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SHAPING SUSTAINABLE SOCIETIES, ECONOMIES, TECHNOLOGIES, AND ENVIRONMENTS

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Introduction

Wicked Challenges, Innovation and the Way Ahead

By Dirk Meissner, Gustavo Salati and Bruno Fischer

Innovation has long been a topic of interest in the fields of economics and management. As outlined by Schumpeter in his Theory of Economic Development, its pervasive role comprehends qualitative changes in the way firms organize their productive and managerial processes. In turn, innovation alters the way people and societies perform their activities. This can mean slight incremental changes about how (and what) individuals consume, but it also encompasses structural shifts that alter the very dynamics of social fabrics, how people interact with each other, and the extent to which the productive systems create (or mitigate) stress on nature. Although this debate can lead us back to the origins of modern societies, the speed and rate of innovation has accelerated enormously since the era of the first industrial revolutions. This has sparked intense discussions about the upsides and downsides of innovation as a source of welfare.

Far from settled, these matters have gained prominence in face of the widespread systemic crises that are currently affecting societies worldwide. Issues related to climate change, social inequalities, pandemics, and geopolitical turbulences illustrate the main "wicked problems" of our time. Innovation is instrumental in this respect. It can either enable or constrain these trends. Abundant examples are out there about how innovation has made our lives easier and societies wealthier. But this is one side of the coin. An increasing amount of literature has illustrated how innovation can have deleterious effects in terms of the natural environment, access to necessary goods and services, and even in the dynamics of political systems. To that we might add the fact that economic growth cannot be deemed as a limitless target. Instead, more rational thinking about it is needed, and we need to better accommodate the notion of development in this domain (which might even mean degrowth strategies in some cases).

In this collection, we aim at gathering complementary perspectives that allow a thorough look into the essence of innovation economics and management, thus critically exploring the possibilities of innovation in building a more sustainable future. It deals with reflections and prospects about the concept of innovation and its meaning for those involved in this exciting topic.

As part of our endeavor to integrate diverse and complementary perspectives, we reached out to and collected the insights of authors from both the National Research University - Higher School of Economics (Russia) as well as the School of Applied Sciences - University of Campinas (Brazil) as part of our effort to integrate diverse perspectives. This collaborative effort has resulted in a comprehensive collection of twenty-nine meticulously curated articles. As a result, the four articles have been grouped into four distinct chapters, each delving deeply into the structural pillars underlying innovation.

We aim to provide a multifaceted examination of innovation by incorporating scholars' viewpoints from these two renowned institutions and encompassing various contexts and approaches. As a result, the resulting chapters offer rich analysis and commentary that explores the foundational elements that propel innovation in the modern era. This structure

allows us to demonstrate the intricate dynamics and the varying theoretical frameworks that researchers from different academic and cultural backgrounds employ.

This compilation aims to give the reader a holistic and nuanced understanding of innovation. We illuminate its complexities and the factors influencing its development and implementation globally across different regions and sectors.

Chapter 1 contains seven essays on the Innovation Journey and Evolution. As a reader, you can navigate the evolutionary nature and trajectories of innovation in human societies through each contribution. As a result of these views, innovation is viewed not simply from the perspective of what technologies can do but from the perspective of how societies function, how individuals interact, and how value creation has changed over time concerning these factors. There is a nuanced understanding of such processes and their interplay with old and new challenges that humanity faces through both empirical and theoretical viewpoints that are integrated to offer a nuanced understanding of these processes.

Chapter 2 consists of nine chapters focusing on innovation from economic and societal perspectives. As a result, it provides a complementary view of the inherent relationship between modes of production, social elements, and the changing notion of progress inherent in all of these elements. With the recent rise of the ecosystem concept as a means to integrating knowledge and capabilities to promote development, we can also see a change in the focus from innovation as an agent-based event to a network-oriented process, with a recent shift in innovation as an agent-based event to a network-oriented process. This has resulted in a renewed interest in entrepreneurship to achieve breakthroughs in science and technology.

Chapter 3 focuses on the Driving Forces of Innovation. The seven essays offer an insight into the elements that stimulate and steer innovation, i.e., the contextual elements that channel technological efforts in one direction or another. We believe that these phenomena are critical to understanding how we got to where we are today and how we can shape a better future by creating and combining the necessary ingredients to achieve it.

We will finally have the opportunity to take a closer look at the complexities involved with Innovation Policy and Sustainable Development in Chapter 4. Throughout the four essays in this book, the authors devote considerable attention to how policy can be used to guide innovation in order to achieve the grand challenges that we are facing now - and that we will likely be facing in the future as well.

To sum up, we anticipate that the contributions within this collection will substantially enhance critical awareness regarding both the potential and the limitations of innovation in terms of tackling the "wicked problems" that have far-reaching effects over a wide variety of countries around the world. Rather than simply providing answers to students, scholars, policymakers, and managers alike, this book aims to provoke new questions and avenues of interest for those interested in public policy, administration, and academia.

There are times when it is imperative to step back and examine the current zeitgeist we are living in in order to determine which aspects of the current zeitgeist remain relevant, as well as which parts have lost their relevance as foundational elements of society. As we see it, these contributions are precisely what is needed to create a sense of necessary unease among the readers. When assessing innovation outcomes, it is important to recognize that it is a non-neutral event (or series of occurrences). Inevitably, innovation will happen, but its effects are not inherently positive or negative, they are just inevitable. In the end, the impact of global warming will depend on the way in which it is managed by governments, businesses, and individuals. In order to come to terms with this reality, we must come to terms with it as soon as possible.

We hope you enjoy reading this collection and that the contributions outlined throughout the book can be a source of inspiration.

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Chapter 1. Innovation Journey and Evolution

The Impact of Innovations: Role in Shaping Our World Across Multiple Spheres

By Iryna Zyl

Abstract: This essay explores the transformative power of innovations, dissecting its profound impacts on the intricate tapestry of human existence across its four most important dimensions. Through examples, it illuminates how innovations serve as engines of change, driving societal evolution, economic prosperity, technological breakthroughs, and environmental sustainability efforts. By delving into the intricate interconnections between these spheres, the essay unveils the role of innovations as catalysts for cascading effects that shape the trajectory of human civilization. Furthermore, the essay calls for a paradigm shift towards responsible innovation governance, underscoring the imperatives of collaborative endeavors and holistic approaches to harnessing innovation's potential for the advancement of our world.

Keywords: innovations, social, economic, technological, environmental spheres, positive effects of innovations.

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Positive changes, efficiency growth, increased profits in various industries, new technologies and processes – the main aims and objectives of the modern world. Globally, there is a pervasive and relentless effort to enhance, evolve, and revolutionize various facets of life. This aspiration encompasses a commitment to create something new, to improve something old and to investigate something still undiscovered. And in all these desires innovations are the main tool. Innovation is the process of introducing new, creative, or improved ideas, products, services, processes, or methods. It typically involves the development, application, and implementation of novel concepts to address challenges, meet needs, or seize opportunities, ultimately leading to advancements and progress. Innovations are a dynamic force that profoundly affects various spheres of people's lives. This essay investigates innovations impact on four essential aspects of our lives from the author's perspective: social, economic, technological, and environmental. This exploration emphasizes the vital role of innovations in these areas, how they directly influence and improve them, shaping the way we live and interact with the world.

First of all, the choice of these four spheres, which are named as key and further considered from the perspective of innovations, should be justified. The social dimension of life is undeniably crucial, as it serves as a basis from which human connections, relationships, and interactions are built. It is the realm where the bonds between individuals and communities are formed, fostering a sense of emotional belonging. Within the social sphere, culture thrives, preserving traditions, values, and norms that define a society's identity. Social justice and equity are fundamental components of this dimension, serving as a catalyst for societal progress. The social aspect is where people actively work towards a fair and just world, striving to eliminate inequalities and biases. That is why the social sphere is important for people's lives. At the same time, the economic facet of our existence is the cornerstone of both individual and societal well-being. It functions as the conduit through which individuals and families access the fundamental necessities of life, such as food, shelter, education, and healthcare. Beyond meeting basic needs, the economic realm is conducive for innovation and prosperity. It does not only generate opportunities, but also fuels job creation and spurs economic growth, thus enhancing the living standards of individuals and entire communities. Moreover, in our globally interconnected world, the economic aspect intertwines nations and regions, profoundly influencing international relations. Besides, in the digital age, the technological dimension occupies a central role in our lives, shaping the contours of human progress and innovation. It is the catalyst for breakthroughs in various domains, from healthcare and communication to transportation and entertainment. Technologies profoundly elevate the efficiency and convenience of our daily routines, offering not just time savings, but also resource conservation. Technologies connect people worldwide, allowing ideas, cultures, and knowledge to move easily across borders. This fosters a better global understanding and cooperation, making innovations in this area one of the most relevant. And in the end, our environment, the very foundation of life, is undoubtedly critical in the context of our existence. The environmental aspect is tasked with preserving the natural world, ensuring the sustainability of ecosystems, and mitigating the consequences of human actions on the planet. Climate change, an urgent environmental concern, is inextricably linked to the well-being of people and the future of generations. Biodiversity and ecosystem equilibrium are not just ecological concepts, but vital components of our world's health, intricately tied to the stability of human society. This is why these four areas of people's lives were selected as important. And further in this essay it is discussed and showed, how innovations improve and impact on these areas, playing one of the key roles.

The first area to discuss is the social sphere, because in the contemporary world, the role of innovations within it is of primary importance, arguably more so than ever before. Innovations do not only affect technologies and science, but they also change how we live, connect with others, and organize our communities. They shape our daily lives and social interactions. The author of this essay maintains a steadfast belief in the profound significance of innovation within the social sphere, viewing it not just as an aspiration, but an imperative for the progression of our communities and the well-being of individuals. To better consider the importance of innovations, it is much easier to look at specific examples of how some innovations have changed the way we communicate, work and interact with each other. Therefore, the author will now give some examples of famous innovations and describe how they have affected the social sphere. The first and most famous and influential example refers to a social media revolution: the ascent of social media platforms, such as Facebook, Twitter, and Instagram, has revolutionized the way we connect and communicate. It can be argued that these are technological innovations, but the author attributes them more to a social one, because these innovations have transcended geographical boundaries, fostered connections, and urged social movements that span the globe. They have empowered individuals to share their stories, forge connections with like-minded souls, and raise their voices on matters of social significance, from human rights issues to environmental conservation. They literally changed the way we communicate, speak and how much we know without being close to each other. Another example of innovations that made our lives better is dedicated to remote work and online education. The fundamental shift towards remote work and online learning, catalyzed by the unforeseen COVID-19 pandemic, represents innovations that have permeated the professional and educational landscape. These transformations challenge traditional concepts of work by affording employees greater flexibility, disrupting the traditional work-life balance, and altering community engagement dynamics. They are also challenging the conventional classroom model and revolutionize the way individuals access knowledge, transforming lifelong learning possibilities. Social innovations broaden our boundaries of social construct, as now people have the same opportunities regardless of where they come from and where they live. The impact of these innovations is profound, touching upon almost every aspect of our community. They defy convention and argue with societal norms by confronting established norms. These innovations breathe new life into our social structures and institutions, from reshaping family dynamics to revolutionizing government systems. The ever-evolving social sphere, thanks to innovations, ensures that our societies remain adaptable and responsive to the dynamic.

Moving forward to the economic aspect, it can be easily stated that innovations are one of the main sources of economic progress. It propels societies forward, creating new opportunities, driving growth, and improving our standards of living. This essay will now delve into the significance of innovations in the economic sphere, providing examples and exploring the author's perspective on this pivotal subject. The author thinks that innovations in the economic area are not only significant, but also indispensable for the betterment of societies and the prosperity of individuals. Innovations fuel economic growth, create jobs, and enhance efficiency. They are the catalyst for tackling pressing challenges, fostering economic inclusivity, and ensuring sustainable development. By embracing and promoting innovations in the economic sphere, we lay the foundation for resilient, dynamic, and prosperous societies. As in the case of the social sphere, several examples of economic innovations are given to explain their impact more precisely. The first example is digital payment systems. The rise of digital payment systems, exemplified by services like PayPal, Apple Pay and other mobile wallets, has transformed the way we conduct financial transactions. These innovations have enhanced

convenience, security, and global accessibility to financial services. As the second example, e-commerce platforms can be considered. Companies like Amazon, Alibaba, and eBay have revolutionized retail and global trade. E-commerce platforms offered a vast array of products and services, streamlined supply chains, and enabled small businesses to reach a global customer base. Also, fintech and online banking: financial technologies (fintech) companies have introduced innovative solutions in banking, lending, and investing. These innovations provided consumers with more accessible and affordable financial services, challenging traditional banking models. Innovations in the economic sphere have a far-reaching impact on societies and individuals, which shows their close connection to the previous social area. They drive economic growth and job creation, fostering prosperity and reducing unemployment. Innovations lead to increased productivity, cost efficiency, and the creation of entirely new industries, contributing to rising standards of living. Furthermore, innovations often lead to the globalization of industries, contributing to international trade and cooperation. Now let's look at one of the areas that is most associated with innovations and novelty – technological. Technological innovations define the course of modern society, shaping the way we live, work, and interact. The author believes that innovations in the technological sphere drive progress, propelling us forward into an era of constant transformation and boundless possibilities. It empowers us to address complex challenges, improve efficiency, and elevate our quality of life. However, embracing and promoting innovations in the technological sphere is not just a choice, but also a necessity to foster a dynamic, forward-thinking, and technologically advanced world. Let’s consider some illustrative examples. The advent of smartphones has revolutionized communication, information access, and even commerce. These pocket-sized devices connect us to the digital world, enabling a lot of applications and services that have transformed nearly every aspect of modern life. Talking about a more modern example – AI has emerged as a game-changer across numerous industries. It powers virtual assistants, autonomous vehicles, and machine learning algorithms that enhance healthcare diagnostics, predict weather patterns, and even personalize our online experiences. The Internet of Things (IoT) connects everyday objects and devices to the internet, enabling real-time data collection and automation. Innovations in IoT have given rise to smart homes, intelligent transportation systems, and advanced industrial monitoring. 3D printing: this innovative technology has applications in fields as diverse as aerospace, healthcare, and consumer goods manufacturing. It enables rapid prototyping and the production of complex, customized objects. There are too many examples to provide all of them, but the ones already discussed are enough to show how much technologies are changing in our lives. Technological innovations wield a transformative impact, reshaping the way we work, communicate, and interact with the world. They have led to unprecedented connectivity and instant access to information. Moreover, these innovations have revolutionized industries, allowing for more efficient processes, enhanced convenience, and the development of new, exciting possibilities. In essence, technological innovations are the driving force behind the evolution of our digital age.

Finally, in an era defined by ecological challenges and growing environmental concerns, the role of innovations in the environmental sphere has never been more critical. Innovations that address these challenges are essential for the betterment of our planet and the legacy we leave for future generations. The author holds a steadfast belief in the paramount importance of innovations in the environmental sphere. Our planet is facing an array of environmental crises, from climate change to biodiversity loss, and these challenges necessitate innovative solutions. By embracing and promoting innovations that support environmental sustainability and conservation, we not only safeguard our natural world, but also secure the well-being and future of humanity. The author views environmental innovations as not only a choice, but an

ethical and practical obligation. And a lot of environmental innovations have already helped our generation not to pollute the planet so much. For example, innovations in renewable energy sources, such as solar panels and wind turbines, have transformed the energy landscape. These technologies harness clean, sustainable sources of power, reducing greenhouse gas emissions and mitigating climate change. The development of electric vehicles also represents a significant innovation in transportation. EVs offer a more environmentally friendly alternative to traditional fossil fuel-powered vehicles, reducing air pollution and reliance on non-renewable resources. Another good example are innovations in smart grids and energy storage systems, which are revolutionizing the way we generate, distribute, and use energy. They enhance the efficiency and reliability of energy systems, facilitating the integration of renewable energy sources. Also, innovations in the circular economy focus on reducing waste and promoting recycling and resource efficiency. This approach minimizes the environmental impact of consumer goods and industrial processes. There can be named many more examples and new attitudes, developed for sustainable development and ESG goals, because such topics now are on the high of their popularity. Innovations in the environmental sphere combat climate change, reduce pollution, conserve resources, and safeguard ecosystems and biodiversity. These innovations support sustainable development and promote responsible stewardship of our planet, ensuring that we leave a habitable world for future generations. Moreover, speaking back to the economic sector, innovations in the environmental sphere also drive economic growth and job creation. They foster green industries and environmentally conscious business practices, offering new opportunities in renewable energy, sustainable agriculture, and conservation technologies. The economic benefits of environmental innovations extend beyond profit, contributing to long-term economic stability by addressing the root causes of ecological challenges.

Thus, the four essential spheres of human existence – social, economic, technological, and environmental – are intricately interconnected, and innovations in one sphere reverberate across all. Social innovations, for instance, alter the way we communicate, connect, and interact, creating a ripple effect in the economic sphere by shaping consumer behaviors and driving demand for new products and services. In the economic area, innovations in business models and industries significantly influence technological advancements, as companies invest in research and development to gain a competitive edge. This, in turn, can have far-reaching effects on the environment, either by creating more sustainable practices or, in some cases, through the unintended consequences of resource consumption. Technological innovations, especially in the digital age, reshape social interactions and offer new economic opportunities. In the environmental sphere, innovations in clean energy and sustainable practices not only benefit the planet, but also have profound economic implications, creating jobs and reducing costs. In this dynamic interplay, innovations in each sphere are catalysts for changes in the others. They are highlighting the importance of a holistic and balanced approach to progress – one that seeks to harmonize the interests of society, economy, technology, and the environment to create a sustainable and thriving world.

In conclusion, innovations go beyond time and fields of study, shaping the fabric of our society and driving our progress. In this essay not only the meaning and intrinsic importance of innovations has been explored, but also their profound impacts on four essential spheres of human existence: social, economic, technological, and environmental. In all these areas, innovations are not merely a concept or an aspiration, but an imperative for the betterment of our world. It is the driving force that propels us forward, enabling us to create, adapt, and evolve in the face of ever-changing circumstances. As we navigate the challenges and opportunities presented by innovations, let us remember that their true value lies not only in

power to transform our world, but in our responsibility to harness it wisely, for the benefit of humanity and the preservation of our planet. Responsible guidance and ethical oversight are crucial to ensure these advancements benefit society and the environment, fostering a harmonious and sustainable world. By taking innovations under careful control, we can use their power for good, moving forward while maintaining our values and principles.

