INTERNATIONAL JOURNAL OF INNOVATIVE RESEARCH IN MULTIDISCIPLINARY EDUCATION

ISSN(print): 2833-4515, ISSN(online): 2833-4531

Volume 03 Issue 10 October 2024

DOI: 10.58806/ijirme.2024.v3i10n07, Impact factor- 5.138

Page No. 1623 - 1628

The Challenges of Innovation: A Societal, Economic and Technological Triptych

Yassine ELKHATIBI[1], Redouane BENABDELOUAHED[2], Houda Guelzim[3]

[1,2,3] Doctor in Management Sciences, Hassan II University, Morocco

ABSTRACT: This article explores the multifaceted challenges of innovation through a tripartite lens encompassing societal, economic and technological perspectives. Beginning with an overview of the historical importance of innovation and its evolving definitions, the article delves into its conceptual landscape, dissecting innovation into invention, creativity and new product development. The discussion then turns to innovation challenges, starting with social issues such as social inclusion and the evolving role of public authorities in innovation governance. Economic challenges are addressed, highlighting the need for innovation for economic growth while recognizing its potential for job destruction and industry disruption. Finally, technological challenges, including data security, sustainability, and equitable access, are examined. The article has a triptych contribution since it underlines the importance of meeting these challenges to promote socially inclusive, economically equitable and technologically responsible innovation. Thus, innovation presents opportunities for progress, but careful management and ethical considerations are essential for a sustainable and balanced future.

KEYWORDS: Innovation, Challenges, Societal, Economic, Technological.

I. INTRODUCTION

As markets become more dynamic, interest in innovation, its processes and management has grown. Organizations need to innovate to meet changing customer demands and lifestyles, and to take advantage of the opportunities offered by technology and growing markets, configurations and dynamics (Tidd and Bessant, 2020) . According to these researchers, innovation can encompass product categories, operations, processes and people. As early as 1950, Schumpeter asserted that organizations needed to innovate in order to renew the value of their assets. Even before that, although the term innovation was not widely used, Schumpete (1997) suggests that innovation is widely regarded as the engine of survival and growth. It is recognized that innovation plays a fundamental function in "creating value" and maintaining competitive advantage.

Recently, innovation has been going through a period unlike any other, as it is often viewed with suspicion (3) . It might be tempting to shun innovation to avoid the unknown; however, it would be impossible to ignore the need for organizations and individuals to innovate to stay afloat. Several authors have proposed different definitions of innovation; Schumpeter (1939) sees it as absolute and dependent on a company's external and internal factors, while Miller (2017) places innovation at the heart of all entrepreneurial thinking. In the field of management, innovation has seduced a number of researchers, such as Burns and Stalker and their book "The Management of Innovation", or Rogers and his famous work (1962) "The Theory of Diffusion of Innovations".

Despite the progress made in understanding various concepts, the importance and difference between the different innovation issues is still poorly understood. Our aim is to answer the following question: How can companies and society as a whole navigate through the complex issues associated with innovation, reconciling technological progress, sustainability and social impacts, to ensure harmonious and beneficial development for all concerned?

The academic sources relating to innovation are quite rich, and we will try to verify the different conceptions through this research. Firstly, we'll present a set of concepts from the various reflections. Secondly, we'll explain what's at stake in innovation.

II. INNOVATION CONCEPT

Innovation is a complex concept applicable to various fields, such as technology, management science and economics (6). Many authors consider innovation to be something original and with a marketable purpose. One of the great innovators in this field is the Austrian economist Joseph Schumpeter, who continues to be highly influential today (7) .He sees innovation as a new use, a technological change, a combination of productive forces to solve problems (Schumpeter and Nichol, 1934). Kotler and al. (2000) describe innovation as something that is considered new by someone, while Astous and al. (2018) explain it as a process of

creating and disseminating novelties through research and development, particularly in the context of marketing. So, for Zaltman and al (1973) innovation represents three different meanings, namely:

- ✓ he first is a new configuration resulting from a creative process, e.g. television, tablet;
- ✓ The second is based on the principle that a process leads to the integration of an existing novelty into people's behavior, e.g. FAX, Internet messaging;
- ✓ The third concerns the objects that have been imagined, i.e. tools and materials.

