intellectual capital to achieve a competitive advantage, and to address the most important modern financing strategies, especially those related to start-ups. One of the most important challenges facing the growth and development of these institutions is obtaining the necessary financing. Therefore, innovative financing has emerged as a solution to support these companies and ensure their continuity.

Keywords: Startups, Knowledge, Innovative Finance.

Introduction:

Knowledge-based start-ups are firms that rely primarily on knowledge and innovation to deliver new products or services. These firms are characterized by a focus on research and development, a reliance on intellectual capital, and the ability to adapt to rapid market changes.

The concept of knowledge economy is closely linked to the concept of start-ups. Traditionally, the challenge has always revolved around collecting and developing the financial and material side, which was the real engine for developing institutions and achieving their goals. Knowledge is a power and a source of competitive advantage. Financing is also one of the challenges that determine the failure or success of start-ups, as these institutions need capital to finance research and development, launch products, and expand into markets.

From the above, the following main problem can be raised:

What are the innovative financing strategies relied upon by startups based on the knowledge economy?

In order to achieve the goal of identifying emerging institutions operating in the knowledge economy and the methods and challenges of financing them, we will pose some questions as follows:

- What is the concept of start-ups? What are their characteristics?
- What are the problems and obstacles that knowledge-based start-ups face?
- How important is innovative financing for knowledge-based start-ups?

1. Knowledge-Based Startups concept:

1.1. Definition of startups: There are many definitions given to startups, including:

- « Startups are newly established companies that work on developing an innovative idea, product or new service, relying on technology to achieve rapid growth and expansion in the market ».[1]

[1] World Bank Report (2018). *The Innovation Paradox: Developing-Country Capabilities and the Unrealized Promise of Technological Catch-UP.*

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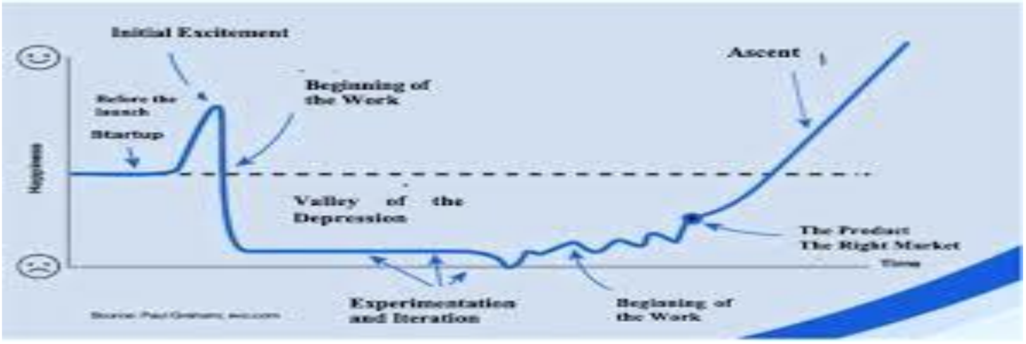
- **Steve Blank defined** « it as a temporary organization that searches for an economic model that allows growth, is repeatedly profitable and can be measured. It tests different economic models, discovers its environment and gradually adapts to it ».[2]
- **Organisation for Economic Co-operation and Development defined**: it as « A startup is a newly established business that relies on innovation and technology strategies to enhance its competitive advantage in the market ».[3]

Through the above, a startup can be defined as an organization that seeks to rely on innovation and technology in its activities in order to achieve rapid growth and success.

Startups go through several stages of growth, from idea to sustainability and sustainable growth. These stages vary from one company to another, but they usually follow the following path:

Figure 01: startup curve.



Source: Paul Graham, startup happinesscurve, http://t.co/P1FDc1MCUB".

The **Startup Curve**, developed by **Paul Graham**, illustrates the typical emotional and financial journey of a startup. It highlights the ups and downs that founders experience, showing that startup growth is rarely linear.

1. The "TechCrunch of Initiation" (Initial Euphoria)

- The startup launches with excitement and optimism.
- Founders receive early praise, media attention, and maybe some initial funding.
- There is a belief that the startup will succeed quickly.