Survival of the Fittest: Innovation as an Expression of Natural Selection in Modern Societies

By Bite Ivars Patriks

Abstract: The essay examines how innovation has adapted the paradigm of survival of the fittest from genetics and evolutionary biology to modern human societies. By traversing the course of human evolution from the taming of fire by our evolutionary ancestors through the emergence of hunter-gatherer societies and the agricultural revolution to the present day, the essay explores how the threats and challenges faced by the common man have evolved together with our societies. Thus, the essay demonstrates that, while the concept of survival of the fittest in the biological sense explains the physical survival of individuals and species, innovation performs the same function for individuals in the modern societies and for the societies themselves on the global level.

Keywords: innovation, evolution, natural selection, social innovation, technological innovation

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Natural selection has governed life ever since it first emerged on Earth almost 4 billion years ago. Individuals in every new generation of a species have slightly different mutations in their DNA and, should these mutations contribute to traits, which improve the ability of the individual to survive and procreate, this new genetic trait is then passed onto the individuals of the next generation. Over billions of years only those species, which managed to adapt to an ever-changing world, would survive. As such, the rule of the game is survival of the fittest.

Around 2 million years ago australopithecine human ancestors began using stone tools to butcher their prey, such as gazelles and antelopes, in order to get access to the more nutritious parts of the body like the calory-rich bone marrow. The regular access to relatively large sources of calories may have contributed to the increased size of brains of human ancestors, which in turn allowed them to improve their technological development, potentially creating a feedback loop. Furthermore, the process of toolmaking itself is thought to have contributed to the development of the part of our brain that controls visual-motor coordination and planning, while the pressures exerted onto fingers and hands as a result of australopithecine toolmaking and tool use may have affected the evolution of the human hand.

A little over million years later ancestral humans began to regularly create and use fire to cook food, most importantly meat. Doing so breaks down larger molecules into smaller and easier-to-digest ones and kills pathogens and other harmful organisms. As a result, less energy was needed to be used by their bodies to digest the food and to defend against microscopic invaders. Additionally, fire could keep people warm, during cold nights, safe by warding off predators and better fed as it could be used for hunting.

Eventually, roughly 300 000 years ago, modern humans emerged as a separate species in Africa and approximately 100 000 years after that we began to migrate outside the continent, venturing to Europe, Far-East Asia, Australia, North and South America. The use of tools and fire is believed to have allowed early humans to adapt to the different and harsh environments of the regions they migrated to.

Humans reached southern parts of South America around 50 000 years ago. By then humans all over the world had developed the ability to effectively communicate in large groups, which allowed for a rapid sharing of information and knowledge. This was an important advantage for a hunter-gatherer species, as it allowed humans to improve their tools, coordinate strategies for hunting large animals, like the mammoth, and differentiate poisonous plants from edible ones.

One of these plants was wild wheat, which humans began cultivating around 20 000 years ago. By planting the first crops it was possible to predict that additional food will be available for consumption in the future. This was a great supplement for hunting and gathering and significantly decreased the area needed to feed our ancestors. Temporary settlements were built and with time they would transform into permanent ones as knowledge and understanding about the growing of crops and hoarding of animals expanded and improved with each new generation. All over the world humans were becoming more reliant on farming and 12 000 years ago the collective efforts of different tribes and multiple generations reached a critical point, initiating the agricultural revolution. The Human Era had begun.

Up until then everyone in the tribe had to be strong and knowledgeable about their surroundings equally, as their survival, as well as that of the tribe, depended on that. However, as tribes were able to grow and store their own food without the need for constant relocation, their members could begin to specialize for the first time. Some could make more efficient tools, while others could crossbreed and create new and more productive breeds of crop, forever changing the social dynamics of the tribes.

At the same time the placement of domesticated animals close to each other and living close to their proximity allowed for disease to easily jump from animals to humans: cholera, smallpox, measles, influenza, chickenpox and malaria-all emerged and began infecting humans in the last 10 000 years. Although these diseases killed many, particularly the young, more children were being born than at any other time in history. As such, populations grew, forming first towns and then-cities.

Some 1000 years after the Agricultural revolution began Jericho, probably the first city in the world, was established. Over the next two thousand years the number of permanent settlements continued to grow and led to the creation of first cultures from the Fertile Crescent to what is today China. Two thousand more years into the future the wheel is invented, first proto-writings are created and a thousand years after that (5000 years from today) the first civilizations emerged, including the Indus Valley civilization, Ancient Egypt, the Sumerians, the Minoans, and Ancient China.

The numerous new civilizations would create myths and stories to explain the world around them, as well as the origins of their own cultures and social structures that characterized them. Monarchies and dynasties, kingdoms and empires emerged with organizational hierarchies and laws, to which all members of the ancient societies had to adhere to.

As the empires grew in population, they needed more food to feed their populations, which meant that they had to obtain new, fertile grounds, which in-turn led to wars. Now defenses and weapons, as well as tactics and strategies once used for the hunting of large game, had to be constantly modified and improved to gain an advantage over the adversary. With time, reasons to start wars would expand to access to sea and trade, valuable minerals, exotic spices, and eventually royal and religious titles, as well as ideas of superiority of one's own civilizations compared to others.

A few centuries before the beginning of the modern era, algebra and geometry were created and zero was invented. Attempts were made to explain both the movement of stars and other celestial objects and the structure of the building blocks of all matter. The interactions of objects, solids, liquids, and gasses were explored as were the geometric paths of light. The foundations of what we know today as mathematics and physics were laid.

However, it would be almost 2000 years until the establishment of modern science and the scientific method, employed by all natural sciences. Major advances in mathematics, physics, chemistry, biology, and medicine would pave the way for the Industrial Revolution, beginning in the second half of the 18th century. Productivity increased exponentially with an unpresented efficiency. Suddenly, even the common man could think not only about survival, but also his or her quality of life and the necessary rights, social and political changes, necessary to obtain them. They could take inspiration from the works of the great thinkers of the Age of Enlightenment, which had begun a century earlier. The social hierarchies and standards that had lasted for centuries and millennia were about to be turned upside down as new ideas like capitalism, liberalism, socialism, and nationalism were proliferating, while in the background new great empires were splitting the world between them.

With the arrival of the 20th century science and technology had advanced so far that, when the great powers once again went to war, the weapons they were using caused death and destruction on an industrial scale. Battles were fought not only on the land and sea, but in the air and beneath the waves, in factories and laboratories. The use of chemical weapons and aerial bombardment demonstrated the dark side of technological advancement, which culminated in the creation of the nuclear bomb. For the first time in the history of our planet Earth a species has developed an instrument, with which it could end its own existence. It was

clear that a new era of human experience had begun, in which an entirely new mentality had to be created to prevent Armageddon.

In this new era science and technology developed exponentially and each new year and decade brought forth a new, almost unimaginable, breakthrough both in our understanding of how the universe works and in technologies, leading to increased lifespans and more comfortable lives. In 1961 man became the first species to leave the planet, upon which it had evolved, and just eight years later, perhaps in the greatest testament to human endurance and spirit, man set foot on another world for the first time. In 1980 smallpox, the disease that first caught onto humans at the agricultural revolution 12 000 years earlier, became the first human disease to be completely eradicated. The advent of the internet permitted a near unlimited sharing of information, knowledge, and wisdom for humanity. The Information revolution and great advancements in computer technologies and robotics have led to the creation of artificial intelligence, while the emergence of gene editing allowed humanity to directly interact with its own DNA-the molecular strand, which determined the evolution of humans for millions of years.

Parallel to these scientific and technological developments, major shifts in global society were also taking place. Not only did individual empires crumble, but the very notions of empires and kingdoms, colonies and superiority began to collapse in popularity. Independence and democracy, equality and human rights, unity and cooperation became the new principles of the new era in human history, which materialized in organizations such as the United Nations and the European Union. But along with these major changes, new challenges emerged. The use of fossil fuels to power the seemingly endless engine of progress changed the contents of both the atmosphere and the oceans, triggering man-made climate change and, although more people were pulled out of poverty and middle classes grew around the world, major economic and social inequalities remained and even grew in the new and globalized world.

This is the world we have inherited today in the early 21st century. It is often said that innovation is in the human DNA. However, this is closer to the truth than most people may realize. The mutations in the DNA of our ancestors (both close and distant) were a series of uncountable natural, biological, and genetic innovations, which permitted us to become the dominant species on Earth. Our evolution permitted us to use tools and develop technologies that then positively affected our evolution further, thus creating a sort of synergy between natural and human innovation.

Following the agricultural revolution, entirely new social structures and hierarchies formed, as humans transitioned from hunter-gatherers to farmers, from nomads to inhabitants of temporary and permanent settlements. This change represented one of the first major societal and organizational innovations and it would be the first in a pattern of technological innovations leading to societal, hierarchical, political, and economic innovations.

As technologies continued to develop over the centuries and millennia, humanity was becoming less and less influenced by nature. Instead of adapting to different and at times changing environments, humanity changed them instead, adapting them to our needs. This eventually led mankind to conquer the world and become, in a sense, the dominant species on Earth, having terraformed the planet to fulfil our own requirements and desires. It would seem that this feat has separated humans from nature, especially when considering that we are now gradually obtaining the knowledge of how to edit our own genes to eradicate disease and improve our abilities.

This may be true to a certain extent, however, we have nowhere near managed to abandon the laws that govern evolution. In the wild a human ancestor could have been killed

by other animals, which inhabited the same territories. Therefore, he had to adapt to the environment, be agile and enduring, knowledgeable of sounds and smells around him to survive. As humanity evolved and created ever more complicated social structures, survival took on a different meaning.

In order to survive in the new civilization, a person had to be able to obtain food, water and, should it be necessary, medical assistance. To do this the person, therefore, had to be a useful member of a society, where everyone has unlimited desires, but limited resources. To get ahead, a person had to be smarter, more cunning and demonstrate his or her ability to be a more valuable member of society than the competition. They had to make better tools, grow more productive plants, develop, or use more efficient production techniques or create and use connections with people of wealth and authority to gain what was desired. The same applied to businesses, governments, countries, and their militaries only at a higher level or dimension.

We see that little has changed in that regard even in the world of today. The survival of the fittest is no longer a question about surviving in the wild within a food chain, but surviving in the societal hierarchies of individuals, companies, organizations, countries, and multi-national entities. Thus, no matter how hard we may try to separate ourselves from nature, its rules still apply to us, albeit in ways we do not always see. This is the essence of the meaning and importance of innovation. It is and always has been with us in the ether throughout our history: from genetic innovation, shaping our evolution, to the ability to amass large concentrations of wealth by individuals, to technological dominance of companies and economic and military dominance of countries. It has been driving humanity to find new ways of ensuring access to resources needed for our survival and desires. Innovation is, therefore, in our human world-our own natural selection.

Unabated Search for Innovations

By Anna P. Glebova

Abstract: The essay examines the phenomenon of innovation demand around the world. Though there is a scientific consensus that innovative production contributes greatly to various domains of human lives, the paper seeks to examine the balance between objective and subjective urges of innovation procurement. In the first place, practical benefits of innovation are backed by particular examples, while the second part delves deeper into the aspects of social and cultural trends. Without juxtapositioning these facets, the essay concludes the well-grounded need for innovation.

Keywords: open innovation, artificial intelligence, economics, human culture.

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Do you encounter innovation in almost any ambit of life? Why does anyone aspire to be as innovative as possible? What meaning does innovation bring to the world? States ameliorate innovation sovereignty for the fear of descending into acquiescence, companies create from scratch innovation systems in order not to become a scapegoat in competitive scramble for a market shares, lay people consume innovative products to go hand in hand with the progress. In this respect, there is a conspicuous allusion that innovation is something that is hard to find as the search for it seems unabated; innovation is something that is easy to lose up-to-date comprehension of as the amount of technological knowledge petrifies and at this juncture, it constitutes police phallos monster looking in various directions; finally, innovation is something that is impossible to obviate due to the essential benefits accompanying it. This definition may appear quite involved and in need of abridgement.

Indeed, it would be more scientifically productive to use the notions coined by prominent researchers in the field such as Joseph Schumpeter [Schumpeter, 1934], Homer Garner Barnett [Barnett, 1953], Michael Aiken and Jerald Hage [Hage, 1971]. This path would be more approachable as the academic atlantes have born this weight for around less than a century. They concluded that innovation is based off certain attributes: novelty, bringing change, creating value, profit, improving, disrupting on-going processes. These criteria are as objective as one could imagine. However, a more elevated definition would be the one described higher aloft. It perfectly resonates with the main character's wish in the movie "Great Beauty" by Paolo Sorrentino [Sorrentino, 2013] to find the great beauty, which is so evasive, hard to find, easy to lose, impossible to get away from. As mankind got acquainted with innovations, it was inexorable that people would still pursue the existent lifestyle knowing that these technologies are able to disrupt certain economic branches and transform whole societies. As Jep Gambardella once experienced the inspiration of great beauty of the outside world, he grew obsessed with finding this ineffable feeling. Hereby, let's find the balance between these two notions and infer the meaning of innovation whether it is inenarrable phenomenon all-pervading defining the modern reality, contributing to societal development or it is a tool of economic development contributing to the financial indicators and creating room for economic growth.

Pertaining to the novelty, this aspect could be named quite crucial. Nevertheless, there should be some additional ideas put behind as technology new in one sphere could be an antiquated one for another branch. Moreover, advanced technologies might be well-established at one stage of the production process and be unknow at another one. The novelty could also be ascribed to original methods, markets, resources, forms of organization. Having this in mind, it is evident that the creation of original technological product surrounds us everywhere and manifests itself in various forms. This explanation of this need for something new, actually, has its roots in customers' behavior. Although some theories allege that love of novelty is not innate in any person dividing them into categories in consistence with their type of approach towards technology [Rodgers, 2003], there is still an amble of creative minds willing to go shoulder to shoulder with progress or event antecede it.

Besides, love of novelty on any level greatly contributes to the development of innovative products [Furukawa and Sato, 2023]. innovative ding the fact that innovative products cannot be created permanently as in the production process existing products which are the basis of modern economic performance are produced, the preference for novel invention stays strong. However, if this penchant proves to be too active or on the other side quite passive, the situation of underdevelopment in the technological field is inevitable. The proactive approach does not allow to concentrate all energy on a main project, the capabilities are dispersed. For instance, Israel is acclaimed for its specialization on pharmaceutics which

accumulates vast benefits for its national innovation system. However, an aery room for improvement to be noted. In this case, the following agape perfectly encapsulates the spirit of excessive proclivity for novelty: if you chase more than 1000 technologies at once, you will have neither. On the other hand, being reserved in terms of embracing new leads to underdevelopment as well. If the majority of population could be described as laggards, it almost equals a death sentence regarding innovative and economic development. So long genome editing was abundantly biased and seen upon as an immoral tool, juxtaposing natural flow of life. Nevertheless, certain countries found the equilibrium between ethics, wish not to dive into this questionable sphere and permitted clinical trials with the use of genome editing in order to prevent cancer development. In fact, it saved lives. Two teenagers in Great Britain were freed from leukemia and more are to come. Deliberately turning a blind eye to the "grey spots" where innovative development could be quite efficient but repelling in terms of ethics and in general behavioral patterns.

Albeit the main question remains whether novelty and love for it a phenomenon is just aggregating human attitude and culture, or it is an indispensable leverage of producing additional value. Only moderate love for novelty could serve the objectives of long-run economic growth. Primarily low and excessively high activity prevent from producing long-lasting results. Overall, novelty is one of the economic drivers, not only cultural need for innovation. Apart from this, not any novelty produces beneficial value, but what makes innovation a valuable novelty?

Another important trait of innovation consists in creating value. First and foremost, innovation should be applicable in the business processes and have aptitude to bring economic profit. Indeed, around 17% of Singapore's GDP by additional value is produced by digital economy. It encompasses information and communication sector as the fastest growing part of island's economic with more than 5% a year and other spheres encountering digitalization [Onag, 2023]. Innovative development could be found in direct or indirect influence as technology might be the final ready-for-sale product, licensing, spin-offs, contracted research, and development services. In the paradigm of open innovations [Raghupati and Raghupati, 2023] outbound innovations are the ones bringing the firm external benefits and inbound ones being brought from outside, being internalized. For example, Huawei greatly exploited the opportunity to receive revenues from his patents and technologies' in-licensing being the champion of the field. However, the number of technologies produced does not always equal the greatest income streams of financial flows. The quality of patented know how should not be taken out of equation. There is still needed to cover the gap, the pain of the consumers or discover a new one. The fashion of trends is quite mercurial; nevertheless, it corresponds to the search for something that will bridge frustration in different spheres.

According to Gartner hype cycles [Gartner, 2023], a technology could enjoy popularity and massive demand from 5 to 10 years ordinary. Innovation usually has a short life span until it loses its novelty and special features responsible for it. Not as short as the lifetime of a butterfly but still in terms of economic cycles, one should put great effort and genuinely disrupt the market in order to fly high for a longer time. At this time, the technologies meeting the requirements of societal, economic, innovative, engineering requirements are Generative AI, Augmented AI and Cloud-Native.

Indeed, AI being the focus of everyone's attention is not a surprise. Although the technology was accessible to the broader markets since 2000 and prototypes existed even half a century earlier, the fame found it quite later on. In this regard, it is challenging to dissect the composition of success. What has facilitated the rise of AI even though the invention was not as novel as stated earlier for long-term efficient use in production and among consumers?

Should AI be named the exception in the field of innovation that proves the rule? Actually, this breakthrough should be namely attributed to the size of capabilities having become available to the algorithms of artificial intelligence. Earlier the data sets available for analysis were more limited, later the opportunities of AI grew. Therefore, this technology has been reinvented in a sense. Covering the mundane needs of lay people, it ascended to one of the most popular technologies. The only thing apocryphal about its future is for how long it will be on the annex. The practical value is apparent, with lesser resources, time spent on tasks. The cultural value consists in aggregating human designs and ideas; thus, producing something novel. Despite the positive ambience, there is still an opportunity for AI downfall into the abyss of mundane technologies. It might become as intrusive into societal lifestyle that it will not be innovative anymore. In addition to it, the resemblance to the human mind of AI might have been part of success providing people with almost anthropomorphic connection experience and bridging the gap of loneliness [Murthy, 2023] in the era of new individualism. Considering the following aspects (novelty and value creation), AI seems to become an integral part of our life. Nonetheless, most countries are growing aware of AI faults and conceivable negative trends for labor market, scientific research education, quality of life. For example, Russia has started developing law about AI produced markings in 2023. Might be the slump of AI looming?