This summary of what constitutes an innovation reveals the difference of opinion on what the term implies. This wide range of definitions in the literature has made the concept uncertain (Bigliardi and al., 2011)

A. The difference between invention/innovation/creativity/new product

Schumpeter (1947) believed that invention had a creative element behind it. He defines invention as any modification of an existing mechanism, carried out in the most advantageous way and whose design was distinct from what had been seen before. Abbot (2019) also considers invention to be linked to a genial intuition that requires appropriate means of implementation. However, (Elster et Moene,1989) disagree with this view, seeing it as a confusion with innovation. For them, invention is defined as an activity aimed at "generating a scientific idea, theory or concept which can lead to innovation when applied to a production process" .Several authors distinguish between innovation and invention, among them Mohr (1969), who points out that "invention implies the creation of something new, innovation implies the use of something new". Invention can lose its economic value if it is difficult to use and access (Sener and al.,2017). These researchers explain their arguments through the following example: the telephone invented by Grahma Bell initially had no economic value, since the inventor saw it as an aid for his mother. Conversely, Steve Jobs' practical innovation, the IPhone, was a major breakthrough that brought substantial economic value to the initial invention. Furthermore, for some researchers, understanding this paradigm requires linking it with others, namely: creativity, innovation itself and the concept of a new product. Thus, for Vehar (2020),creativity, innovation and invention are essential to economic development. Entrepreneurs support inventors by turning their thoughts into innovations. However, Lucas and Mai (2022)prioritize the creativity process above all else. According to the author, creativity is an intangible, personal contemplation. Invention, on the other hand, is the physical embodiment of ideas that were initially created through creativity.

For Crilly and Firth (2019) there are only three conditions to ensure this creativity:

- The quality of individuals, who must be highly creative and innovative;
- An environment that fosters creativity and innovation;
- Modern cognitive skills.

The delineation between a new product, innovation and invention can be seen in Kahn (2018) , who consider a new product to be the result of exploration based on scientific principles. However, for a product to be considered new, it must be accepted and perceived by the consumer (Cuva,2015).

We have thus demonstrated the contrast between innovation/invention/creativity/new product. We now devote the following paragraph to highlighting the distinction between considering innovation as an outcome and as a process.

B. Innovation as result or process

Pinkse and Bohnsack (2021) argue that those who see innovation as a process pay attention to the phases of adoption. This procedure begins with the diagnosis of problems, then moves on to the search for solutions before culminating in implementation. By way of illustration, Myers et al., (1969, p. 1) characterize innovation as "a comprehensive undertaking which begins with the invention of a new concept and culminates in the solution of the problem to produce economic or social value". In the same vein, Tidd and Bessant (2020a) proposes that innovation is a sequential procedure that moves from research to development, production and finally the introduction of the product on the market. However, Do Adro and al (2022) suggest that Tidd and Bessant definition remains inadequate despite their demonstration of an operational model of innovation. Whatever the definition of an innovation process, it must have certain characteristics (Forest and al.,1997): Firstly, it must have not only a fixed, predetermined timetable, but also a sequence of information exchanges between the beginning and the end. Secondly, it must be both predictable at the local level and open to new possibilities on a global scale. Thirdly, an element of productivity must be introduced to transform ideas into reality with unique specificity.

III. THE CHALLENGES OF INNOVATION

We will explore the challenges of innovation from a tripartite perspective: social, economic and technological impacts. Innovation, a driving force for progress, also raises challenges that profoundly affect our society, our economy and our technological landscape. Let's take a closer look at these challenges and how they shape our future.

A. Social issues

As with any period of crisis, it's important to get away from buzzwords. This is the case with the social issue, which is regaining interest among the political community and socio-economic players whenever the social movement forces it (Bucolo and al.,

2015). According to these authors, social innovation is the result of these actions. In contrast, for a long time, the debate focused on the degree of commitment of public authorities to innovation policies (Boon,2018). Today, the duty of public entities is evolving. It's no longer just a matter of helping out or lending a hand, but of taking a leading role in the governance of innovation. These authors see this shift as part of strategies focused on major societal issues such as ageing populations, ecological problems, improved lifestyles and food security. Continuing in the same direction, the OECD's 2021 report on technology and innovation and how they can tackle the health and social crisis points out that, as a result of the pandemic, science and innovation have undergone an extraordinary surge of activity; public research bodies, private foundations and charities, and the healthcare sector have set up various research projects that have received billions of dollars in a very short space of time. Science is the only way to overcome this crisis, and governments must fund innovation research as a means of rapidly tackling the pandemic, mitigating its adverse effects on the distribution of wealth and income. They need to bring together a clear range of innovations to tackle the most pressing societal problems.