2. The "Trough of Sorrow" (Reality Hits)

- After the initial buzz, startups face **slow adoption, revenue challenges, and unexpected issues**.
- Many startups **struggle to achieve Product-Market Fit (PMF)**.
- Cash flow problems arise, and some co-founders may leave.
- This is where many startups **fail** or pivot.

3. The "Wiggles of False Hope"

- The startup experiments with new features, marketing strategies, or customer segments.
- Occasional small wins create **false optimism**, but they are followed by setbacks.
- The company is still **not fully sustainable** but sees glimpses of success.

4. Product-Market Fit & Promising Growth

- The startup finds **the right product-market fit**, leading to steady customer adoption.

[2] Blank, S., & Dorf, B. (2012). *The Startup Owner's Manual: The Step-By-Step Guide for Building a Great Company.*
[3] OECD (2010). *High-Growth Enterprises: What Governments Can Do to Make a difference.*

- Revenue starts growing, and investors show **renewed interest**.
- Scaling efforts begin, and operations become more structured.

5. The Climb to Success (Sustained Growth)

- The startup achieves **consistent revenue growth and customer retention**.
- It starts attracting bigger investors or considers an **exit strategy (IPO, acquisition, or expansion)**.
- The company moves from survival mode to a **dominant market player**.

1.2. Characteristics of startups: Start-ups are distinguished by the fact that they base their business on pioneering ideas and follow market needs in a smart and modern way. Among their most important characteristics, we will mention the following:

- **Creativity and innovation:** Startups are distinguished by their ability to develop services and products existing in the market based on innovative solutions and modern technology.

- **The ability to rapidly grow and expand:** Emerging institutions seek to achieve growth at the internal and external market level, by building partnerships and cooperation with new investors or expanding the business with existing investors.

- **Creating new job opportunities:** directly through the innovators of the institutions, or indirectly through their use of other people.

- **Requires low costs:** The Start-ups is characterized by the ability to invest at low costs compared to the profits it obtains quickly and suddenly.[4]

Therefore, start-ups are characterized by rapid growth and expansion, in an innovative and flexible manner, and by adapting to changes occurring in the market by facing challenges and exploring and exploiting available opportunities.

1.3. The importance of startups: Startups play an effective role in promoting the economies of countries, as they contribute to raising the gross domestic product and accelerating the growth process in an innovative and effective manner.

1.4. Definition and importance of knowledge-based start-ups: Knowledge-based start-ups are entrepreneurial firms that rely on the production, transfer, and use of knowledge as a primary source of value creation and innovation. These firms are characterized by their focus on research and development, advanced technologies, and intellectual capital as key drivers of their growth.[5]

Among the characteristics of emerging knowledge-based institutions are:[6]

- **Driven by innovation:** It relies on modern technologies such as artificial intelligence, big data, and biotechnology.

- **High intellectual capital:** They employ experts and scientists, by relying on the output of universities, research centers, or technology business incubators.

- **Scalability:** They have a business model that can be easily scaled globally.

- **Knowledge transfer:** By focusing on the knowledge economy, they are active in sectors such as artificial intelligence.

1.5. Knowledge index for startups: The Knowledge Index for Startups is a measure that reflects the extent to which startups rely on knowledge, technology and innovation in their operations and growth.

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[4] Jeanne Ross, « Act Like a Startup », January 11, 2019, available at: https://sloanreview.mit.edu/article/act-like-a-startup/.

[5] Md. Ashikuzzaman, « What is a Knowledge-Based Economy? Key Concepts and Insights » , 2024, available at: https://www.lisedunetwork.com/what-is-a-knowledge-based-economy/.

[6] Franco Malerba & Stefano Brusoni, Perspectives on Innovation , Publisher: Cambridge University Press, 2007, p.353.

This index is used in the knowledge economy to measure the efficiency and ability of startups to generate and exploit knowledge to achieve a competitive advantage.

The **most important elements of the Knowledge Index** for Startups are:

- Research and Development (R&D): the percentage of spending on scientific research and innovation.

- Human capital: the availability of specialized competencies and skills in the organization.

- Digital transformation: the use of modern technologies such as artificial intelligence and data analysis.

- Intellectual property: the number of patents and licenses registered for the organization.

- Academic partnerships: cooperation with universities and research centers.

- Innovative financing: the extent of reliance on non-traditional sources of financing such as venture capital and crowdfunding.