One more aspect to be discussed is disruptive type of innovation. Having assumed that technologies mostly bring creative, constructive comeuppances with them, let us not forget about disruptive ones. In order to embark upon a type of production at a more advantageous level sometimes previous traditional linkage need to be burned. There are certain branches which find it extremely involved to adapt new technologies. The healthcare industry could be counted as a conservative one not ready to embrace the change. It has been over the course of history. The most prominent discoveries were made despite many hurdles to be tackled. Now with the rise of many new technologies, companies are at risk of losing market shares, the whole national healthcare system could be disrupted in a negative way.

The following technologies present a threat as well as opportunities in the medical sector. Telemedicine or mobile health applications include provision of services without actual presence of a doctor or a patient. This could be performed remotely. Moreover, the necessity for a specialist disappears as artificially created chat bots analyze consumer's condition and suggest the needed recommendations. This technology employed at the maximum level could relieve a great majority of doctors from their additional responsibilities, follow-up hours, bureaucratic troubles. The burden on the medical personnel decreases substantially. Health informatics is now used to manage and analyze data in great amounts. Clinical decision support systems assist in providing doctors with reminders and prompts based on developed guidance improving the quality of the service. AI in healthcare has the potential to reduce costs, better patient care, assist in tasks such as image analysis, natural language processing and literature examination. Internet of Things and blockchain technologies enable secure and efficient data sharing and management of healthcare facilities. Augmented reality and virtual reality have now been used for patient rehabilitation and training healthcare professionals. Radio-frequency identification has the potential to transform tracking, communication, and identification of resources. Having all these technologies deeply integrated into healthcare system would definitely do a substantial change to it. Nevertheless, the human factor can bot be foregone especially in the ambit crucial to human wellbeing.

By the way of following up the above-mentioned argumentations, it should be admitted that, indeed, innovations surround human in their daily lives. There are certain reasons for it. As a wish for novelty is an inherent part of human culture, notwithstanding the need to be reserved in order to survive and fear of exogenous influence. There would be no

modern civilization if in ancient times there any curiosity had not been, penchant for new discoveries. In line with the statement people seek unknow methods not only due to their proclivity for curiosity, but also as a way of improving their lives. Some technologies completely transformed the lifestyle of generations, while others added micro minutiae into main mechanism bridging the gap, creating an apotheosis of productivity and at the same time influencing only a limited part of the processes. However, the search for successful innovation can be challenging because the factors of success present a great variety of options, mixes. It is also easy to lose track of the latest advancements due to the overwhelming amount of technological knowledge available. Despite its complexities, innovation is impossible to ignore due to the essential benefits it offers. It drives progress, improves efficiency, and enhances quality of life. Whether it is in logistics, healthcare, E-commerce or any other field, innovation plays a crucial role in shaping the existing world.

A vast number of renowned researchers invested their effort into establishing main criteria of innovation in order to distinguish it from other phenomena. Having in mind classical theories of innovation and economic growth, in this essay a bit aberrant viewpoint was presented. In fact, innovation cannot be deprived of its main characteristics such as novelty, bringing change, creating value, profit, improving, disrupting on-going processes, adding new dimensions and possibilities to entailed production, decreasing costs, revolutionizing scientific field and the production area. Innovation has many faces as it is not a simple invention. It could rise to the world popularity or stay forever forgotten. Humankind seeks to find the universal tools contributing strongly to the better way of life. Innovation could offer that. However, the issue stays, how to grasp the “great beauty” of innovation as this sphere constantly evolves and is full of unexpected turn-outs. The main ides could be consolidated in the following adage: never give up in your search of it, stay innovative and curious about the surrounding environment.

In summary, innovation is highly valued because of its transformative power. It is sought after in different domains of life, and its significance cannot be overstated. The constant pursuit of innovation is driven by the desire for progress and the advantages it brings.

Innovation: A Viable Tool for Human and Economic Development from Time Immemorial

By James N. Louis

Abstract: The evolutionary trajectory of innovation spans millennia, from early human ingenuity in toolmaking to the contemporary digital age marked by advancements in information and communication technology. Key milestones include the Agricultural Revolution, Industrial Revolution, and Technological Revolution, each catalyzing societal transformation through groundbreaking inventions and paradigm shifts. Classifications of innovation elucidate its diverse manifestations, such as sustaining innovation focused on incremental improvements, disruptive innovation heralding transformative change, and process innovation optimizing production methods. Additionally, business model innovation, product innovation, and social innovation exemplify the breadth of innovative endeavors across sectors. The significance of innovation extends beyond commercial interests to encompass societal progress and environmental sustainability. It fosters economic growth by stimulating entrepreneurship, creating job opportunities, and enhancing competitiveness in global markets. Moreover, innovation plays a pivotal role in addressing pressing challenges like poverty, healthcare, and climate change through the development of sustainable solutions. Businesses that prioritize innovation gain a competitive edge by delivering unique value propositions and adapting swiftly to evolving market dynamics. By fostering a culture of innovation, organizations can optimize operations, reduce costs, and enhance customer satisfaction. Furthermore, innovation serves as a catalyst for environmental stewardship, encouraging the adoption of eco-friendly practices and technologies.

Keywords: innovation, evolution, environmental sustainability, revolution, economic growth

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Introduction

Unveiling the Forces that Shape the Future" in a world that is changing rapidly, the notions of innovation and evolution play a critical role in shaping our lives and society. While innovation is the creation and use of novel ideas, products, or methods, evolution is the ongoing alteration and adoption of already-existing objects across time. Comprehending these ideas and their interrelationships is essential since they foster development and transformation across numerous professional spheres. The foundation for examining the immense significance of innovation and development in the modern world is laid out in this introduction. These components act as catalysts for growth, rivalry, and the continuous improvement of human existence. Innovation has created a very good impact not just in the lives of people or companies around the world; it has also been a vital tool for economic growth and industrialization in many countries. This paper seeks to dive into the definition of innovation from a general perspective of people, industries, firms, scholars, institutions, or government agencies. A brief history on the evolution of innovation was also discussed as well as the importance of innovation. This essay is written on self-thoughts and it's open for further research work.

Discussion

Innovation means many things to many people and different schools of thought have defined the term “innovation”. However, the common language agreed by all these people is; Innovation is an idea aimed at creating something new; this could be a new product, a new service, a new marketing strategy, a process of production, a new distribution channel or simply improving on the existing one. It is worthy to note that innovation is the implementation of an invention or idea in order to achieve or develop a new product or services to improve the quality of an existing product or services. Therefore, in order for innovation to occur, there are various processes involved. The first stage of the innovation process is generating an idea. This could be a thought, or anything that has the potential to create new products or improve existing ones is a potential innovative idea. This is followed by the implementation stage, this is actually the process of implementing the idea generated and if it has an impact on that specific sector, then it is called innovation. The third stage is the dissemination process. Here, the product or services has been fully developed, the next phase is to release it to the general public and if it affects the global market environment in a positive way, we can call it an innovation.

The evolution of innovation has been a continuous and dynamic process that has evolved over centuries. Here's a simplified overview of its progression:

Early Human Innovation: Innovation started in the ancient time when the early men started creating tools, fire, and basic techniques for farming. These were the first human innovations.

Agricultural Revolution: The Agricultural Revolution was an important period about 10,000 years ago, during which farming, and animal domestication was introduced. The development prompted settled cultures, increased population, and surplus food production.

The Industrial Revolution: The development of cutting-edge technology in the manufacturing and transportation sectors ignited the Industrial Age, which took place in the late 18th and early 19th centuries. It resulted in the invention of breakthrough technologies like the steam engine, which facilitated industrialization and urbanization.

The Technological Revolution: The technological revolution, characterized by advancements in computing, telecommunications, and electricity, originated in the 20th century. It turns out that the rise of the internet and personal computers was crucial.

The Information Revolution and the Digital Age: The World Wide Web, mobile phones, social media, and other technological advances ushered in the Digital Age, which began in the latter half of the 20th century. The development of information and communication technology has had a major impact on business, society, and day-to-day living.

Innovation is a multifaceted concept that may be classified into many different categories based on its nature, relevance, and application. Below are few typical classifications that innovations can fit into:

Sustaining Innovation: Sustaining innovation is basically improving existing products or services of a particular firm based on the needs of its customers or the market trends. For example, an upgrade in the model of an Apple phone from iPhone 5 to iPhone 14.

Disruptive Innovation: Contrary to sustaining innovation, disruptive innovation means a complete introduction of a new product or service into the market and this new product or service displaces the existing one completely. For example, the introduction of smart mobile phones which completely disrupted the use of landlines on the roads.

Process Innovation: process innovation centers on improving the procedure or method of production and delivering of these products and the general services involved in the production and delivery

Business Model Innovation: This innovation is associated with a change or a shift in the way a firm conducts its business. An example of this type of innovation is a change of partnerships, or the distribution pattern of the company.

Product Innovation: Product innovation is the process for creating new or improved products or services. It could entail launching whole new products or improving the existing ones; which may include new features.

Incremental Innovation: this kind of innovation entails making little, progressive adjustments to the existing available goods, services, or packaging. Generally speaking, it results in more evolution and less disruption than other forms of innovation. A typical example is Samsung phones upgrading their system.

Social Innovation: This is the process of creating new techniques or approaches for solving issues pertaining to the environment or community. Usually, it involves government programs, nonprofits, or responsible businesses.

Cultural Innovation: Cultural innovation is the emergence of new ideas or techniques that affect the norms of the culture and tradition of people of diverse communities, or societies.

Policy Innovation: Policy innovation is the process of establishing new laws, regulations, or public policies that address societal issues or attain certain goals.

Educational Innovation: This is the process of creating new curriculum, technologies, and methods of instruction to improve learning and information transfer.

Innovation has promoted growth and advancement in societies over several decades. It has led to different creativity when solving unmet needs and seeking ways to solve problems as they come up. The importance of innovation can't be overstated. Businesses can get a competitive advantage through innovation by offering unique products or services which make them stand out in the market. Innovation promotes economic growth through the creation of new industries, job opportunities, and investment opportunities. Because innovation offers lasting solutions, it is crucial for addressing global issues like poverty, healthcare, and climate change. Better products and services are frequently a result of innovations, which boosts

customer satisfaction levels. Businesses may operate more effectively through employing innovative solutions that improve processes and cut costs. In a world that is changing swiftly, businesses that innovate are better prepared to adapt to new market conditions and technologies. Innovations have the ability to encourage environmental sustainability, conduct and mitigate the adverse environmental impacts of industry. It urges people to think in new and innovative ways on how to solve problems or establish something new.

Conclusion

Innovation has been in existence as early as life itself. The world cannot function properly without innovation because it evolves on a daily basis to make life on earth more comfortable and easier. Innovation has brought different changes all over the world. There are different types of innovation, and its importance can never be underestimated. Innovation has done more good than harm to our society. Looking into different forms of innovation, one could imagine what the world would look like in the years to come. Organizations, industries, firms, and individuals keep innovating new things to make progress in their daily activities. Different countries of the world also consider innovation as one of the key factors to their economic growth. The more humans seek innovation; there could be chances of harming the environment as well as humans. It is therefore important to seek sustainable innovation which is environmentally friendly. It is also important to put a lot of factors in place before considering any innovative ideas. Innovation has truly been a viable tool for human development and economic development from a distant time.

Innovation: From Human Essence to Corporations

By Pavel E. Koliasov

Abstract: This essay examines the pivotal role of innovation in human history and development, from ancient epochs to contemporary organizational dynamics. It delves into the intrinsic connection between innovation and human nature, fueled by curiosity, evolution, and neurotransmitter functions. Furthermore, it highlights the perpetual cycle of innovation, driven by the continuous emergence of new problems demanding inventive solutions. Across individual, corporate, and national levels, innovation remains a critical force driving progress and adaptation in society.

Keywords: drivers of innovation, human nature, evolutionary role of innovation, Adizes.

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Innovation is an important and significant aspect of humanity and its development. Throughout history, humankind has developed thanks to innovations in different spheres of life: science and technology, culture, economy, politics, etc. Even historians as a scale of division of epochs as a criterion take the technological development of humankind, which was the introduction of new innovations. Thus, the earliest epochs are called the Stone Age, Copper Age, Bronze Age and Iron Age. And their distinctive feature is the application of the development of new processes for the use and processing of resources, which, in turn, leads to the creation of "new products" - tools, weapons, etc. In other words, even the division of human history is based on innovation.

Another example of the importance of innovation in terms of human development is the case of the Roman Empire, who created a number of process innovations in politics, governance, and law. The emergence of the Roman system of law initiated a new science and changes in the system of interaction in society, which led to the stabilization of social relations, the expansion of legal space and increased legal awareness and legal literacy.

Thus, innovation has often been a catalyst of human development. Even development itself implies reaching new frontiers, increasing efficiency and productivity, creating something new that solves problems and raises the standard of living. Innovation, in turn, represents the introduction of various innovations that imply changes based on improvements of various kinds: process, technological, etc., which lead to the solution of problems.

However, the question arises: if the development of humankind is built on the constant introduction and emergence of innovations, what stimulates the creation of innovations? I dare to suggest that the answer lies in the very essence of a man, our nature, the peculiarities of our evolution and the peculiarities of our mind. Evolution itself has led humans to create and use our brains to generate ideas. On the basis of intersection of various factors, a man has been capable to create the tools for his survival, which became an important step of transition from adaptation to environmental conditions through the evolution of organisms to the use of resources of the surrounding world. In other words, already at the very beginning of our way a simple innovation lies - to use a stick with a stone instead of fingernails and teeth. Further not so technologically advanced innovations began to appear in comparison with the present ones, but with great importance for those times: use of fire, creation of weapons, use of wild animals as helpers in labor activity. All these innovations were the first, and it was those innovations that gave rise to the emergence of sciences, research institutes and modern technologies.

Moreover, our organism often stimulates us to innovative activity through the production of special neurotransmitters such as dopamine and serotonin. Dopamine [Wise, 2004] is called the "happiness hormone" because it stimulates the reward system in the brain and induces positive emotions. The reward system is activated when we receive something pleasurable or expect to receive it in the future. This could be food, money, social interaction, or any other activity that generates interest or pleasure. Moreover, pleasure and interest are also caused by activities and solving different kinds of tasks: household, work, etc., which stimulate human research and innovation. Serotonin [Canli et al, 2007] is a neurotransmitter that affects many processes in the human body. It is also called the "happiness hormone" or "mood hormone" because it is involved in the regulation of emotions, motivation, pleasure, learning, memory, and other functions. Serotonin stimulates the reward system, like dopamine, in the brain and causes feelings of satisfaction, joy, optimism, and self-esteem.

These 2 neurotransmitters help a person in his/her striving for cognition, giving internal self-satisfaction from the work done, which, in its turn, gives us the mechanisms laid down by nature aimed at stimulating our innovative activity. In other words, at the level of the organism

there is a desire for innovative activity, without which the organism and the person will be in a suppressed state.

The human being also has a desire to study and learn, often we are driven by interest. We can observe such human behavior in horror films. Often the plot of horror movies begins when the protagonists, in spite of their fear, go to a creepy house in the woods or stop the car to see what creepy creature ran ahead. Such behavior can hardly be called rational, and it, in turn, once again shows the nature of man and his desire to learn, to satisfy his interest even despite the possible danger that may await him.

If we continue to perceive innovation as a human need, we can see that people create and implement innovations at the household level all the time. Thus, it can be stated that every person in his/her everyday life constantly improves his/her household system: optimizes processes, thinking out the daily routine, stages of gathering for work/study; changes the organizational structure, planning the space of the house with places for storage/cloakrooms; introduces new technologies, installing switches on one side and the other side of the corridor, modernizing recipes for cooking, etc. And, undoubtedly at the level of an individual these will all be innovations because they increase efficiency, productivity, passing the stages from research and generation of ideas to their realization.

Thus, we can say that for human being innovations are not plainly important, but to some extent the essence of human life and the process of its evolution. For us, innovations, and innovative activity in any of its manifestations are a natural way of life and interaction with the world around us. Moreover, the organism itself stimulates us to support innovative activity by stimulating the release of neurotransmitters.

If we talk about innovation in terms of inventions and products that solve existing problems, then the innovation process is cyclical and never-ending. According to I. Adizes the solution of existing problems leads to the emergence of new problems that also require a corresponding solution [Adizes, 1991]. Moreover, this concept also applies to the innovation process. Thus, when one s-shape innovation is replaced by other innovations or when one innovation requires the creation of other innovations for scaling. There have been plenty of such examples in human history:

- The invention of the light bulb contributed to the development of the energy industry and infrastructure. The light bulb itself, like other electrical devices, requires a source of energy for its operation. Electricity has become the primary source of energy for light bulbs, which has created the need for the production and distribution of electricity. In order to deliver electricity from sources (power plants) to end users (homes, businesses), electrical networks had to be established. This involved the deployment of wires, transformers, and substations. And to ensure a constant and reliable supply of electricity, infrastructure had to be built and maintained, including electric poles, distribution centers, and more.
- The invention and spread of the automobile led to the development of infrastructure and the logistics industry. With the advent of automobiles, the construction of roads, highways, bridges, etc. began and the need to regulate the flow of traffic led to the creation of traffic rules. Also, the proliferation of automobiles had an impact on urban planning. The creation of parking lots, changes in public transportation systems, and the development of suburban areas became features of urban infrastructure.

These examples show that one innovation that solves a certain problem creates many other problems that require new innovations to solve them. And this process is endless, i.e. innovation itself generates other innovations regardless of our willingness to participate, because it creates new problems. We can even say that we are dependent on innovation, which requires constant support and new solutions.

Considering an organization, we can notice that to some extent it is a living organism with different systems implementing their functions, with their motives, goals, with their mission and their needs. However, in this case, first of all, this organism solves not its own problems, but the problems of a society, being in close interaction with it. For solving problems, the company receives income and eventually profit, but the company cannot receive profit constantly, because its solution, its processes become obsolete over time. Therefore, in order to increase its survival and sustainable development (in this case we are talking about the constant process of company growth, not the concept of "sustainable development"), the company needs to increase both its attractiveness to the consumer and its competitiveness. The need to be competitive and attractive leads to a constant struggle and race for the best, most suitable solution for the target audience. This process constantly transfers problems inside the organization, where the generation of ideas and corresponding solutions (innovations) occur naturally, but this allows to remain competitive only at the current moment and does not guarantee the survival of the company in the future, because there is no creation of solutions for 1 step ahead.