In the academic sense, social innovation is in its infancy. For Campopiano and Bassani (2021) "The existing literature shows, firstly, that studies are scattered across various academic fields, such as management, urban and regional development, public policy, social psychology and social entrepreneurship". Researchers are attempting to initiate topics related to social innovation empirically, but this remains insufficient, according to the two authors. However, there are many interpretations at this level (Lee and al., 2018). For example, Haskel (2018) suggests that social innovation is an inventive activity or service produced and disseminated by organizations with a social or environmental objective. Several dimensions emerge from this definition, qualified as social issues according to the study by Haskell and al (2021) . The first dimension relates to social practices, which must respond to the most recent needs and problems, and which are not yet academically established. The second, social innovation, must respond to societal challenges and issues that vary according to time and context. The third is to meet sustainable development objectives, especially in terms of preserving natural resources. The fourth relates to governance and the key players involved in the sphere of social innovation. Terstriep and al. (2020), confirm that the success of a social innovation is based on the involvement of several players, such as the developers who launch it, the promoters who publicize it and others who contribute to its development and decision-making. The dynamism of these processes is reflected in the way they are able to change behavior.

B. The Economic Stakes

Innovation is essential to economic success. It is not possible for a company to maintain its profitability without innovating (Gravito, Galvis, 2021). Boulding (1949) famously commented: those who believe that unlimited growth can occur in a finite world are either fools or economists. This was his way of saying that economists assume that growth can go on forever since there is still undiscovered knowledge, and so innovation can continue to fuel perpetual progress. Since the initial industrial revolution, there has been an exponential trend rather than any sign of slowing down. Yon and Attali (2015) attribute this to the fact that innovation is the main source of wealth and economic concentration; Silicon Valley is a good example, where a few dozen square kilometers are home to the most avant-garde companies in existence, creating extraordinary wealth.

Is the impact of innovation always positive. Yon and Attali (2015) pose this question. For them, innovation can generate unemployment, particularly for the least qualified, and this is expressed by well-known phenomena. According to Joseph Schumpeter, the famous economist, the answer is no; he coined the term "creative destruction" to illustrate how innovation can lead to job losses for the less skilled. What's more, some industries may become obsolete as a result of these advances. For this reason, governments must be prepared to follow the innovation process.

Innovation is the main source of economic wealth creation, and this is all the more true as we live. We often hear it said that economies are knowledge-based (39). For the author, the main source of wealth for companies and governments is knowledge. We are therefore living in knowledge-based economies, and this has fundamental consequences for governments and businesses alike. Here are a few concrete examples of what the knowledge economy can mean. The first example is the phenomenon of start-ups, which are non-manufacturing companies that don't produce manufactured goods, but essentially produce technological knowledge that they then sell to industrial companies Yon and Attali (2015). Another example, again from these two authors, is linked to the knowledge economy and to which they testify the growing role of patents, the importance of brands and appellations of origin. Both authors consider intellectual property to be at the heart of the debate, as something that forty years ago was not considered as important. In their view, few experts were aware of the importance of intellectual property for innovation. This is no longer the case today, since it has been introduced into the general public's debate, the two authors add. Because we live in a knowledge-based economy. So how to protect knowledge is becoming the most important issue for innovation.

What is at stake for companies in the knowledge-based economy?

High-tech companies recognize that competition is essentially based on innovation. These days, it's imperative to be able to innovate or quickly become obsolete (Gilbert, 2022). We're in a kind of "innovate or die" cycle. Companies that fail to innovate run the risk of rapidly disappearing (Polino, Tahri, 2014). Kodak is the most illustrative case in point. Once at the forefront of the photo industry in the late 90s, it was unable to keep pace with digital photography and eventually went bankrupt (Dabbot,2019). To put it a little boldly, according to Drucker (2014), for any business these days, there are only two activities that will bring value

namely innovation and marketing; everything else can be outsourced. To illustrate this point, the Apple brand remains a good example, specializing in product design and promotion while outsourcing all other tasks. Most large companies are more involved in research and development (R&D); without giving exact figures, we can say that companies in Europe and America invest the most in R&D Drucker (2014).