- Growth and sustainability: the rate of expansion of the organization and its ability to adapt to changes.

Thus, the **importance of the Knowledge Index** in the knowledge economy for startups can be summarized as follows:

- Helps governments and investors assess the readiness of startups for growth and innovation.

- Enhances the ability of startups to compete globally by adopting knowledge and technology.

- Encourages increased investments in research and development, which supports the growth of the digital and knowledge economy.[7]

1.6. Ranking of knowledge-based startups by the Knowledge Index: We mention some of them in Table No. 01. Where the index value is from 0 to 100.

Tabla 01: **Ranking of knowledge-based startups by the Knowledge Index for 2024.**

country	rank	value
sweden	1	68.28
denmark	4	66.84
United kingdom	8	65.82
norway	9	65.77
germany	16	63.66
france	23	61.68
United arab emirates	26	60.85
Hong kong china(SAR)	29	60.05
qatar	39	55.49
Saudi arabia	49	54.82

Source: global knowledge index, available at: https://www.knowledge4all.com/ranking#.

[7] Report « Global Knowledge Index by Country » ,December 2024*(Index, December 2024).*

2. Innovative Finance as a Mechanism for Financing Knowledge-Based Startups:

Given the role that start-ups play in supporting economic development through the use of knowledge- and technology-based strategies, providing the necessary financing for them is among the most important challenges they face in carrying out their activities, especially in light of traditional financing, due to the nature of their intangible assets, such as patents, intellectual property, and specialized knowledge. Hence, the need for innovative financing solutions that meet their unique needs arises.

2.1. The Concept of Innovative Finance: There are many definitions of innovative finance, including:

- The World Bank defines innovative finance as “an approach to financing that helps create new mechanisms to increase financial resources and improve the efficiency of their allocation, with the aim of achieving sustainable development.”[8]

- According to the International Labour Organization (ILO), It is “a set of new financial and economic mechanisms that aim to increase the state’s financial resources and improve the efficiency of their allocation, to ensure the sustainability of the economy and achieve sustainable development goals.”[9]

Innovative finance is therefore the use of new tools and mechanisms to finance projects and companies in unconventional ways, with the aim of improving access to capital, reducing risks, and enhancing financing efficiency. Innovative finance includes alternative sources of financing such as venture capital, crowdfunding, revenue-based loans, and intellectual property-based financing, in addition to the use of financial technology (FinTech) to increase transparency and ease of access to financing.

2.2. Some important innovative financing mechanisms: There are many innovative technologies that help knowledge-based startups. Here are some of them:[10]

- **Crowdfunding:** is raising money from a large number of people through electronic committees for a specific project or idea. **For example:** Platforms like **Kickstarter**, **GoFundMe**, and **Indiegogo** support startups and social causes.

- **Venture capital:** is investment by partners or partners in startups with high ownership in exchange for a share in the shares.

- **Equity financing:** the company obtains financing in exchange for investors obtaining their share in the company.

- **Financial technology (FinTech):** using modern technology to provide digital financial services, such as electronic payment and digital reading.

- **Incubators and accelerators:** through programs that provide support, financing and entrepreneurship for startups in their early stages.

These emerging capabilities are available with various financing options that suit their different companies, which contributes to investment and economic growth.

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[8] The world bank official.

[9] According to the International Labour Organization (ILO), Innovative finance, 14 December 2018, available at: https://www.ilo.org/resource/other/innovative-finance?utm_source=chatgpt.com.

[10] -Elisabeth Sandor, Simon Scott and Julia Benn, Innovative financing to fund development: progress and prospects, DCD Issues Brief • NOVEMBER 2009.

- Stuart Davies, Jose Palacin, United Nations Economist Network, INNOVATIVE FINANCING MECHANISMS AND SOLUTIONS, 2022.

- **Carbon Pricing & Emissions Trading Systems (ETS):** Mechanisms that put a price on carbon emissions to incentivize pollution reduction. For **example:** The **EU Emissions Trading System (EU ETS)**, where companies buy and sell carbon credits.