To be sure of survival, companies are beginning to utilize the exploratory and pioneering nature of human beings to generate the innovations that the company needs. For this purpose, this process is tried to be controlled in order to steer it in the direction that the company needs based on its strategy, mission, vision, etc., but at the same time it limits the human ability and creative nature. Therefore, companies try to balance between the controlled innovation process and the free one, when employees can offer their ideas, because for companies the emergence of innovations becomes a postponement of the moment of withdrawal from the game. There are many examples of creating such a system, here are some of them:

- 3M [Towns-Andrews et al, 2019; 3M Buckley Innovation Center. Retrieved October 23, 2023, from https://3mbic.com/about/] sponsored the creation of the 3M Buckley Innovation Center, which provides business incubator services to both internal employees and people outside the company. Additionally, the center provides amenities and services for startups and SMEs. This support includes access to office space, meeting rooms and laboratory facilities. The center also promotes innovation by connecting businesses with local universities and research institutions and offers business support services and mentoring.
- Rosatom State Corporation [ИННОВАЦИОННЫЙ ХАБ ГОСКОРПОРАЦИИ “РОСАТОМ.” Retrieved October 23, 2023, from https://ih.rosatom.ru/] has created an innovation hub, Inn hub, which is a gas pedal for startups that have emerged both inside and outside the corporation. The hub helps startup teams to create a product, invests in them and provides employees to the team.

Innovations, as well as for companies, give a competitive advantage to the states on the world stage. Therefore, at the state level, innovation activity is stimulated: favorable conditions are created for scientific research, development of new technologies, support for innovative projects and companies. In this case, innovations for the company and the state play a significant role, because the survival of these organizations depends on them.

However, due to the increasing focus on the race of innovative development, the period of release of new technologies and innovations to the consumer market begins to decrease. This trend is increasingly becoming evident, which is becoming noticeable to various researchers, futurologists, etc. For example, Raymond Kurzweil (2005) created the theory of technological singularity of technological development of humankind, according to which technological progress occurs on an exponential curve and at some point, will become

uncontrollable, and the release of new products and their distribution among the vast masses of consumers will be instantaneous [Kurzweil, 2005]. Of course, this theory is not convincing due to the fact that a person needs a period of adaptation to new technology. If we talk about the moment of singularity, then during this period a person will have to learn new products every day and immediately forget the old ones, which in fact does not give time to use and solve problems. In this case, the person will not realize what problem they are solving and whether they have a need.

However, Raymond Kurzweil's theory reflects the trend that innovation is not a means to an end, but to some extent a goal, that the system changes to generate innovation, because it remains one of the only ways to survive. The negative side of this process is the exploitation of the innovative nature of man himself, his creativity and desire to explore. This state of things will eventually lead to a slowdown in innovation processes in the distant future, but not to the rejection of innovation, because it is a way of solving constantly arising problems.

Thus, the importance and significance of innovation is critical for humanity and a man, because it is a manifestation of the very nature of people and the mode of evolution, which is reflected at different levels: domestic, corporate, state. And as long as there are problems that need solutions and areas of unexplored, innovation will remain significant and important. And the attention of companies and the state to the field of innovation will only increase in parallel with the growth of investment in innovation activities and the creation of more and more systems that integrate different stakeholders: business, research institutions, financial funds, government, etc. Within the framework of this cooperation there is an opportunity to generate new innovations at the intersection of several industries and spheres of life, which is also a certain trend of increasing complexity of problems. New problems often stand at the crossroads of several industries and require joint solutions, what increases the importance and significance of innovation and innovation activity.

Innovation in Education: The Use of Artificial Intelligence as a Tool in the Teaching-Learning Process

By Viviana Cristina Gianini Sant'Anna

Abstract: Society is in constant transformation, enhanced by globalization and, mainly, by the rapid advancement in technology. Currently, technology is present in all social spheres and, along with innovation, social relations, organizational processes and advances in education are associated. The objective of this study was to analyze how innovation and technology are included in education and how these technological innovations can assist in the individual's teaching-learning process by using artificial intelligence in the educational context. The methodology adopted was a bibliographic review, enabling a deeper understanding of the topic of innovation and artificial intelligence. The results demonstrated that the use of technologies generates a robust, dynamic and innovative educational environment for student development, ensuring that the agents involved in the process are increasingly prepared for a model of an immediate and technological society.

Keywords: Innovation, Technology, Artificial Intelligence, Education.

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Currently, individuals' daily lives are organized with and through technology. This is proven by acts that range from setting an alarm to complex daily and professional decision-making. This advancement allows for evolution and transformation in terms of knowledge. However, in an increasingly technological society, it is necessary to think of strategies to maintain the set of necessary skills in individuals.

Due to this concern, UNESCO (United Nations Educational, Scientific and Cultural Organization) brought together a set of skills that will be necessary for the survival of citizens towards the new Era. These skills are linked to the organization of life, study and work. Thus, with the unification of media literacy and information literacy actions, a new model emerges, the so-called Media and Information Literacy (MLI) (Domingues, Camargo Filho and Laburú, 2023).

Universally, there is a deep thirst to understand the complex world around us. Media and Information Literacy (MIL) is a basis for enhancing access to information and knowledge, freedom of expression, and quality education. It describes skills, and attitudes that are needed to value the functions of media and other information providers, including those on the Internet, in societies and to ¬nd, evaluate and produce information and media content; in other words, it covers the competencies that are vital for people to be effectively engaged in all aspects of development. (Jānis Kārkliņš, p. 07, 2016)

The creation of MIL was essential, as the trend is towards converting media (radio, TV, newspapers, books, among others) into digital files and concentrated on a single platform. In this regard, UNESCO was responsible for uniting countries and organizing alignments in the various spheres in which the individual is involved.

According to Souza and Valle (2021), the educational institution is part of the training process of individuals and holds the responsibility of teaching literacy and educating through the use of technologies. Thus, the application of MIL is valid for the context of education.

The justification for the study of innovation and artificial intelligence in education, with a focus on the teaching-learning process, is pertinent to the current context, as the investigation of this topic provides value and solutions, in addition to being a support tool to facilitate management and work of educational agents (managers, teachers, supervisors, coordinators, among others), in addition to providing students with innovative and active training in the Digital Age.

Society is changing due to the rapid advancement of technology, so innovation is present in this framework, allowing an attempt to transform society into an inclusive, pluralistic and democratic community. Innovation is present in all segments, since innovation means encouraging, creating or recreating, therefore, everyone uses innovation daily, as it is associated with the generation of value, productivity and profit. Through digital transformation, changes happened very quickly, and society began to adapt to remain updated and competitive.

Through innovation and advancement in technology, it was possible to insert education in this context, as educational systems are of paramount importance in the process of managing information and changes. According to Parreira, Lehmann and Oliveira (2021, p. 977), “innovations have a known path in the field of Education, essentially as instruments that make information available.” Therefore, the innovation process, as well as information technologies, can add to the teaching-learning process using the systems' expertise in favor of evolution.

In this regard, artificial intelligence fits into this process, making its use viable to enrich learning and assist educational agents in pedagogical demands.

Artificial Intelligence (AI) is conceived as a system of combining binary codes that allows machines to make decisions like those made by human thought, constituting an innovation and revolution present in all fields and areas of knowledge. (Ambrosim, p. 02, 2024).

From the contextualization of ideas for this study, a bibliographical review was carried out, with the aim of collecting data, which support the context of innovation and artificial intelligence applied in education. The choice of this theme arose out of concern to understand how technology can further assist the teaching-learning process, as the current generation of students, regardless of the teaching modality they are in, has a technological and media bias, in addition to the urge of obtaining immediate responses, a characteristic of the new generation and consequence of technologies on the individual's daily life.

Undeniably, Artificial Intelligence (AI) has become popular very quickly and is transforming many areas of society. AI is commonly thought to be recent, however, this is not true. According to authors such as Abar, Santos and Almeida (2023), Ambrosim (2024), research into AI began around 1950, by pioneers John McCarrthy, Marvin Minsky, Nathaniel Rochester and Claude Shannon. The first studies were premised on understanding machines and the possibility of them simulating human behavior and intelligence.

In regards available studies on the context of innovation and artificial intelligence, there is still a long way to go. Even though research began in the 1950s, AI still needs to be studied and adapted on several fronts, which does not negate the fact that AI has made significant progress, having the ability to recognize different patterns, process languages, and have a pluralistic vision, among other purposes. Through this development and deepening of knowledge, AI is increasingly present in education, technology, health, transport, financial and other sectors.

Analyzing AI in the scope of the present study project, it is clear how it helped educational agents, since it allows teaching based on data analysis, solving more complex problems, gamification for the teaching process, correction of activities and even support when answering questions about specific subjects.

Therefore, it is possible to affirm that artificial intelligence has promoted digital transformation, which results in better quality in teaching, in addition to enabling engagement and integrative methodologies that enable students to exercise leadership in the teaching-learning process.

Naturally, there are still fears about AI, as many believe that it will replace the human factor, but this view is not entirely correct. In some functions, AI can indeed take on a relevant role and even replace some functions developed by man; however, there will always be a need to have human command behind it.

In the educational context, AI can be incorporated into the management process and used in the classroom to improve student learning. However, all these actions create new challenges for agents, as it is necessary to understand the use and application of AI so that it can be productive, otherwise it might bring a bad experience and more distortion to the agenda.

According to Perrenoud (2024), teachers can use of technology as a support tool to organize educational practices and thus apply them in the learning process. In addition to organizing teaching practice, AI can help plan more personalized and active classes, providing students with an active methodology, participation in integrative projects and more realistic problem-solving simulations. For the teacher, there will be time optimization, better management and organization of content, in addition to being able to make the material more communicative in terms of visual aspects.

The Governor of the state of São Paulo (Brazil), Tarcísio de Freitas, announced in April 2024 that the state government is developing a project to use artificial intelligence (AI) tools to produce teaching material, such as part of the classes aimed at students enrolled in primary and secondary education in the public education network (Uol, 2024).

This initiative was established to assist teachers in planning and producing material that would facilitate the viewing of content during classes. The state education department reinforced that this project does not exclude the participation of teachers, i.e., AI will only be a tool used in the teaching process.

After the announcement of the pilot project by the governor of the state of São Paulo, many researchers and teachers questioned the functionality of the tool, in addition to generating discomfort among professionals in the field who deduce that with the application of AI, several education professionals run the risk of not are more necessary in the field of education.

This announcement caused a great division of the class over the questions surrounding AI; however, it is unquestionable that the future of all segments is linked to artificial intelligence and new technological tools due to the evolution and transformation we have been going through. (Lieutenant and Santos, 2024).

New technologies are in use, and it is up to all education professionals to improve their daily lives and understand how such tools can facilitate the teaching-learning process, in addition to adapting to new educational methodologies in different niches.

Considering the perspective presented on innovation and AI in the educational field, based on the bibliographic survey it is possible to affirm that it is necessary to break this paradox that society does not need to train and prepare itself for this Digital Era.

Regarding the educational field, the focus of this study, it is necessary to establish a culture with an in-depth look at the actors (students and teachers) involved in this process and ensure that everyone has access to training with learning methodologies that address different tools that can enable learning in the classroom, which involves the student as the main axis of the process, providing assertive and quality learning.

Another essential element in this teaching-learning process is ensuring that educational institutions prepare adequately for the use of artificial intelligence. Because the tool is available for use and often in free versions, the best solution is to bring AI as an ally of educational agents, rather than for students to use the tool inappropriately, generating a lack of learning and plagiarism in delivery. of activities. Therefore, it is important that institutions use the tool and train agents to recognize when students are using AI inappropriately and circumventing the educational process.

Therefore, innovation and technology play a fundamental role in learning. I highlight the importance of integrating innovative technologies, since these tools provide broad access to educational resources and allow revolution and transformation in the teaching-learning process, thus generating engagement and raising the potential of students, who participate in a robust educational process and dynamic and innovative learning environments. Thus, this study provided elements for a brief analysis of data on the topic and provided a pluralistic view of innovation and artificial intelligence in the learning process, as well as its involvement with other elements such as the set of skills that the individual needs to develop and knowledge regarding media and information literacy.

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Theories of the Innovation and Their Main Contributions

By Luis Fernando Panicachi Cocovilo Filho

Abstract: The essay aims to present some of the main theories about innovation in order to show concepts, techniques, methodologies and processes. A parallel will also be made with real and famous cases about innovation, in a critical way. The goal is to inspire reflection and promote insights that can assist future innovations, both theoretically and practically. In general, understanding established and widespread theories, as well as visualizing and interpreting successful innovations, is an important pillar for innovating. The critical aspect of the analysis also provides important considerations regarding ethics, employment, society and the human x machine relationship. Future innovations have a duty to consider their social impacts in order to balance advances in favor of social well-being, and a critical look at past and present innovations is essential to achieve this objective.

Keywords: Innovation, Theories of Innovation, destruction, entrepreneur, open innovation, ecosystem

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Innovation generally means creating or rebuilding something. It is the act of changing, renewing or transforming something. This something can be processes, products or services. Every day, someone is trying to innovate, as this means being one step ahead, especially in the corporate environment. When companies innovate, they force competitors to also innovate, as the target audience is attracted to this. Standing still represents a competitive disadvantage and can consequently lead to bankruptcy.

Although it is easier to visualize in the corporate environment, innovation is not restricted to it. In academia, it is possible to see innovation and even in the daily lives of normal people, within their homes and routines it is possible to innovate. It is an activity that does not require a degree of study or specializations, although it is undeniable that these strongly help the development of innovations. Innovation is intrinsically related to thinking outside the box, seeking solutions to problems and externalizing ideas and thoughts that offer value, whether monetary or social.

Given the importance of the topic, scholars and specialists look for ways to instigate and process innovation, in order to try to make it more recurring and valuable. As a result of these efforts, various theories and methods are available to facilitate innovation at every stage, from creation to implementation. However, there is no magic formula or guide to follow that will result in an innovation, especially a successful innovation. It is possible to extract patterns from innovations that have worked and prospered, but even adopting these patterns does not mean arriving at the same places. Area of activity, country, culture, and several other variables are correlated with the result of an innovation.

The first known theory is attributed to Joseph Schumpeter, an economist. For him, as early as 1911, innovation played a fundamental role in economic development. He praised the role of the entrepreneur, who is generally more connected to the world of innovation, mainly because he has characteristics that are necessary to innovate (solving problems, generating opportunities, creating solutions and investing in ideas). This theory is based on 4 main factors: Creative Destruction, entrepreneurs as agents of change, types of innovation and economic cycles.

The first principle has a self-indicative name, the concept of destruction refers to giving up the old in favor of creating the new. It is a dynamic and inevitable process, for something new to emerge something old needs to become obsolete or even extinct. The main catalyst for this process is technology. Looking back, a lot of things were replaced by something technological. A very simple example is the typewriter that gave way to the personal computer and today is merely a collector's item or decoration. Another example is digital media, which are increasingly taking the place of printed media, and this has a direct impact on the habits of people who consume these media. Unbridled advancement, with little regulation, makes innovation dangerous. With the aspect of free expression, a lot of crimes are committed, and a lot of hate is distilled, what was supposed to be a space for networking, exchanging messages, publicity and the like, becomes something harmful. If there is no preparation or control of innovation, it becomes a risk to society. It is not simply launching it into the world, engaging millions of users, being a platform that raises billions, representing success, but on the other hand being open to attacks and disorder.

As a second factor, the author highlighted the importance of the entrepreneur, placing him as an agent of change, that is, the one who takes the lead and promotes transformations. Its characteristics of innovation, creativity, knowing how to deal with risk, vision, leadership, strategy, etc. allow it to find opportunities where others do not see, and, with this, they are able to identify needs and provide solutions to meet them, in this process, innovation occurs. Generally, new markets and industries are created with one or more new factors, to stand out

among the others. Entrepreneurs know the importance of change in favor of development and know how to use technology as an accelerator of solutions. When they innovate, a continuous cycle of innovation is created, as external agents are impacted, directly and indirectly, and are forced to also promote improvements and progress.

In addition to these characteristics, when it comes to the free market, the entrepreneur also needs to have virtues in relation to raising resources, dealing with competition and pressure and knowing how to manage their innovations in order to balance scalability and efficiency and, above all, they need to be resilient in relation to uncertainties and failures. As already mentioned, innovation is not a given, it is possible to not find success. But it is a process, a mistake means being closer to success, so it is extremely necessary to learn from mistakes and be flexible and adjustable to prosper an idea. All of these issues shape the entrepreneur as an agent of change (innovation) and directly relate them to the concept of creative destruction. An important point is that the entrepreneur cannot only have a market vision, he also needs to look at society and think about social or environmental problems. The creation of value in fields such as education, health, social inequality directly affects the progress of an innovation. All of these issues shape the entrepreneur as an agent of change (innovation) and directly relate them to the concept of creative destruction.

The third factor is related to the theoretical part of innovation classification. Schumpeter presented five categories to differentiate the types of innovation: new products and services, new production methods, opening new markets, new raw materials and new organizational structures. Understanding these concepts is essential for understanding the impact of innovation on economic growth, industrial transformation and technological development. Knowing these dimensions of innovation helps in identifying new business opportunities and capitalizing on the strengths of an idea, in order to direct it more easily. The understanding of these classifications also helps in moments such as hiring or training talent for innovation and creating strategies to achieve innovation objectives.

In practical terms, products and services are simpler to identify, such as digital banking, what used to be a physical branch is now all done through applications. This change has been forcing traditional banks to increasingly invest in improvements and online solutions to serve their audiences. As we have seen, innovation brings positive points but is also accompanied by challenges and problems. The digital bank is criticized for difficulties in support (a direct consequence of the lack of physical space for customer service), difficulty in withdrawing physical money and being 100% dependent on the internet. It is an example that shows how a market (even an extremely consolidated one) is affected by innovations in order to redefine concepts and affect the interaction between company x customer.

In terms of new production methods, the creation of a production line used by Ford to improve efficiency and optimize costs stands out. This example also directly affected the way industries function.