Companies are faced with a whole series of strategic challenges, such as how to anticipate revolutionary innovations, how to adapt and stay up to date, and how to strike a balance between the search for new ideas and the need to make a profit. These are all questions raised by Peter Drucker, who stresses that companies must be able to move from exploration to exploitation if they are to remain competitive. In the same vein, Gay & Szostak (2017) consider that the challenge for innovation is both economic and organisational, suggesting that companies should devise original concepts for products or services in order to stand out from the crowd, but also to develop creative solutions for production, promotion and delivery in order to cut costs. Organisations need to merge imagination with their innovation policies while recognising the ever-changing climate of which they are a part. For both authors, the time constraint is a major issue. In the past, the transformation process took place every seven or ten years, but this has now been reduced to just two or three years. This limitation forces companies to capitalise on existing knowledge and seek out new inventive ideas if they want to stay one step ahead of their rivals through innovation.

C. Technological issues

The technological challenges of innovation occupy a central place in our modern era, redefining the way we interact with the world (Gay et Szostak, 2017). Firstly, the speed with which emerging technologies are adopted creates challenges. Businesses must constantly adapt to remain competitive, but this headlong rush can lead to risks such as data security, the resilience of IT systems and the sustainability of technologies(Bhattacharyya,2022). A second major technological challenge is the growing complexity of innovations, particularly in areas such as artificial intelligence and biotechnology. This complexity increases the need for appropriate regulation and governance to ensure ethical and responsible use. In addition, the growing interconnectivity of technologies is creating cyber-security concerns, requiring robust measures to protect sensitive data and prevent malicious attacks (Dwivedi and al., 2021).

The technological challenges of innovation are also evident in the area of sustainability. As society strives to meet environmental challenges, technological innovation must play a key role in the transition to more sustainable solutions (Abid and al., 2022). However, this transition involves challenges such as the management of electronic waste, the sustainability of the materials used in new technologies, and the need to rethink production and consumption models (Siakas and al.,2023).

Finally, the question of equitable access to technological advances is a major issue. While some regions of the world benefit greatly from innovations, others may be left behind (Sovacool and al., 2022). This raises questions relating to digital inequalities and the need to ensure that the benefits of technological innovation are extended equitably to the entire world population (Robinson and al., 2015).

IV. CONCLUSIONS

In conclusion, innovation issues form a complex knit of social, economic and technological challenges. To create a sustainable and balanced future, it is imperative to carefully navigate through these challenges, promoting innovation that is socially inclusive, economically equitable and technologically responsible. The development of new ideas is a fundamental factor in economic growth and can have a major influence on the economy. Governments, businesses and individuals must all participate in encouraging and supporting innovation to contribute to economic success. At the same time, the technological challenges of innovation are diverse and interconnected, requiring a considered and ethical approach to maximise benefits while mitigating potential risks. Creating the right regulatory framework, promoting sustainability and ensuring fair access are crucial steps in overcoming these challenges and fostering a responsible technological future. In turn, innovation has a significant influence on social structure. Technological advances are changing the nature of work, creating new jobs while rendering some obsolete. This raises crucial questions about social inclusion, vocational training and transition management. The impact of new technologies on human relations, privacy and ethical standards is also a growing concern.

The prospects for innovation offer a picture rich in opportunities for transformation, but the associated challenges demand careful and ethical management. By navigating these challenges with foresight, we can shape a future in which innovation becomes a powerful lever for progress, equity and sustainability. These research perspectives aim to deepen our understanding of the concept of innovation and the various issues involved, and to guide the development of more advanced solutions tailored to the needs of businesses and consumers.

REFERENCES

1) Tidd J, Bessant JR. Managing innovation: integrating technological, market and organizational change [Internet]. John Wiley & Sons.
2) Schumpeter J. Ten Great Economists [Internet]. Taylor & Francis; 1997.