2.3. The importance of innovative financing for knowledge-based start-ups:

Innovative financing mechanisms play a vital role in supporting knowledge-based startups, providing unconventional solutions to financial challenges. The following are the most important benefits of innovative financing for these organizations:[11]

- **Promoting innovation and technological development:** Innovative financing such as venture capital and technology incubators allows startups to invest in research and development, which enhances innovation and helps bring new solutions to the market. **Facilitating access to capital:** Tools such as crowdfunding and participatory financing provide new opportunities for startups to raise funds without the need for traditional guarantees, which contributes to reducing reliance on banks.
- **Achieving financial sustainability and rapid growth:** Innovative financing enables companies to achieve rapid and sustainable growth by providing the capital needed to expand without the need for debt that burdens the organization.
- **Attracting investors and talent:** Mechanisms such as equity financing help attract investors who believe in the company's vision, and also contribute to attracting talents looking for opportunities in companies with high growth potential.
- **Reduce financial risk:** Performance-based financing, such as impact bonds, provides startups with financing based on their results, helping to reduce risk and improve their chances of success.
- **Enhance competitiveness:** Startups that receive innovative financing can leverage the latest technologies and resources, giving them a competitive advantage in local and global markets.[12]

3. The evolution of the use of innovative financing to support knowledge-based start-ups:

3.1. Ranking of the world's best knowledge-based startups: To identify the world's top knowledge-based startups, it is necessary to evaluate their innovation, growth potential, and impact across sectors. We summarize them in:

- **Mistral (France):** Mistral specializes in developing AI models, and has gained significant investment, becoming a technology powerhouse in Europe.
- **Databricks:** Based in the United States, it focuses on AI software to build, test and deploy machine learning applications, and has achieved a valuation of $43 billion, confirming its influence in the AI and data analytics sectors.

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[11] Based on many references, including: - Prashant Chaudhary, 120+ Best Tech Startups to Watch in 2024, availabla at: https://www.gadgetinsiders.com/business/120-best-tech-startups-to-watch-in-2024/.
-*Vish Gain*, 24 tech start-ups to watch in 2024, availabla at: https://www.siliconrepublic.com/start-ups/startups-to-watch-in-2024-tech-top-companies-list?utm_source=chatgpt.com.
-Econoinsider, Top 10 Most Innovative Startups to Watch in 2024, available at: https://econoinsider.com/top-10-most-innovative-startups-to-watch-in-2024/.

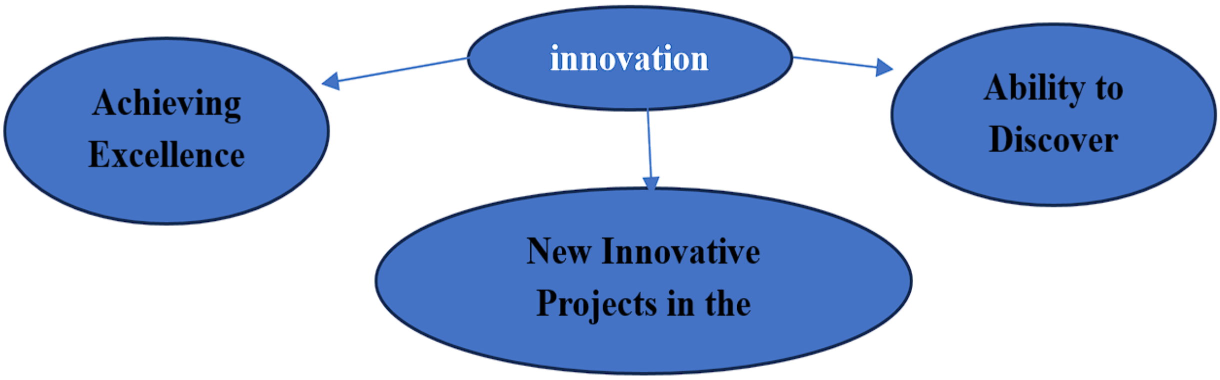
[12] - Nigam, N., Mbarek, S. and Boughanmi, A. (2021), "Impact of intellectual capital on the financing of startups with new business models", *Journal of Knowledge Management*, Vol. 25 No. 1, pp. 227-250. https://doi.org/10.1108/JKM-11-2019-0657.
- Anabela M. Santos, Michele Cincera, Giovanni Cerulli , Sources of financing: Which ones are more effective in innovation–growth linkage?, Economic Systems, Volume 48, Issue 2, June 2024.