In relation to raw materials, it is something more difficult because they are generally of natural origin, but they can still happen, especially when it comes to processed materials or understanding how to use everyday materials in mechanical tasks. This factor is directly related to sustainability, knowing how to reuse resources is essential. A practical example is that it is possible to transform sewage sludge into civil construction material (for example ceramic masses). This discovery was possible thanks to researchers who seek to find solutions outside the box and impact the means of production.

The category of opening new markets is related to the opening and/or migration of companies into new or improved segments. This represents the potential for transformation. Amazon is a great example, what used to be a bookstore is now one of the largest global e-

commerce in the world, with a direct impact on the user experience, revolutionizing the buying and selling of products and also sectors such as logistics.

Finally, the category of new organizational structures relates to the creation of methods and practices that can be adopted within the company for continuous improvement. There are countless examples ranging from Design Thinking techniques (an approach to developing critical thinking and creating a favorable environment for the creation and development of ideas) to regulatory changes such as the adoption of remote work, hybrid working hours or reduced working hours for employees, aiming for productivity and better conditions of work.

The last principle of Schumpeter's theory, that of economic cycles, defends the idea that innovations happen in cycles (waves), periods determined to occur, and which are directly related to the economy where the innovation was implemented. This is an inherent characteristic of capitalism due to the disruptive factor that changes promote. There are 4 stipulated phases, the first being expansion, when innovations are introduced into the market and cause enthusiasm and provide growth. This is where the public most consumes innovation (in the case of services or products) and where the most movement takes place (hiring and promotions). Companies move to absorb the changes and prepare for the next ones. Saturation is the second stage, the economy begins to slow down, the public begins to consume less, the stimuli are already smaller, competitions increase as the new factor no longer exists, the paths begin to diminish as most have already been explored, the impacts begin to stabilize or decrease. The third phase is recession, which is where the lack of demand begins to impact on companies, which, if they are not prepared, could have serious problems, even bankruptcy. Here unemployment increases, which causes a social impact reflected on the economy of the entire ecosystem. This stage is the most challenging for companies, in addition to having to endure the moment, they need to spend efforts to get out of the situation, that is, return to the first stage of the cycle, promoting new changes. Finally, the recovery stage, where new ideas begin to be put into practice, investments begin to return, and the economy begins to move again. This is the moment that bridges expansion. This cycle is infinite and difficult to predict. Understanding this dynamic is essential to know when to position yourself in the market. Launches need to be linked to the best moment in terms of economy and market. Launching an idea at a time of recession can represent its failure, not because of quality, but because it was not the time. It is necessary to know how to extract as much as possible from expansion in order to mitigate recessions and be able to continue developing even in times of downturn. Planning is affected by these dynamics, and therefore moments of difficulty must be considered.

The digital revolution that began in the 20th century and continues to this day is a practical example where it is possible to see how these steps work. In the beginning, many innovations were made and prospered, smartphones, personal computers, internet, etc., this reflected in the advancement of technology and communication companies, generating a lot of revenue and impact on people's lives. However, in 2000 we had the dot-com bubble burst, where more than 500 companies that provided online services went bankrupt. A little later, in 2008, a global financial crisis, caused by the bursting of another real estate bubble, resulted in the bankruptcy of many companies. As time passed, a wave of innovations began to recover the economy and usher in a new era. Fashionable themes that move the market are sustainability (renewable energy, electric cars, etc.), artificial intelligence, internet of things, among others.

Innovation has also evolved, Schumpeter's theory, although very valuable, with great contributions, has some criticisms, after all it was from 1911, and since then many things have changed, and new standards have been changed. Some healthy and valid criticisms about the

theory are the focus on the entrepreneur and the lack of exploration of basic innovation (that which is provided by normal people, but which also have social and economic impacts) and the neglect of incremental innovation, with a lot of emphasis on creative destruction. Therefore, we must consider other theories and ways of seeing innovation, especially considering the contemporary period.

Another more recent theory, from 2000, developed by Henry Chesbrough, is behind the concept of Open Innovation. Its main contribution is a break with the idea that innovation can and should only be developed internally, without the influence or contribution of external agents. On the contrary, the author defends the idea that the absorption of external innovations can be valuable for the internal development of innovations. In the same way, sharing internal innovations helps other companies, which can improve and evolve ideas more effectively, creating a valuable network of information and ideas.

These shares create what the author classifies as an Innovation Ecosystem, where multiple actors contribute to the creation and development of new products or services. These actors include other companies, even competitors, where business partners, technical colleges, universities or research institutions are formed, where advances create spaces for academic and technological advances to be tested, validated and put into practice. Also included are startups and entrepreneurs, which have acceleration potential and are generally associated with emerging technologies that generate major impacts. There are also specific cases, where even individual people can also interact in the ecosystem.

Some of the main concepts that were highlighted in this theory are crowdsourcing and co-creation. The first is one of the ways that companies find to open their doors to the external community, establishing communication and interaction channels for the generation and evolution of ideas. It is generally a formal process, with funding for research groups and the use of methodologies to achieve the objectives. The existence of different online platforms helps with this issue. They connect people with companies to ensure that the interests of both are satisfied. The use of crowdsourcing provides scalability and diversity to the company, after all, it is possible to allocate many people, with different knowledge and specialties, without the need to include this group internally, which would represent bureaucracy and formal HR processes.

Co-creation also involves the external community, but in a more strategic way, often focused on marketing. Often the customers themselves or other interested parties are involved in the creation of the product, in order to collaborate with it, making it more attractive and innovative. Again, both won. The company has the chance to receive insights and expand its brand in the market in accordance with the expectations of the most interested parties. Customers, in turn, have the opportunity to positively impact the product or service. It is a continuous process, with multiple feedback aimed at improvements. An example that illustrates this concept well is what Nike does. It allows the customer to customize the sneakers according to their preferences, considering materials and colors, and thus being part of the design process. In addition to pleasing the consumer and providing a pleasant experience, new products or ideas can emerge according to these individual creations.

Both concepts bring benefits to the company that practices them. They are directly related to innovation and have the ability to accelerate it. Many people are involved, with different profiles, perspectives, imaginations and ideas. This means that problems are identified and resolved more quickly. Costs are also reduced, considering that the community itself collaborates with the innovations, and even when paid groups are used, the costs are lower. Having direct contact with external agents provides better market alignment and puts you closer to the customer, creating a connection that can lead to customer loyalty. On the

other hand, the use of such concepts also brings problems and challenges. How to manage intellectual property with so many external people involved? How to motivate and keep external agents motivated? How to guarantee quality? All of these questions require processes and techniques so that things do not get out of control. For innovation to thrive in this ecosystem, it needs to overcome all these doubts.

Moving on to another theory, even consolidated companies cannot remain inert. The Theory of Disruptive Innovation proposed by Clayton Christensen in 1997 says that small companies can surpass large companies by offering the same product or service but with innovations that win over consumers. The author presents some concepts that help in understanding this dynamic. The first is the comparison between disruption and support. While disruptive innovations focus more on offering better usability through simplicity, providing more convenience through simple but attractive and direct features and reducing costs, sustaining innovations seek to focus on specific and demanding customers, offering incremental improvements and more robust services. Almost always, disruptive innovations begin in markets where large companies do not pay attention, mainly due to low returns, causing a poor cost-benefit ratio. This is what the author characterizes as an initial niche market. Over time, products improve and evolve and end up leaving the niche and attracting the public. This is due to continuous improvement, another concept defended as extremely important for the functioning of innovation. What started out simple starts to have more performance and more complex features and ends up expanding. For the functioning of these dynamics, simple business models are not conducive and, therefore, disruptive innovations are generally accompanied by new business models, which favor innovations in the way of creating and attracting value and being flexible to business moments.

To support these concepts, 4 steps are presented as processes to characterize disruption. The first is to enter niche markets, capture a portion of users that are neglected by the big ones, whether due to economic factors or business decisions. In this first stage, the product does not yet have the best features or does not have major new features but is focused on meeting specific pain points in a simple and convenient way, which is what the second stage represents, a product under construction, but already basically functional. Only in this way, the third step is possible, with users already using it, it becomes easier to implement continuous improvement, this is what gives more robustness to the product, so that it can begin to be seen by the general population and no longer the restricted group. After it has matured enough, the fourth step takes place, the official migration to the market in general, competing on equal terms with the big players and being a threat to them.

The application of disruptive innovations brings many benefits to small businesses and also to groups that were previously ignored or underserved. These innovations cause services or products to be anticipated for some groups, bringing social and economic gains. It brings with it new business models, also innovating in the processes and methods used. Finally, it forces large companies to reinvent themselves, encouraging competition. It's an important message so that little ones don't stop dreaming because there are spaces to be explored. Although it is difficult at first to raise resources and manage scarce resources, Christensen's model shows that it is possible to reverse and prosper. And also, so that the great ones don't close their eyes and think that no one can reach them. On the contrary, it is necessary to be aware of disruptive innovations to be prepared for them or even take advantage of them for new and better innovations.

Contemplating a range of theories and thoughts from different authors, innovation systems theory compiles some of the main topics that have been developed over the years by different authors such as Bengt-Åke Lundvall, Christopher Freeman, Richard R. Nelson and

Charles Edquist. They highlight the importance of interactions between agents and how this affects the innovation process. The agents are the same as those presented by Christensen, including NGOs and governments. Institutions, both governmental and non-governmental, are important when it comes to creating laws and policies that favor interactions between agents, in order to stimulate innovation. These interactions are characterized by mutual collaboration and knowledge transfer, as well as the possibility of financing and promoting innovation projects. Another factor is the infrastructure to support the ecosystem to function properly, both physical (laboratories, offices, playrooms, etc.) and technological (digital platforms, social networks, etc.) and institutional (intellectual property, patents, financing programs, etc.).

A different type of categorization for innovations is also presented, these being National Innovation Systems (NIS), Regional Innovation Systems (RIS) and Sectoral Innovation Systems (SIS). It is a more geographical division, where innovation processes are developed. In NIS, the country as a whole is observed, where interactions and communications are at a national level, in the same way that government policies influence the innovation process. RIS is even more specific, in the context of regions, using geographic proximity to favor innovations. A great example is Silicon Valley, a technological landmark where several innovations are developed, combining universities, startups and big techs. Finally, SIS are focused on specific company sectors, where specific knowledge is concentrated to develop innovations. These systems provide the transfer of knowledge and technology between various agents, the creation and development of (formal and informal) collaboration networks, the encouragement of innovation through public policies through subsidies, tax incentives and the creation of laws that regulate the support innovation. The internal business environment is also of great importance, companies need to value innovation by providing an environment that favors its development. This needs to be part of the companies' mission, vision and values, create a culture, processes, methods and apply practices that create an innovative environment.

This typification has some challenges to be overcome. The more actors involved, the more complex the systems, therefore, if not well managed, it can lead to fragmentation, which can represent bad results. Interdependence between actors can also cause a break in the entire chain, because if one system fails, all others are affected, directly or indirectly. Furthermore, segmenting by region is a problem, given the inequality that exists. Focusing innovations on specific places can cause serious social problems in places that are not covered, directly affecting economic development. When it comes to government, just as incentives and legislation are important, bureaucratic aspects or rigid regulations can be an obstacle, which end up becoming barriers to innovation.

It is possible to notice similarities between the theories and also counterpoints. In addition to those specified, there are several others that focus on specific concepts or cover different topics. It is worth mentioning here Frugal's innovation, which gained prominence in the early 2000s and was developed and increased by different scholars, including C. K. Prahalad and Stuart L. Hart, Navi Radjou, Jaideep Prabhu and Simone Ahuja and Carlos Ghosn. They propose the development of low-cost and sustainability-oriented innovations. These concepts bridge the ideas of Social Innovation and Sustainable Innovation, which develop the concept of innovation for specific areas. Other areas that are also explored by Innovation Theories are those accelerated by data, taking advantage of the wave of artificial intelligence and large-scale data. Also, those based on Design, which apply techniques to deeply understand the needs of users and in this way are able to devise solutions through prototyping and field tests. Strategic innovations, aimed at resource and process management and

Complex Systems Innovations, which recognize the complexity of systems and the need for adaptability and resilience to advance with innovations.

There are several others, as an intrinsic part of the concept of innovation, changes, improvements, adjustments and improvements are also part of the theories. Just as they are applied to business, services and products, theories are also innovated as new technologies emerge, new processes are created, and companies reinvent themselves.

The objective of bringing the main theories and their contributions is to present the various concepts, coming from different scholars, that encompass innovation. It is a broad field, which can be explored in different ways and has an impact on everyone. After all, innovation has the potential to connect different audiences and affect them in a way that benefits everyone. Understanding the concepts is essential for developing new innovations as well as sourcing existing ones to improve them.

Chapter 2. Economic and Societal Perspectives

Economic And Social Aspects of Implementing Innovations

By Diana A. Pavlova

Abstract: The essay sheds light on the economic and social aspects innovations can lead to from both positive and negative perspectives. The different levels are concerned: from consumers and companies to the countries. From the economic point of view, the essay touches upon such crucial benefits as the increase in the clients' opportunities, strengthening of corporations' competitive advantages, decrease in mortality rate, at the same time mentioning such innovations' limitations as durability of the innovation processes, their high risk, inappropriateness and appearance of many unexpected effects, illustrating it with real examples. In turn, in terms of social issues, there are described the changes in the traditional way of people's life and labour market the innovations influence. As for the negative aspects, they include the enhancement of gap in the society and worsening of behaviour patterns. All in all, it is concluded that when assessing the effects of innovations, both advantages and disadvantages should be taken into account.

Keywords: Sanofi, pharmaceuticals, labor market, competitive advantage, digitalization.

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Today no one could be amazed seeing a corporation's CEO with a smartphone and air pods in his ears, coming into the open-space office and simultaneously talking to his colleagues about the conference devoted to a new drug submission. This picture is commonplace these days: so, as innovations have invaded into humans' life, no one feels something wrong with them. On the contrary, innovative processes have become synonymous with success, a blessing. However veracious it might sound; it is not so at all. Even though one can see numerous merits of scientific and technological progress on the surface, the dark blurred sides of it still exist and, oftentimes, they can play a trick on people. The point is that, in the main, innovations (wherever innovative products or processes they are) should be perceived as newly created or existent ideas directed to improve the state of the organization, its structure, or activities. Nevertheless, this general benign intention can be unachieved. This is the core nature of innovations: having a strong characteristic of uncertainty, they can lead to both positive and negative outcomes. And no one can predict it. In order to clarify this statement, let us shed light on the benefits and limitations innovations can bring to different actors (consumers, companies' owners, mere citizens) in the economic and social contexts.

First and foremost, from the economic point of view, innovative products and processes in different spheres are supposed to provide economic improvements for consumers, stakeholders, companies, industries, and what is more important, national economic systems. In this sense, serving a certain function, they tend to make the economic indicators of organizations higher, the national economic system's outcomes stronger, the variety of goods for consumers broader. For instance, we can take R&D activities, newly developed drugs and digital platforms used in medicine. Having the 'novelty of effectiveness', the ability to gain the evolutionary medical results which were not attained before, as S. Morgan, R. Lopert, D. Greyson (2008) put it, innovations in the healthcare sector can strengthen the countries' economic systems by reducing the morbidity and death rates among employees (p. 4). Likewise, today no one would argue that due to such medical products as Insulin, Eltroxin, etc., modern surgery procedures and therapies, the mortality rates are lower than they could be, what helps to stick people to the working lines. According to the statistics, since 2000 to 2016 the number of deaths in the USA because of prostate cancer has been diminished by 36%, colorectal and gastric cancer - by 34%, lung cancer - by 31%, what has positively influenced the national economy (MacEwan, Dennen, Kee, Ali, Shafrin & Batt, 2020, p. 4). In a similar vein, new applications, and digital platforms (for instance, 'Biogenom',) assist people to prevent the appearance of diseases in the very beginning. All such medical improvements save the lives of many humans, leave them employable and, thus, work for the good of the national economic systems.

Another positive effect of innovations implemented in the companies is that they can lead to their colossal economic success and competitive advantage. To illustrate, here we can talk of the radical innovation of the game currency exchange service created by the Russian company Xsolla in 2006. Before it, there was nothing like that to pay for online-games, except for the platform WebMoney Transfer which was uncomfortable for video players because of its complicated delayed system. However, Perm company opened the doors to a new market of virtual currencies and helped the game corporations to increase the number of online users, the amount of the players' spendings and, generally, the annual revenue. To be more precise in figures, we can take a glance at the statistics of the Epic Games company and their blockbuster game Fortnite which made partnership relations with Xsolla in 2016. The indicators demonstrate that from 2017 to 2023 the number of all-time users has increased from 20 to 500 million people (Fortnite Statistics, 2023). As for the spendings left by users in Fortnite, they have soared up from 27 to 44 million $ since 2019 to 2022, and, as a result, the

Epic Games annual revenue has attained 6,23 billion $ by 2023 in comparison with 5,4 billion in 2019 (Fortnite Statistics, 2023). Thus, based on this vivid example, we can point out that the Xsolla's innovation was implemented in the Epic Games system with flying colors, what stimulated its economic growth, raised its competitiveness on the gaming arena and made it far more prosperous than before.

Finally, in terms of economic activities, needleless to mention the most obvious benefit innovations give to consumers. It is no surprise that innovation introduction to the market breeds an economic competition in which corporations try to invent something new and attract more basic clients. This, in turn, broadens the variety of goods available for the latter and lets their eyes wander. From this perspective, such type of rivalry enlarges the number of digital applications, online platforms, innovative products, and processes accessible in the market, and gives users a golden opportunity to choose what is more preferrable for them in terms of goals, time limits and costs. To demonstrate, we can take the business competition between the major worldwide marketplaces Amazon and eBay which have gained a widely spread popularity in Europe and USA for selling products online. After the emergence of Amazon in 1994 as an online-shop of books, electronic items and many other types of things, the entrant eBay intervened in the market and made a name for itself as almost the same online-shop but in the format of an auction. Becoming an incumbent, it is clear that Amazon strove to get its winner's place back and give a various range of goods to people. The same went from eBay's side: it confirmed that from then on it was possible to buy any product there. Watching all this mess, the real struggle of the online-shopping giants to please everyone, these, actually, became the consumers who practically won in the contest. They were blessed to choose anything they wanted, not overpay and waste money.