3) Godin B. L'innovation sous tension : Histoire d'un concept. Presses de l'Université Laval; 2017. 513 p.
4) Schumpeter JA. Business cycles. Vol. 1. Mcgraw-hill New York; 1939.
5) Miller JD. Big Data Visualization [Internet]. Packt Publishing; 2017 [cité 5 oct 2021]. Disponible sur: https://ofppt.scholarvox.com/catalog/book/docid/88842702?searchterm=Big%20Data%20Visualization
6) Cohendet P, Simon L. Concepts and models of innovation. The Elgar companion to innovation and knowledge creation. 2017;33-55.
7) Mehmood T, Alzoubi HM, Alshurideh M, Al-Gasaymeh A, Ahmed G. Schumpeterian entrepreneurship theory: Evolution and relevance. Academy of Entrepreneurship Journal. 2019;25(4):1-10.
8) Schumpeter JA, Nichol AJ. Robinson's Economics of Imperfect Competition. Journal of Political Economy. avr 1934;42(2):249-59.
9) Kumar N, Scheer L, Kotler P. From market driven to market driving. European Management Journal. avr 2000;18(2):129-42.
10) Astous Alain d'. Comportement du consommateur / Alain d'Astous, Naoufel Daghfous, Pierre Balloffet, Christèle Boulaire. 5e édition. Montréal: Chenelière Education; 2018. xiv+530.
11) Zaltman G, Duncan R, Holbeck J. Innovations and organizations John Wiley & Sons. Inc, New York. 1973;
12) Bigliardi B, Colacino P, Dormio AI. Innovative Characteristics of Small and Medium Enterprises. Journal of Technology Management & Innovation. juin 2011;6(2):83-93.
13) Reinhold S, Zach FJ, Krizaj D. Business models in tourism: a review and research agenda. TR. 20 nov 2017;72(4):462-82.
14) Begum S, Xia E, Ali F, Awan U, Ashfaq M. Achieving green product and process innovation through green leadership and creative engagement in manufacturing. Journal of Manufacturing Technology Management. 2022;33(4):656-74.
15) Schumpeter JA. The Creative Response in Economic History. The Journal of Economic History. nov 1947;7(2):149-59.
16) Abbott R. Everything is obvious. UCLA L Rev. 2019;66:2.
17) Elster J, Moene KO. Alternatives to Capitalism. Cambridge University Press; 1989. 192 p.
18) Mohr LB. Determinants of Innovation in Organizations*. American Political Science Review. mars 1969;63(1):111-26.
19) Sener S, Hacioglu V, Akdemiral A. INVENTION AND INNOVATION IN ECONOMIC CHANGE. Journal of Economics Finance and Accounting. 30 juin 2017;4(2):203-8.
20) Vehar J. Creativity and Innovation: What Is the Difference? In: Carayannis EG, éditeur. Encyclopedia of Creativity, Invention, Innovation and Entrepreneurship [Internet]. Cham: Springer International Publishing; 2020 [cité 16 mars 2024]. p. 558-64. Disponible sur: http://link.springer.com/10.1007/978-3-319-15347-6_10
21) Lucas BJ, Mai KM. Illumination and elbow grease: A theory of how mental models of the creative process influence creativity. Organizational Behavior and Human Decision Processes. 2022;168:104107.
22) Crilly N, Firth RM. Creativity and fixation in the real world: Three case studies of invention, design and innovation. Design Studies. 2019;64:169-212.
23) Kahn KB. Understanding innovation. Business Horizons. mai 2018;61(3):453-60.
24) Carù A, Cova B. Expériences de consommation et marketing expérientiel. Revue française de gestion. 2015;41(253):353-67.
25) Pinkse J, Bohnsack R. Sustainable product innovation and changing consumer behavior: Sustainability affordances as triggers of adoption and usage. Bus Strat Env. nov 2021;30(7):3120-30.
26) Myers S, Marquis DG, Foundation (U.S.) NS. Successful Industrial Innovations: A Study of Factors Underlying Innovation in Selected Firms. National Science Foundation; 1969. 148 p.
27) Do Adro F, Fernandes CI, Veiga PM. The impact of innovation management on the performance of NPOs : Applying the Tidd and Bessant model (2009). Nonprofit Mgmnt & Ldrshp. juin 2022;32(4):577-601.
28) Forest J, de Lyon U, de Lyon I. Petite histoire des modèles d'innovation. :16.
29) Bucolo E, Fraisse L, Moisset P. Innovation sociale, les enjeux de la diffusion. Sociologies pratiques. 2015;31(2):1.
30) Boon W, Edler J. Demand, challenges, and innovation. Making sense of new trends in innovation policy. Science and Public Policy. 1 août 2018;45(4):435-47.
31) Campopiano G, Bassani G. Social innovation: Learning from social cooperatives in the Italian context. Journal of Cleaner Production. avr 2021;291:125253.
32) Lee J, Wei T, Mukhiya SK. Hands-On Big Data Modeling [Internet]. Packt Publishing; 2018
33) Mulgan G. The process of social innovation. innovations. 2006;1(2):145-62.
34) Haskell L, Bonnedahl KJ, Stål HI. Social innovation related to ecological crises: A systematic literature review and a research agenda for strong sustainability. Journal of Cleaner Production. nov 2021;325:129316.
35) Terstriep J, Rehfeld D, Kleverbeck M. Favourable social innovation ecosystem (s)?–An explorative approach. European Planning Studies. 2020;28(5):881-905.