- **Anthropic:** Based in the United States, it focuses on the safety and ethics of AI, tackling complex problems with a focus on the responsible use of AI. A notable $4 billion investment from Amazon highlights its prominence in the AI industry.
- **Abridge:** Also based in the United States, it uses AI for healthcare to transcribe and summarize medical conversations, enhancing patient engagement and simplifying clinical documentation.
- **CodaMetrix:** This US-based company leverages AI to automate medical coding processes, with the goal of reducing administrative burdens and improving efficiency in healthcare billing.
- **Sweep:** A knowledge-based startup based in France that focuses on sustainability by managing and reducing its carbon footprint through comprehensive data management solutions.
- **Neara** (Australia): Specializes in energy infrastructure, developing software that simulates physical assets, helping utilities optimize and future-proof their networks.
- **KNIME** (Switzerland): An open-source data analytics platform that allows users to create visual workflows, facilitating advanced and accessible data analysis.
- **Harvey (USA):** is a legal technology company that leverages AI to simplify legal research and drafting, enhancing the efficiency of legal professionals.
- **Synthesia (UK):** A pioneer in AI-powered video content creation, it enables users to create videos with realistic avatars, revolutionizing the media production landscape.

These startups embody the dynamic and innovative spirit that drives the global knowledge-based economy, each making significant contributions in their respective fields.

From the above, we find that innovation in financing startups depends on:

Figure 02: Financial Innovation in Knowledge-Based Startups.



Source: Prepared by the researcher.

Accordingly, the start-up must enter the market with innovative ideas that depend on technology, whether in the product, marketing operations, distribution system, marketing communication, organizational structure, or a combination of the elements mentioned in Figure 01.

4. Challenges and Opportunities of Innovative Financing for Knowledge-Based Startups:

It can be summarized as:

4.1. Challenges: These include:

- Difficulty in accessing financing:

- Knowledge-based startups require significant investments in research and development, which may be difficult for investors to understand or accept.
- The lack of traditional collateral makes obtaining bank loans complicated.

- High risks for investors:
  - These companies rely on untested ideas and technologies, which increases the risks compared to traditional projects.
  - Some investors prefer companies with clear business models rather than betting on innovation.

- Complexity of financing models:
  - Many innovative financing mechanisms such as venture capital and crowdfunding require a deep understanding.
  - Some startups lack the management and financial expertise to attract appropriate financing.

- Regulatory and legal framework:
  - In some countries, banking and investment laws are not prepared to support new financing mechanisms such as crowdfunding and digital asset-based financing.
  - Restrictions on foreign investments may limit opportunities for international financing.

- Unclear future returns: Most knowledge-based companies need many years to develop their products and achieve profits, which may lead to investor hesitation.

4.2. Opportunities: These include:

- Expanding sources of innovative financing:
  - The emergence of technologies such as blockchain and smart contracts opens the door to decentralized finance and tokenization-based financing.
  - Crowdfunding platforms have become more widespread, allowing startups to access individual investors.

- Support from governments and major institutions:
  - Governments in many countries provide grants and tax exemptions to support knowledge-based startups.
  - Major institutions are increasingly investing in venture capital to support innovative companies.

- Digital transformation and increased confidence in innovation: The growing interest in artificial intelligence, big data, and biotechnology is increasing investors' desire to support startups in these fields.

- New investment models:
  - The spread of revenue-based financing (RBF), where investors receive a percentage of revenue instead of equity ownership.
  - The emergence of investment funds specializing in deep technology (Deep Tech), which facilitates the financing of highly innovative projects.

- Growth potential in emerging markets: The increasing demand for cognitive technologies in emerging markets provides opportunities for startups to expand and obtain international funding.

Conclusion:

Finally, we conclude that knowledge-based start-ups are institutions that rely on knowledge and innovation as a fundamental pillar in their activities, and rely on innovation and technology to produce products and services with added value and a competitive advantage in the markets.

Given the importance of these institutions in the modern economy, the most important challenge they face is the financing element, and with the growth of the knowledge economy, innovative financing with its various mechanisms (crowdfunding, digital currencies, business incubators and accelerators, ...) has become a solution that allows these institutions to exploit technology and smart investments to provide capital with more flexibility and efficiency.

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