However, needless to say that not always innovations give economic benefits to the national economic systems, organizations, and clients. In order to prove it, we can go back to the previous argument with bio-technological innovations in medicine. First and foremost, the crux of the matter is that the creation of new drugs can simultaneously cause diseases itself. For example, it is a well-known fact that the overuse of antibiotics can weaken the person's immune system and give birth to germs invulnerable to bacteria. These are such drug-resistant microorganisms as Daptomycin, Caspofungin, Imipenem and many others which also enable other germs to become invulnerable to antibiotics. This puts plenty of people under threat. As the statistics shows, there were found 323 cases of Candida Auris bacteria revealed in 2018 (what was 318% more than in the period between 2015 and 2017); 223 900 cases of Clostridioides Difficile bacteria found in patients in 2017 (including those 12 800 cases which ended up at death) (U.S. Centers for Disease Control and Prevention, 2019). This is a wake-up call for the healthcare sector whose specialists already realize that it is hardly possible (and even inevitable) to save people from bacteria detrimental consequences. The innovative microorganisms in genetics appear because of the remedies themselves, and, unfortunately, it means that the best breeds the worst. In the same fashion, new innovations in biology and chemistry, for instance, nanoparticles of titanium dioxide widely used in the production of sunscreens, turn out to be hazardous for mankind as well. As it was found out after numerous tests and clinical trials, and then afterwards confirmed by the European Commission members, the nanoparticles of this chemical substance can lead to cancer (Sunscreens with titanium dioxide as nanoparticles, 2013). Therefore, we have to recognize that innovative drugs can not only sow the seeds of humans' health prosperity but also lead to the irretrievable harm for humanity and national healthcare system.

Continuing the medical line, we can also add another innovation limitation: the long durability to create and register newly developed drugs. Unquestionably, each year some

innovative products in the sphere go through registration, the final stage of their development (for example, the French company Sanofi reports that it expects to submit 27 more drugs in 2024-2025, while now there are only 2 new drugs under the registration, 21 drugs in the 3rd phase of clinical trials, 32 drugs in the 2nd phase, 23 drugs in the 1st phase on the official website) (Sanofi Pipeline, 2023). However, not everybody knows that it takes an immensely long and tough period of time for the innovation to get there. Approximately, in 2023 it takes about 12-15 years to create an approved drug, register it and start producing (European Federation of Pharmaceutical Industries and Associations, 2023, p. 6). Apart from durability, such innovations go through numerous regulations and time-consuming legal restrictions complicating the drug entrance to the market. Therefore, less than half of the initial substances get to the final phase. In the case of Sanofi and its expected drug amcenestrant against breast cancer, it did not go through clinical trials in 2017 in the 2nd and the 3rd phases in 2022 and simply ceased to continue to scrutinize under the blockbuster (Sanofi drops out of competitive breast cancer drug race after another trial failure. 2022). As an economic consequence, the French company's stock decreased by 4,8% (Sanofi drops, as it abandons amcenestrant clinical development program, 2022). This means that such long-term deadliness can oftentimes bring not benefits but financial losses. And such a time-consuming and unprofitable process concerns not only the innovations in the medical field: the majority of innovative applications have the same financial risks and need a long period of time to test whether it will be successful or not, whether it will be competitive or not. This puts the shareholders, stakeholders, companies' owners, and their reputation at constant high risks. The innovation uncertainty forces them all to doubt investing in the idea, wait and see, and does not guarantee that in some years they will get back any financial perks. More than that, in the future period of time, the idea they have invested in can become obsolete and outdated, what will also decrease the outcome results they could have got before. For this reason, many customers oftentimes refuse to make investments in the IT-projects as they do not want to lose more in the long run. All the way they need to sit between two stools and seek the most reasonable solution they would make today and get tremendous results out of it in the present and in the future.

Indeed, it is not a secret that not all the innovations can be profitable for companies and countries within any period of time. On the contrary, such economic actors as organizations can not only stumble in their economic growth but also gradually slow down because of the innovation products and processes. To go into the details, we can analyze this dilemma in the case of the company Spotify. In 2006, this agile company was the first one to refuse piracy in the music market and create a stream application to get legal access to download songs. Due to new engineering practices and algorithms, the company opened the door to the market of online music and gave users the opportunity to listen to something new (get personal recommendations based on the previously listened melodies). However, the Spotify business turned out to be unprofitable. The point is that the lion's share of the income has had to be paid to the singers with the IP rights. Thus, the company's losses were equal to 139 million euros in 2017, 167 million euros in 2020, 194 million euros in 2022 and 247 million euros in 2023 (Götting, 2023). All the hopes for the success of the new recommendation algorithms implemented by the company turned out to be unjustified. Therefore, these days almost everyone talks about the sooner death of this music mobile application.

The last but not the least limitation of the innovations from the economic viewpoint is that, even though companies can be eager to win in the game among rivalries, it is, on the one hand, too risky for them and, on the other hand, temporary. As it was seen in the previous example with Sanofi's amcenestrant, the company was rushing to suggest a new medical

product against breast cancer to the public. However, in view of innovation uncertainty, the idea failed, and the French pharmaceutical company not only did not succeed in the race, but also went under financial problems and somehow spoiled its image upsetting the audience. However, it is necessary to understand that even though if, luckily, the company gained a good result, it could not take the niche for long: someday new and new innovations could come with other corporations and become the leaders in the industry. Thus, it should be clear that innovations do not give a certain and constant success to the owners: the duration of this success is just a question of time. Soon after implementing one innovative structure, the other company comes, and the former one cannot go hand in hand with it: it lacks resources and cannot be flexible to be on time with new technologies. Once it has been proved by the case of Polaroid (implemented the technique of printing immediate positive photographs and soon brought away by the smart applications with built-in cameras) and many other companies ceased to be the leaders in the industry they once created.

Meanwhile, innovations can be advantageous and disadvantageous from the social perspective as well. Little by little, they can change the traditional way of people's life which can seem rather unnoticed at first sight. Firstly, they are the key to the transformations in the social institutes, roles, behavior patterns. Today no one would argue that once they have led to the gender justice between men and women. This is such a technological innovation of the 19th century as a dishwasher, which let women not make much effort in the household chores and save energy for doing other deals round. This fact made the women's routine similar to the men's one. As a result, such kind of innovations gave foundation to the equality in gender and, in the long run, to the feminism movement which up to now is tended to alter the previous ideas and conceptions of the female role in the social, economic, and political spheres of life. Presumably, someday this innovation consequence will turn into one more social revolution with will be reflected on the demographic trends in many countries.

Secondly, innovations, certainly, restructure the labor market. Due to the digitalization era, a wide spread of computer sites, new computer systems, smartphone services applications, programming languages, Instagram accounts, it is no surprise that IT-specialists have become in high demand. It was not so 30 years ago. Innovations in the technological sphere have required new professional skills, competitive competences which are needed to accomplish new types of tasks in the working places. Thus, innovations have created absolutely new specific occupations, in particular, AI and machine learning specialists, business intelligence analysts, information security analysists, fintech engineers, robotics engineers, big data specialists, digital transformation specialists, database architects, software and applications developers, database and network professionals, etc. increasing the necessary level of knowledge in the field. According to the statistics from the Future of Jobs Report, these professions and kinds of skills will be a common place by 2027 (World Economic Forum, 2023). This fact tends to mean, that the more such jobs appear in the market, the more people will be involved in the development of the IT-sector, the more various will be the IT-infrastructure of the companies and digital solutions they will offer and, consequently, the more positive benefits economic actors will get in the end.

Thirdly, following the changes in labor, innovations lead to changes in people's educational practices. To be more precise, the creation of online platforms like Microsoft Teams, Zoom, many other platforms, and boost of Instagram accounts, alter the gist of the social institute of education and its standards. Since then, many online courses devoted to foreign languages, programming languages and, in general, any sphere of knowledge have gained popularity and approval from the parents', teachers' and professors' side, having proved to be effective. There have appeared many online educational solutions aimed at

immersing students into the detail of the subjects. For example, the Instagram account devoted the Holocaust girl Eva, gives a sense of authenticity in the public history field highlighting the real details of the past to the young generations and teaching kids of the reality of that period. Furthermore, many bachelor's and master's programmes have been created in the online format which lets youngsters attain new information, broaden their horizons not leaving their comfort zone, managing their time rationally and being united with those living in other countries. All in all, it makes the process of education more individual, goal-oriented, and opens the doors to life-long learning tendency which cannot be considered a drawback at all.

Nevertheless, this is only one side of the coin in the social context. Admittedly, although men and women were once lucky to gain social equality in the household chores, innovations still have to deepen the gap, but already between the rich and the poor. Unfortunately, because of new technologies the developed, more wealthy countries go ahead of the low-income ones much faster and more intensively. As a consequence, the differences in the economic, social programmes, systems do not stay the same, they become only larger what leaves the weakest ones behind and even makes them much weaker than before.

In the same vein, definitely, the changes in the labor market do not make everybody be under the sun. On the contrary, because of the trend of digitalization such kinds of job related to humanitarian track and the office work (including relationship managers, bookkeeping and ticket clerks, legislators, and many others) soon will be out of fashion, they will be withered away, what, in turn, will lead to the increase of unemployment in some regions by 2027. Particularly, it will concern the middle-income workers and those with the low education level. And again, this will play a negative role and exceed the social and economic gap in the welfare levels, as has been already said.

Finally, because of the opening of online libraries, courses, easy online connection with professors from foreign universities, the social institution of education starts losing its main meaning, although unveracious it sounds. Today it is viewed as a service which can be bought rather than a privilege. For this reason, the attitude to academics, professors also gradually changes students start neglecting them and perceive not as mentors or colleagues but as a personnel, in economic terms. This puts this social institute of education in crisis: it does not have the significance it has previously had, value, it becomes something that is easy to gain. Pupils and students do not strive to gain food for thoughts and academic degrees, because they think it is something that is easy to achieve. This consequence restructures the traditional system of the educational sphere and coerces further changes in the same direction, not in a positive way.

To sum it up, it should have become clear that innovations certainly do not bring only good fruits to their creators, people. As has been discussed above, any economic actor can suffer from the innovations that appeared in the market because the latter are always characterized by the high levels of uncertainty and spin-offs everybody should bear in mind. The same goes with the social context. Having provided the social equality between men and women, today innovations tend to alter the present habits, lifestyles, employment trends even more radically and only enhance the social problems in labor and education sectors. Thus, there is no such sphere which could not have been affected by the STI development. For this reason, it is fair to say that today we have to observe the vicious circle innovations make themselves and which no one ever will be able to break.

The Meaning and Importance of Innovation: Transformation of Social and Economic Dimensions

By Karkhi Ahmed Khaled

Abstract: This essay explores the transformative role of innovation on the economic and social dimension of a country. It emphasizes on the role of innovation beyond technology, toward shaping economic policies and societal structures. Moreover, it highlights the impact innovation makes on the enhancement of competitiveness and sustainability within the national economies, particularly in developing countries.

Keywords: economic innovation, societal innovation, national economy

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Introduction

In the last few decades, Innovation became a very widely used term, not only in business, but in academia too. Academics and researchers showed many differences in their approach to define Innovation. However, most of them put a large amount of concentration on the technological aspect of the term, undermining the social and economic dimensions of it. Innovation is definitely a wider concept that can shape economies on different levels such as: economic policies, economic development, and economic structures. Furthermore, Societies can be transformed and reshaped in order to approach productively toward an advancement in other dimensions. Therefore, the essay will define innovation from these two dimensions.

Economic Innovation

In an economic sense, Innovation is essential for driving competition on an individual level, but rather on a national level too. Competitiveness is a key pillar in the modern world economic order, in which is vastly driven by extreme capitalistic mechanisms. Meaning that in order to have a growing economy that aims to advance steadily, Innovation is key element for having such economic growth. Com- petition is not only about the manufacturing of new products, but rather about development of new models in businesses in which ultimately leads to gain larger market share locally and with the possibility to expand globally. It gives businesses the ability to be in line with the market demand and raise the bar for new methods to emerge, which gives the economy a sense of sustainability and longevity.

This factor of how innovation is essential for structuring a sustainable and growing economy is crucial to be identified by policymakers, particularly in developing countries. In this period, Economies has to go beyond only relying on natural resources, such as the middle east, the region where I am from, we do not see the diversification of the economy, to where it becomes independent form the energy sector. The introduction of innovation to the economy is going to open doors for new inputs for the country's GDP and foster the engagement of the new generations to actively participate in boosting the country's economy, In a region that has the youngest population on an global level.

Recently, it can be noticed that many governments all over the globe consider innovation performance critical to the economic growth and diversification of the national income. In addition, according to the UN 2030 SDG agenda, private business investments and innovation are the primary drivers of productivity, eco- nomic growth, and the creation of job opportunities. Ultimately, in regard to economics, we can define innovation as the introduction of new mechanisms that assure the diversification of national income and foster economic growth.

Societal Innovation

Innovation on a societal level might be the challenging part for developing countries or even emerging economies. Innovation as a concept has an enormous impact on almost every single dimension in the state, including the societal impact. The development of the human mindset and making it much more dynamic and present when it comes to economic engagement and opportunities. Meaning that the rentier system mentality of heavily relying on the public sector to secure jobs and salaries decreases when introducing the innovative element to society.

Societal innovation is important as it can promote the idea of companies and strengthening of the economy that is based on the human resources of the country. Not only on the natural resources, but it also drives the citizens to create an alternative economy that is out of the government direct control or interference. So, each citizen needs to be included and feel an important and essential part of the economic development of the smaller aspect of the organization he/she in, and the larger picture of the national economy. Societal innovation can bond employees and also bring compassion and understanding into the workplace. Therefore, we can define the innovation on a societal level as the practical approaches to change the oneself drive to engage more in the development of the country's economy, particularly in rentier economies which are heavily dependent on the natural resources.

Conclusion

In conclusion, Innovation is a term that has been widely used in research and academia. Yet, most definitions tackled the topic from a technological advancement point of view. The definitions almost starts from the be- ginning of the innovative process, meaning that they concentrate on the procedural steps of the innovative process. Yet, innovation need to be defined by the impact that potentially make on the society and the economy, as innovation can make a great impact on the economy of a country as well as the societal change of the population particularly in developing countries, in order to achieve a sustainable economic growth.

Innovation: The Engine to Grow

By Durrani Ali Sher

Abstract: Innovation, a term often mentioned but not universally defined, holds the key to breaking the cycle of weak and strong times. This essay delves into the multifaceted nature of innovation, exploring its importance across various domains, from business evolution to social initiatives. Through examples like Netflix's transformation and Nokia's downfall, it highlights the dire consequences of neglecting innovation. Moreover, it emphasizes the role of diversity as a catalyst for innovation and its significance in addressing global challenges like climate change. Ultimately, the essay underscores innovation as both a driver of progress and a solution to perpetual cycles of stagnation.

Keywords: innovation, business innovation, social innovation, global concerns

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Weak times create strong men, strong men give good times, good times create weak men and weak men create weak times. It's an endless cycle that continues again and again. But what could be the ultimate solution for it? It's a constant urge to improve, having curiosity to explore, to be uncomfortable in comfort zone and alas "innovate" would be the cure to breaking this cycle.

Many people might have heard about the word "Innovation", but innovation is much broader than we might think and could be related to any and everything. Some mainstream definitions for innovation are:

1) Something new, which could be method, a service, product and many more.
2) It can also be called a phenomenon, which results in a product or services getting updated and adding value to it.
3) It could be when any novelty is bought into something.

"Be curious – insights for innovation come from looking into places, where your competition isn't."

By Duncan Wardle

There are endless definitions of innovation and still to this day there isn't a universal decided meaning for it and, researchers and IS (Innovation Science) academia are always debating on conceptualizing it. But I take innovation as a water which could be fitted anywhere and can take any form.

Innovation is quite a well absorbed concept when it comes to businesses and it continuously allows an entity to keep stepping up, even when they are excellent at what they do. Because even excellent performances need improvement in the form of an innovative approach. Today many companies are adopting different methods to continuously enhance their capabilities, not just to provide better satisfaction to their customers but also just to survive in the global competitive market. Timely upgrading of the goals, adopting different methods like SMART methods by the companies are some of the ways companies are focusing on innovation. A relatable example for many TV series binge watcher could be of Netflix, which was initially DVD rental business, which then the company completely transformed their business model into an online streaming platform and became a successful pioneer of online streaming business and created a blueprint for many prospects.

Innovation, if neglected, could be a truly destructive force and innovation is usually neglected in the form of arrogance, failing to understand its essentiality, overconfidence and being too comfortable. If you're a Gen Z, then you probably might not have used the product of Kodak but if you ask your parents then they would surely tell you how much of a massive brand it was when it came to photography. But the sole reason for it being vanishing today is its lack of involvement to innovate even after observing rise of new technologies like digitalization and failing to take the opportunity to innovate but unlike their competitors, who innovated their products by embedding modern technologies in it, led to the brand of Kodak getting tarnished in an attempt to protect its existing business of having the same product that stayed without innovation in contrast to the environment.

"Maintain your spirit of curiosity, keep questioning things, you'll find new ways to innovate"

By Richard Branson

If that doesn't tell you the importance of innovation in a business, then there is another example slightly recent than Kodak. Nokia – once the leading mobile phone brand, now has been wiped from the face of the mobile phone industry around the World. Not innovating was the primary cause for the business to fail because of its resistance to smartphone evolution and missing opportunities to develop.

But like I made it clear before that innovation has a very wide spectrum of its usage and definitely can't be limited to businesses but literally in every sphere. An initiative could also be taken in a community for social innovation by individuals, government, NGOs, etc. for e.g., not long ago, the Atlanta City Council purchased the largest edible forest in the United States. It covers 7 hectares and contains more than 100 fruit and nut trees that local residents can eat and grow themselves using planters. It was an initiative for the residents living near the forest to engage in self-sustainable activities like plantations and also for them to have sources for fresh, organic and health food. Even introducing food waste management initiatives in school cafeterias can have massive effect in influencing student's behavior regarding food wastage and can contribute to social innovation wonderfully.

The need and vitality of social and policy innovation might be more important in near future to address the ethical dilemmas that might arise due to scientific and technological innovations such as advancement of AI or genetic engineering, so innovation might play a more significant role in future to counter the challenges that ironically would be bought through innovation as well.