36) Garavito Hernandez Y, Rueda Galvis JF. Innovation and patents as a business success factor. Journal of Economics, Finance and Administrative Science. 2021;26(51):143-59.
37) Boulding KE. Is economics necessary? The Scientific Monthly. 1949;68(4):235-40.
38) Yon B, Attali B. Management et financement de l'innovation [Internet]. RB édition; 2015
39) Coccia M. The origins of the economics of innovation. Journal of Economic and Social Thought-J Econ Soc Thoug–JEST. 2018;5(1):9-28.
40) Gilbert RJ. Innovation matters: competition policy for the high-technology economy [Internet]. MIT Press; 2022
41) Dos Santos Paulino V, Tahri N. Les obstacles à l'innovation en France : analyse et recommandations. Management & Avenir. 2014;69(3):70.
42) Gay C, Szostak B. Management de l'innovation : Nouveaux enjeux et défis, Méthodes faciles à appliquer, Illustrations et témoignages récents [Internet]. Dunod; 2017
43) Drucker P. Innovation and Entrepreneurship. London: Routledge; 2014. 368 p.
44) Trommenschlager M. La ville intelligente: entre utopies numériques et réalités. La ville intelligente. 2021;1-228.
45) Bhattacharyya SS, Shah Y. Emerging technologies in Indian mining industry: an exploratory empirical investigation regarding the adoption challenges. Journal of Science and Technology Policy Management. 2022;13(2):358-81.
46) Dwivedi YK, Hughes L, Ismagilova E, Aarts G, Coombs C, Crick T, et al. Artificial Intelligence (AI): Multidisciplinary perspectives on emerging challenges, opportunities, and agenda for research, practice and policy. International Journal of Information Management. 2021;57:101994.
47) Abid N, Ceci F, Ikram M. Green growth and sustainable development: dynamic linkage between technological innovation, ISO 14001, and environmental challenges. Environ Sci Pollut Res. avr 2022;29(17):25428-47.
48) Siakas D, Lampropoulos G, Rahanu H, Georgiadou E, Siakas K. Emerging Technologies Enabling the Transition Toward a Sustainable and Circular Economy: The 4R Sustainability Framework. In: Yilmaz M, Clarke P, Riel A, Messnarz R, éditeurs. Systems, Software and Services Process Improvement [Internet]. Cham: Springer Nature Switzerland; 2023 [cité 24 janv 2024]. p. 166-81. (Communications in Computer and Information Science; vol. 1891). Disponible sur: https://link.springer.com/10.1007/978-3-031-423
49) Sovacool BK, Newell P, Carley S, Fanzo J. Equity, technological innovation and sustainable behaviour in a low-carbon future. Nature Human Behaviour. 2022;6(3):326-37.
50) Robinson L, Cotten SR, Ono H, Quan-Haase A, Mesch G, Chen W, et al. Digital inequalities and why they matter. Information, Communication & Society. 4 mai 2015;18(5):569-82.