"Innovation is the ability to see change as an opportunity – not a threat."
By Steve Jobs

Innovation also plays a key driver when it comes to inventions or seeking alternatives. If we look at glasses, then the motivation to look for alternative and innovating this already existing product led to the invention of the contact lens.

People often confuse creativity with innovation, and also use both of these words interchangeably but there are far from each other when it comes to its meaning. Innovation is a more pragmatic term and has more practical relevance in comparison to creativity. Creativity is usually the brainstorming phase or coming up with an idea, while innovation is implementation of an idea, however innovation could only be pulled off, if there are creative people around to do that.

Innovation has a global significance, and its significance is only predicted to increase and undoubtedly play a major role for various global challenges like climate change. Already the developing of technologies for renewable energy sources and different sustainable initiatives taken by companies to combat climate change are strongly bought up through innovation. Vertical farming could be thought of an example of sustainable innovation, which introduced a better way of farming through various sustainability farming process that created a better and sustainable approach to agriculture sector by reducing the usage of water, not depending on the weather, more efficient use of space, etc.

"Creativity is thinking up new things. Innovation is doing new things."
By Theodore Levitt

There are different key drivers for innovation and one quite important and fascinating to me is the element of diversity. For various institutes, it's a critical component for the success of a business on a global scale and diverse experiences, perspectives and backgrounds are

crucial for innovation and the development of new ideas. It's evident that the regions with the most innovation are also the territories, which tend to be a melting point for people from different backgrounds. It makes it only a rational case for various institutes like universities to study innovation in a melting pot of its own with students from different disciplinaries and backgrounds. Diversity is followed by unique collaborations, which have the end product of successful innovation.

Innovation is something that truly has endless branches. Although, the term of innovation is new to the World, it has existed, and its implications are witnessed since the beginning of humanity. Innovation can be many things; it can be in the face of complex thing and as well as in the form of relatively simple occurrence. Everyone has the right to have their own perspective on understanding innovation as long as it ends up adding some value. Innovations is like a toothbrush; every toothbrush is sort of the same and serves the same purpose, but everyone wants their own.

Innovation: Catalyst for Economic and Social Transformation

By Ruslan S. Dautov

Abstract: This essay delves into the pivotal role of innovation as a catalyst for economic and social transformation. It explores how innovation drives progress in various sectors, from business and technology to society and the environment. The essay examines the importance of fostering a culture of innovation to address pressing challenges and seize opportunities for growth and development.

Keywords: innovation environment, metaverse, ai, creativity, problem–solving.

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Introduction

Innovation, a term often used in the business and technology world, is a critical driver of growth and advancement. It is the process of translating an idea or invention into a good or service that creates value for which customers will pay. This process involves the deliberate application of information, imagination, and initiative in deriving greater or different values from resources. In essence, innovation is all about creating new methods, ideas, or products to bring about positive change.

The Concept of Innovation

The concept of innovation extends beyond the simple introduction of a new idea or method. Instead, it is a complex process that requires an understanding of both market and technological trends. It involves not just the creation of new products or services, but also the improvement of existing ones. Innovation can take many forms – it can be technological, involving new or improved technology; it can be process-based, involving better ways of doing things; it can be position-based, involving new contexts or applications for existing products; or it can be paradigm-based, involving radical changes in underlying mental models.

The Process of Innovation

Innovation is not a one-time event, but rather a continuous process of discovery, learning, and application. It requires a culture that encourages curiosity, embraces failure as a learning opportunity, and values diversity and collaboration. Moreover, innovation is not just about creating value for the business but also about contributing to societal progress. Whether it's addressing environmental challenges, improving healthcare outcomes, enhancing educational practices, or promoting social inclusion and equality — innovation plays a critical role in shaping our future.

The Environment for Innovation

Innovation requires an environment that fosters creativity and encourages risk-taking. It thrives in settings where diverse perspectives are valued and integrated and where there is a strong commitment to continuous learning and improvement. It demands both leadership that sets the vision and direction and teamwork that brings together different skills and experiences to realize this vision.

The Importance of Innovation

Thus, innovation is at the heart of human progress. It is what drives us forward, pushes us to explore new frontiers, and helps us to solve some of our most pressing problems. It is what enables us to imagine and create a better future. The significance of innovation in today's business landscape is immense and cannot be overstated. It is the primary driver of competitive advantage for businesses, giving them the edge they need to stand out from their competitors. In an increasingly crowded and competitive marketplace, where numerous companies are vying for the same consumer base, being innovative provides a company with a unique selling proposition. This uniqueness allows them to offer something different, something that sets them apart from the rest. This differentiation can be a major factor in

attracting and retaining customers, thereby enhancing customer loyalty and driving business growth.

In addition to providing a competitive edge, innovation also serves as a catalyst for the development and improvement of products and services. Through continuous innovation, businesses can enhance the functionality, design, or overall quality of their offerings. They can introduce new features, improve user experience, and make their products or services more appealing to consumers. This continuous improvement not only satisfies existing customers but also attracts new ones. As a result, businesses can expand their customer base, increase their market share, and boost their revenue.

Moreover, innovation plays a pivotal role in process enhancement. By adopting innovative techniques and technologies, businesses can streamline their operations, reduce costs, and increase efficiency. For instance, implementing innovative technologies like artificial intelligence, machine learning, and automation can significantly enhance operational efficiency. These technologies can automate routine tasks, eliminate errors, and speed up processes, thereby improving productivity and profitability.

Furthermore, innovation opens up new opportunities for businesses to tap into previously unexplored markets. By creating new products or services or improving existing ones, businesses can cater to new customer segments and expand their market reach. This expansion can lead to increased sales, greater market share, and higher profits.

On a broader scale, innovation is a powerful engine of economic growth and wealth creation. Innovative businesses contribute to job creation, stimulate economic activity, and generate wealth. They create new industries, transform existing ones, and drive economic progress. Moreover, the wealth generated from successful innovations can be reinvested into further research and development, fueling a virtuous cycle of growth and prosperity.

Therefore, fostering an environment that encourages and rewards innovation is crucial for businesses and economies alike. It is not just about surviving in the market but thriving and leading it. Innovation is not just a nice-to-have; it's a must-have in today's fast-paced, ever-evolving business world. Without it, businesses risk becoming obsolete and economies risk stagnation.

Innovation is not only a business imperative but also a societal necessity. It plays a vital role in addressing some of the most pressing challenges that society faces today, such as climate change, health crises, poverty, and inequality. These issues are complex and multifaceted, requiring innovative solutions that can address them effectively and sustainably.

Climate change, for instance, is one of the greatest threats to our planet. It calls for innovative approaches in developing cleaner and more sustainable energy sources. Businesses that invest in the research and development of renewable energy technologies like solar, wind, and hydroelectric power can contribute significantly to reducing greenhouse gas emissions and mitigating the impacts of climate change. Moreover, innovation in energy efficiency technologies can help us use our resources more wisely, reducing waste and promoting sustainability.

In the face of health crises like the COVID-19 pandemic, innovation in healthcare becomes even more critical. We need innovative solutions to develop more effective medicines, vaccines, and treatments. Moreover, innovations in digital health technologies can revolutionize healthcare delivery, making it more accessible and affordable for everyone. Telemedicine, AI-powered diagnostics, and personalized medicine are just a few examples of how innovation can transform healthcare and improve patient outcomes.

Poverty and inequality are also pervasive societal issues that need innovative solutions. Innovation can create new economic opportunities, helping to lift people out of poverty and

promote economic equality. For instance, innovative financial technologies can provide access to financial services for the unbanked and underbanked populations, empowering them to improve their economic conditions. Similarly, innovations in education technology can democratize access to quality education, providing everyone with the opportunity to learn and grow.

Furthermore, innovation can also lead to more efficient food production methods. As the global population continues to grow, we need innovative solutions to feed everyone sustainably. Innovations in agricultural technologies can increase crop yields, reduce waste, and make food production more sustainable.

Innovation can also help us build more equitable social systems. Through innovative policies and practices, we can promote social justice, diversity, and inclusion. Innovation can help us challenge the status quo, break down barriers, and create a more fair and just society. Innovation is not just about driving business growth and economic prosperity. It's also about creating a better world for us all. Through innovation, we can tackle some of the most pressing societal challenges and build a more sustainable, equitable, and prosperous future.

However, innovation is not solely centered around the creation of novel concepts or technologies. It is equally about refining and enhancing what already exists. This process necessitates a cycle of continuous learning, experimentation, and adaptation. The act of innovating involves taking the existing status quo and pushing its boundaries, striving to make it better, more efficient, or more effective. It necessitates a culture that encourages curiosity, openness, and resilience.

Innovation is underpinned by a spirit of inquiry and a desire to understand how things work and how they can be improved. It requires an environment where questioning is encouraged, where new ideas are welcomed, and where there is a willingness to challenge established norms and practices. This culture of curiosity fosters an atmosphere of continuous learning, where individuals and organizations are always seeking to acquire new knowledge, skills, and competencies.

Innovation also involves a high degree of experimentation. It requires a willingness to try out new ideas, test hypotheses, and pilot new approaches. This process of trial and error can lead to unexpected discoveries and breakthroughs. However, it can also lead to failures. But in the context of innovation, failure is not necessarily a negative outcome. Instead, it is seen as a valuable learning experience that can provide important insights and lessons.

Moreover, innovation requires the ability to adapt. In an ever-changing world, the ability to respond effectively to new challenges and opportunities is crucial. This involves being flexible and agile, being able to pivot quickly when necessary, and being open to change. It also involves resilience — the capacity to bounce back from setbacks and keep going in the face of adversity.

At its core, innovation entails a willingness to take risks. It involves stepping out of one's comfort zone and venturing into the unknown. It requires courage and determination to persevere despite the uncertainty and potential for failure. But it is precisely this willingness to take risks that can lead to groundbreaking innovations that can transform industries, societies, and even the world.

In addition to these elements, innovation is also inherently collaborative. It thrives in environments where diverse perspectives and ideas are valued and integrated. It is fueled by the cross-pollination of ideas across different disciplines, sectors, and cultures. This diversity of thought can lead to more creative, innovative, and effective solutions.

Innovation benefits from networks of knowledge and relationships that facilitate the exchange of insights and experiences. These networks can provide a rich source of ideas and

inspiration, as well as valuable feedback and support. They can also provide opportunities for collaboration and partnership, which can amplify the impact of innovation.

Innovation is not just about creating new things or improving existing ones. It is a complex process that involves continuous learning, experimentation, adaptation, risk-taking, collaboration, and networking. It requires a culture of curiosity, openness, resilience, and diversity. And it has the potential to drive significant improvements in a wide range of areas – from business and technology to society and the environment.

Innovation is a journey rather than a destination. It is a process that unfolds over time, through a series of iterative steps. It involves both creativity and execution. It demands both vision and pragmatism. It requires both leadership and teamwork.

One compelling example of innovation is the field of Artificial Intelligence (AI). AI involves the development of machines or software that can perform tasks that would normally require human intelligence. This includes tasks such as learning, reasoning, problem-solving, perception, and language understanding. AI has the potential to revolutionize many aspects of our lives. It can improve the efficiency and effectiveness of our work. It can enhance the quality and accessibility of our education. It can transform the way we communicate, entertain, and socialize. It can help us make better decisions, solve complex problems, and understand complex phenomena.

However, AI also raises important ethical and societal issues. It poses challenges related to privacy, security, accountability, and fairness. It has implications for employment, inequality, and democracy. It calls for a careful balance between innovation and regulation.

Another example of innovation is the concept of the Metaverse. Metaverse is a virtual reality space where users can interact with a computer-generated environment and other users. It is often described as a collective virtual shared space, created by the convergence of physically virtually enhanced reality, in a persistently online environment. The Metaverse has the potential to create new forms of social interaction, commerce, and entertainment. It can offer immersive experiences that transcend the limitations of physical space and time. It can enable people to connect, collaborate, and create in ways that were previously unimaginable. However, the Metaverse also presents significant challenges. It requires advanced technologies, robust infrastructure, and sophisticated design. It raises questions about privacy, identity, and safety. It necessitates new norms, rules, and governance structures.

Conclusion

In conclusion, innovation is a complex and multifaceted phenomenon. It offers tremendous opportunities but also poses significant risks. It requires a thoughtful and balanced approach. It calls for a combination of creativity, critical thinking, collaboration, courage, and commitment. It's not just about technological breakthroughs but also about societal transformations. It's not just about economic prosperity but also about social progress. It's not just about individual genius but also about collective wisdom. It's not just about the present but also about the future. This essay explores the pivotal role that innovation plays in driving economic and social progress, as well as its multifaceted impacts on society.

Identification of Failure Modes in Production Processes and Innovation: Understanding their Application and Mutuality

by Talita Helena Landiva

Abstract: Technological innovation and the advances it brings are important for production processes, as they can provide information, aspects and, above all, opportunities to make processes more efficient and effective. Early detection of possible failures is an extremely important strategy for maintaining quality and well-structured processes. Failure mode detection has emerged as a vital area of development, followed by significant technological innovations over the years. Innovation in production systems promotes persistence and the power to keep evolving within organizations, enabling companies to respond more assertively to market changes and global crises. But for innovation and failure mode detection systems to go hand in hand, they need constant human training, so that every aspect of innovation, whether technological or even procedural, can be fully utilized.

Keywords: Innovation, production processes, failure modes, detection

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Innovation is an important component in designing production processes, especially when it comes to detecting failure modes. Early detection of process failures is an important strategy when seeking to maintain efficiency and quality in defined processes, and as a consequence reduce impacts such as costs or any other negative process on what you want to produce. With mechanisms for detecting failure modes in these processes, it is understood that it is possible to guarantee efficiency and safety in operations. Over time, with the growing evolution of technologies, the interest in improving product quality and process efficiency has brought with it the need to implement various innovations so that the quality of products and processes can be improved, and fault detection can be provided.

In the competitive environment of industrial processes, there is a continuous search for improvements in productivity and process efficiency. Based on this, failure mode detection has emerged as a vital area of development, followed by significant technological innovations over the years. Tools for diagnosing failure modes were developed with the aim of identifying, predicting and mitigating problems before they could cause damage to the bottom line.

The first experiments in detecting failure modes in production processes were based mainly on visual inspections and the human experience of trained technicians who observed machines and equipment in operation, looking for visible signs of wear or damage.

The observation and repetition approach, although simple and straightforward, has limiting issues such as the subjectivity of operations and the human fatigue that occurs in processes, as well as presenting inadequate ways of detecting internal or early-stage faults because it is part of a learning process.

Over time, some techniques have been developed by scholars and quality gurus. The detection of faults in production processes is based on techniques such as Failure Modes and Effects Analysis (FMEA) and Fault Tree Analysis (FTA).

These methodologies, also known as techniques, were developed between the 1960s and 1970s and have been applied with improvements up to the present day. However, their conception is based on a systemic approach with the aim of identifying possible failures and their effects on the systems in which they are involved. Although these techniques are effective, they have some limitations in their development, such as their ability to deal with complex systems and the need for extensive historical data to achieve the results expected from their use.

Over time, failure modes have been classified in various ways, always based on the desired approach to their application: mechanical failure modes such as wear, fatigue defined by the structural failure of components subjected to repetitive load cycles and fracture, the rupture of components due to excessive forces or structural defects, electrical, where we can find short-circuit, overload, defined by the excess of electrical current that exceeds the capacity of a circuit or component, the degradation of insulating materials over time, which can cause failures and short circuits, electronic failure modes and disruption caused by external electromagnetic fields that affect the performance of electronic devices and finally software failure modes, such as coding errors, integration failures and security vulnerabilities.

However, another apparently simple aspect, but when analyzed becomes extremely complex, is the so-called human failure mode and its operational errors, caused by human failures often due to lack of training or inattention and even caused by inadequate management decisions.

When we analyze the types of innovation that exist, we also find incremental innovation, found in the continuous improvements and constant improvements that exist in production processes.

This innovation involves adjustments and improvements to technologies, production methods or clear and objective organizational practices, with the aim of increasing efficiency, reducing costs and improving product quality. A classic example of incremental innovation is the lean manufacturing methodology, which seeks to eliminate waste and optimize workflows.

The characteristics of incremental innovation involve low risk through small, progressive changes, reducing the risk of failures, increasing the focus on efficiency, and seeking to improve the performance of existing processes without drastic changes, enabling ease of implementation, thus being able to propose less organizational resistance due to its gradual nature.

Another type of innovation found in literature is known as radical or disruptive innovation, which aims to transform production processes completely or introduce completely new ways of producing something.

Another aspect of innovation that is important to study is what is known as technological process innovation, where the focus is on implementing new technologies to improve production processes, which may involve the adoption of advanced machinery, automation systems or production management software.

When it comes to organizational processes, innovation can be found in the reconfiguration of teams, the implementation of new management methods or the creation of a new culture within the organization.

And finally, we find digital process innovation, which brings digital technologies to transform production processes, including the digitization of operations, the use of big data and advanced data analysis, as well as the implementation of technologies such as the Internet of Things (IoT) and Artificial Intelligence (AI).

With this evolution of innovation, we are faced with the Internet of Things (IoT), which has been playing an extremely important role in the evolution of fault detection, where Internet of Things (IoT) based devices, when connected, allow the collection of data in real time from practically any part of a production process. This not only improves fault detection, but also provides a holistic view of equipment health and performance, allowing for more efficient resource management.

Another process of constant innovation in production processes that is the result of technological developments is the application of artificial intelligence (AI) and machine learning (ML) which, when applied, aim to detect faults.

The algorithms used for machine learning are capable of analyzing large volumes of data, thus identifying complex patterns that humans would not be able to detect. Their implementation of production systems aims to significantly reduce unplanned downtime and operating costs.

The management of failure modes in production processes is a complex and multidisciplinary area, which requires an in-depth understanding of the various forms of failure and diagnostic techniques, and the implementation of effective prevention and mitigation strategies not only improves the efficiency and reliability of processes, but also contributes to the sustainability and competitiveness of organizations.

The continuous evolution of technological innovations in monitoring, diagnostics and predictive analysis has enabled significant advances in the ability to predict and prevent failures, making production processes increasingly robust and efficient.

Despite the significant advances, the implementation of these technologies faces challenges, where the integration of new systems with existing infrastructures can be complex and very costly.

In addition, the accuracy of artificial intelligence (AI) models in order for them to be used and exploited depends on the quality and quantity of the data available, which can be a flaw, since this is imputed by human material (decision-makers) and can be manipulated. Innovation in tools and techniques for detecting failure modes in production processes has evolved significantly, driven by technological progress and innovation and the need to improve the efficiency and safety of industrial operations and processes.

It can be concluded that innovation in production systems has shown transformative potential over the years, with significant impacts on both operational efficiency and the competitiveness of organizations.

As new innovative technologies emerge, such as artificial intelligence, advanced automation and the Internet of Things (IoT), production systems are becoming increasingly integrated and intelligent, detecting faults more assertively and correcting them in time.

From a theoretical point of view, innovation in production systems promotes persistence and the power to keep evolving within organizations, enabling companies to respond more assertively to market changes and global crises.

However, the implementation of innovations is not without its challenges: there is a need to retrain the workforce, large-scale data management and cybersecurity concerns are critical aspects for their success, and these aspects require continuous attention, and the integration of disruptive technologies requires a cultural change within organizations, where collaboration between departments and the acceptance of new approaches are fundamental to success.

In short, innovation in production systems is a key driver of economic and technological progress, and organizations that can successfully navigate the complexities associated with this transformation are better placed to thrive in today's competitive and dynamic environment.

The future of production systems, driven by continuous innovation, promises to be even more interconnected, efficient and sustainable, paving the way for a new era of optimized industrial and socio-economic growth. But for innovation and failure mode detection systems to go hand in hand, they need constant human training so that every aspect of innovation, be it technological or even procedural, can be fully exploited.

Innovation and lean thinking: an approach for obtaining value

By Daniel Felipe de Oliveira

Abstract: Harnessing innovation cycles and continuously managing the development of products and services are important activities to sustain and perpetuate businesses. Effective innovations represent products and services that solve areal customer's problem and present a valuable solution to the market. Seeing value is a principle of lean thinking which encompasses innovation from the early stages of the product and service concept to the development and maturation of the manufacturing or delivery process. Practices and concepts such as Lean Inception, Design Thinking, Lean Product and Process Development (LPPD), and Lean Startup configure approaches to operationalize innovation with value addition centered on the customer. Furthermore, high-impact innovations (GPT class innovation) and market disruptions can be fostered or mastered from the practice of lean thinking. This essay aims to present and discuss such lean practices, verifying their differences and convergences to sustain an innovation process that allows for developing value to the customer.

Keywords: GPT class Innovation; Lean Inception; Design Thinking; Lean Product and Process Development; Lean Startup.

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Innovation can be understood as a process of creating and developing products and services that deliver value to the customer. Being a dynamic process that can present incremental improvements to disruptive innovations, its centrality lies in the customer who uses the product of innovation to solve their real problems. Some innovations, more than others, have a significant positive impact on society. These are called General Purpose Technologies (GPT), which receive special attention because they promote greater impacts than most other innovations.

In the early 2000s, Richard Lipsey and collaborators in their empirical studies identified lean thinking as one of the GPT class innovations and classified it as the last available organizational technology with this broad benefit. This derives from the fact that GPT class innovation starts in localized points, such as the development of lean manufacturing with a limited number of practitioners, and evolves into more complex applications, spreading across the economy and constantly improving its efficiency. Upon reaching maturity, they are widely applied and cooperate with other technologies, such as lean thinking contributing to digital transformation and artificial intelligence.

Observing the historical development of lean thinking from the early days in the Toyota Production System (TPS), compiling constant incremental improvements (kaizen), to its most recent influence on the development of agility theories and other derivations specifically to handle and drive innovation processes, it is possible to see the virtuous circle of naturally expanding value addition and waste removal at all organizational levels and different business segments. This means that lean thinking accommodates the different needs that arise throughout history, giving it a situational character: each transformation is specific and different with its own value purposes. Lean transformation, by addressing technical and technological tools, human and leadership capabilities, cognitive assumptions, and management systems for the pursuit of a common purpose, is a mechanism that drives and sustains transformative innovation of great impact (GPT class) while respecting each specificity in a situational manner.

Being grounded in a set of principles for situational application, as is the case with lean thinking, offers the opportunity for the development of truly profound innovations (GPT class) but also provides incremental improvements in products, services, and processes. The principles and fundamentals of lean, however, operationalize and manifest innovation through concrete practices. These resystematized in approaches such as Lean Product and Process Development (LPPD), Design Thinking, Lean Startup, and Lean Inception. Knowing, discussing, and combining them for situational use in a specific innovation problem is a path offered in this work to collaborate with organizations to be increasingly efficient in their innovation processes, collaborating with society by offering valuable products and services with minimal waste.

Innovation in products, services, and processes is a crucial point for the evolution of businesses and competitive advantages in the market. Organizations, in seeking to escape the “red ocean” of competition for similar products and explore “blue oceans” with potential gains in volume but also productivity and quality, invariably go through innovation processes. In this scenario, it is natural that these same organizations seek structural approaches that support the flow of innovation through the process of developing new products, services, and processes. Conducting innovation without such structuring approaches runs the serious risk of disarticulating the different functions and distinct professionals involved who may lose engagement or work without converging to a common purpose. At the same time, following structured approaches for the development of products, services, and processes allows generating the necessary synergy to promote value addition to the customer as a fundamental

purpose while solving problems agilely and achieving a continuous state of improvement in the very development flow that delivers innovation.

Historically, Lean Product and Process Development (LPPD) is configured as the traditional lean approach to product and process development, mainly observed by Toyota. Innovation in this approach occurs by recognizing that developing new products and services is crucial for companies that aim to grow and evolve. LPPD is a system that encompasses the entire company and, more than developing products, creates new value streams. Using tools such as the concept paper (a document that translates project needs into clear and consistent requirements, actions, and milestones), the Obeya room ("big room" in Japanese, a place with the project's visual management favoring intensive team collaboration), and mock-ups (a scale or full-size model used to evaluate the process in development), the chief engineer (value stream leader of development) structures teams with autonomy to experiment and decide on development trade-offs (situations where there is a conflict of choice), always jointly considering the product and its manufacturing process (or service delivery).

As an approach that integrates product and process development to maximize value and minimize waste, LPPD seeks to ensure that products, particularly physical goods, are developed efficiently and effectively from conception to production. To operationalize it, the process begins with a deep understanding of customer and market needs (voice of the customer) captured in the concept paper. Then, iterative cycles of planning and design are conducted to develop product and process concepts using tools like "set-based design" to explore multiple options simultaneously. The detailing phase involves creating prototypes and rigorous testing to validate concepts and adjust specifications. In parallel, the development of production processes (known as 3P – Production Preparation Process) is refined to ensure quality and efficiency. Interdisciplinary collaboration and continuous feedback integration are fundamental throughout the process, ensuring that the final product not only meets customer expectations but is also produced in an optimized and economical manner.

For lean sensei Michael Ballé, LPPD is the most impactful aspect of lean thinking. Far from the common perception of having mainly lean manufacturing in mind to add value and eliminate waste, it is through LPPD that value for the customer is created. In practice, creating value is about responding to value delivery characteristics on manufacturing stages that determine quality, cost, and availability, as well as other decisions at the component and raw material level, including considering a socio-environmental responsibility perspective in the supply chain. LPPD is practiced through a flow of design information and decisions involving engineering, manufacturing, and other stakeholders in the value chain.

This perspective of valuing the work, decisions, and articulations generated at the product and process development stage is important even for manufacturing and process engineering teams. Traditional vision that could separate product development functions from process engineering, considering them as distinct and sequential stages, would imply the late involvement of process teams, which in turn could generate rework or major revisions in product design. Even within lean thinking, which values and assumes the role of kaizen as incremental improvement for processes, considering the strength and power of LPPD is considering that these kaizens in the process can be avoided once the process development flow is synergistic and concomitant with product development. The kaizens carried out but that could have been unnecessary are called "touzens" and essentially constitute rework.

On the other hand, with the temporal advancement of businesses and the evolution of the consumer market, adapting quickly to changes has become key to the success and perpetuation of any business. In this interim, as if distancing from the more solid procedural premises of LPPD, it is possible to observe that many professionals associate creative work as

something loose and disordered. As if the current reality dissolved Weber's "iron cage" that would kill creativity. However, contrary to the stereotyped idea of creative work, lean practice understands that the innovation process must be structured. In the quest for structuring the creation process, the Design Thinking approach stands out. Originating in the 1960s, it went through a historical evolution where its capabilities were recently reconciled with lean practices for innovation. Design thinking provides the basis for releasing creativity but with the security of being able to return to principles when necessary. It allows diverging and converging thoughts and ideas in a structured manner, focusing not only on delivering the product but always feeding back, testing, and learning with the customer, who is the center of the process.

Design thinking, being a customer-centered process, is operationalized through an iterative and collaborative approach involving five main stages: empathy, definition, ideation, prototyping, and testing. Initially, it seeks to deeply understand the needs, desires, and problems of customers through research and observations (empathy stage). Then, this information is synthesized to clearly define the problem to be solved (definition). In the ideation phase, various potential solutions are generated through brainstorming and creativity sessions. Prototyping involves creating simplified versions of the solutions to explore the viability. Finally, the prototypes are tested with customers, allowing for continuous adjustments and refinements, ensuring that the final product effectively meets customer expectations and needs.

The lean startup, in turn, also customer-centered, is operationalized through quick cycles of building, measuring, and learning, aiming to minimize waste and accelerate the validation of ideas. This approach originates from Eric Ries' homonymous work and is based on the premise that learning comes from correcting mistakes. The earlier you make mistakes and correct them, the sooner you learn. With the concept of Minimum Viable Product (MVP) brought by the approach, distinct from the concept of prototype (which may conceive a product not necessarily at the minimum of its viability in value delivery), it is possible to experiment with value delivery more quickly in a "reduced" but viable version. Experimenting with the product or service quickly allows for faster customer feedback and improves the product swiftly. The essence of agility is not faster development but rather making mistakes and learning more quickly. The lean startup, by advocating agility, focuses on quick adaptation to adjust the course of the creative process whenever necessary, but always without losing sight of the lean purpose of creating value to solve the right problem (meeting a customer value need).

It is important to highlight that agility is not exclusive to information technology (IT) sectors and software development. Any business segment that wants to stay alive can apply for it. The lean startup path is for the organization, regardless of its sector or business segment, to adapt at the appropriate speed to make the business healthier and customers more satisfied. The dynamism and resilience of agility combined with the solid foundation of lean thinking principles is the configuration of the lean startup approach.

On the other hand, lean inception, conceived by Brazilian Paulo Caroli from his experiences in Silicon Valley, brings together development concepts present in design thinking and lean startup (customer-centricity, agility, MVP, etc.) in a collaborative workshop that can range from four hours if it's something simple with few steps, to 40 hours if it's more complex. Lean inception is a well-structured way to allow the use of all product and process development techniques to guide innovation, enabling the validation of an idea's potential before investing in it. The process begins with defining the product's objectives and vision, followed by creating personas (characters created to represent different end-users). The team

then jointly identifies user journeys to focus on their experience and brainstorms necessary functionalities. Subsequently, these functionalities are prioritized and organized into a release sequencing. Finally, exercises are conducted to detail the MVP functionalities and plan their implementation. Operationalizing lean inception involves conducting these activities in interactive sessions, ensuring the active participation of all stakeholders, promoting a shared vision, and facilitating decision-making aligned with the business's strategic objectives.

For lean thinking, innovating is more than understanding what the customer needs: it is the possibility of creating the need even before it exists. The presented practices (LPPD, Design Thinking, Lean Startup, and Lean Inception) give synergy and agility to the creative process that the rapid changes in contemporary consumer market demand. However, the focus of these practices is not just agility but delivering the right product or service with quality, that is, the full delivery of value aligned with the customer’s need.

In this sense, there is a convergence of the approaches Lean Product and Process Development (LPPD), lean inception, lean startup, and design thinking regarding their common orientation towards adding value to the customer through efficient and user-centered innovation. While LPPD focuses on creating robust and optimized products and processes from the beginning, lean inception seeks to quickly define the scope of an MVP through collaborative workshops. Lean startup promotes quick cycles of building, measuring, and learning to validate ideas in the market with an MVP, and design thinking uses an iterative approach to deeply understand customers and creatively solve problems. Despite differences in focus, stages, and constitutive concepts, each approach is applied according to a need: LPPD for structuring product and process development (particularly physical goods), lean startup for agile market validation (particularly for services and software), lean inception to clarify user personas and build their journey experience with the product or service, and design thinking for the strong convergence of innovation to the customer. Together, these approaches form a versatile set of practical applications available to innovation teams that must choose them situationally. In other words, innovation professionals adopt the best approach case by case according to the problem to be solved, aiming to optimize the product, process, or service development flow to maximize the value delivered to the customer.

Innovation in Entrepreneurial Ecosystems from the Perspective of Complex Adaptive Systems and Social Interactions

By Damaris Chieregato Vicentin

Abstract: In the Entrepreneurial Ecosystems (EE) approach, innovation can be essential for adaptation and development in increasingly complex and dynamic ecosystems, as illustrated by Complex Adaptive Systems (CAS). The CAS concept presents the dynamic interactions between various elements that result in emergent behaviors, driving innovation through interconnectivity and adaptability. Likewise, EEs are made up of diverse agents, including entrepreneurs, investors, educational institutions, government entities and customers, whose continuous interaction promotes innovation. The aggregate use of Pierre Bourdieu's field theory complements the CAS approach by explaining how social fields can be defined by various forms of capital (economic, cultural, social, symbolic and political), and how these forms of capital influence the innovation through complex and dynamic interactions. Different types of capital have interdependent characteristics and can be reconverted to other poles, changing the social positions of agents and their capacity for innovation, however this situation is currently an exception. Consequently, there are barriers to innovation, such as unequal access to resources, communication and interactions. Therefore, it is suggested to promote policies and private partnerships to create environments that support local innovation and ensure that all agents can actively contribute to innovation. Furthermore, the integration of CAS with Bourdieu's social fields can provide a more comprehensive and detailed view of innovation in business ecosystems. By combining these approaches, we can better understand power relations, the interconnectivity of agents and the forms of capital that influence their positions and adaptability during crises.

Keywords: Entrepreneurial Ecosystems, Complex Adaptive Systems, Innovation, Pierre Bourdieu's Field Theory, Social Capital

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Innovation is fundamental in Entrepreneurial Ecosystems (EE), for the survival and success of companies and in the evolution of the ecosystem. From the perspective of EE, innovation is more than just a differentiator in competitive terms, but rather a necessary device for continuous growth in EE, which is increasingly complex and dynamic, as observed from the perspective of the Complex Adaptive Systems approach (CAS). Innovation within this approach can be understood as a direct response to the EE's ability to adapt to new information, situations and changes in the environment, as well as emerging from complex and dynamic interactions between different agents, in which each one moves new perspectives and solutions for each challenges encountered.

CAS are highlighted by their form of dynamic interaction between their various elements, resulting in behaviors that are difficult to predict. This characteristic can be observed to identify how innovation emerges within systems. In this context, a product of the CAS's ability to adapt and evolve as changes and new interactions and information arise in the environment that surrounds them. However, complexity arises from the interconnectivity between its elements, where each element can influence and be influenced by others at all times. Thus, this environment of constant change and interaction creates an adaptability that allows CAS to maintain a stable state of their properties in the face of constant changes in the surrounding environment (Cloutier & Messeghem, 2022).

Similarly, EE are composed of a diverse and abundant network of agents, including entrepreneurs, educational institutions, investors, customers and government entities. Within this perspective, it is noted that innovation arises through the dynamic and complex interaction between these agents, who together can create opportunities, change the environment itself, remake strategies and contribute to the creation of value in unexpected and innovative ways, boosting the EE to raise the level of innovation (Audretsch et al., 2021; Daniel et al., 2022).

Another theory, field theory, developed by Pierre Bourdieu, also points to an interesting perspective for investigating the dynamics of innovation within EE from the perspective of CAS. Under this point, Bourdieu highlights social relations in his work, being able to observe the social fields of his theory as spaces in which different agents interact dynamically with their different forms of capital (economic, cultural, social, symbolic, political). Thus, in EE these social fields operate as ecosystems, in which interaction takes place dynamically, shaping the development of the field or ecosystem, and may also result from complex interactions of competition or collaboration for capital, as is often the case in CAS.

Therefore, in CAS or EE, the success and evolution of these systems depend on collaboration between their agents. Innovation would not only be a product of the individual capabilities of agents, but also of the interconnectivity and complexity of this system as a whole. An innovation in the form of a decision from an agent can trigger several reactions that affect other agents in the ecosystem and the agent itself.

It is also observed that during crises, the interdependence of elements, within the EE from a CAS perspective, becomes even more evident. Crises such as climate and political changes, economic sanctions, instability directly affect EE and the population that surround them or are under their influence. This scenario emphasizes the interconnected, dynamic and adaptive nature of EE, highlighting the capacity for innovation and training of agents, allowing them to identify new opportunities and rearrange their strategies in response to changes (Arici & Gok, 2024).

Coevolution may appear as a characteristic present in EE from the perspective of the CAS concept to generate innovation. Within the functioning of EE, it is noted that the agents evolve together, adapting to changes in the ecosystem, such as those caused by technological

innovations and environmental changes. Innovation can emerge from this continuous process of adaptation and complex evolution in collaboration. During crises, however, agents may face pressure to adapt quickly to new economic, climatic and political conditions, accelerating co-evolution. In field theory, it is observed that this co-evolution is presented in the continuous efforts of agents to gain positions in the dominant pole of the field, reestablishing their strategies to increase their economic and cultural capital through reconversion as they interact with each other measured by different capitals, such as economic, cultural, social, symbolic and political capital.

In social dynamics, as in the dynamic and complex interaction in EE, power relations emerge in this context, focusing on different types of capital in which agents accumulate, aiming to establish themselves in the social positions of the dominant pole in EE. In this way, economic capital refers to material and financial resources, which can be directly converted into liquidity to acquire other types of capital and exert a dominant influence over others. Cultural capital can be understood as knowledge, education, skills, and high level of qualification acquired by agents that are socially valued. Cultural capital can be divided into embodied (skills and knowledge), objectified (material cultural goods) and institutionalized (certificates and diplomas). Social capital is incorporated into networks of relationships and connections that can be manipulated to achieve more resources and advantages, as can be seen in the context of business environments such as EE to achieve the success of an enterprise.

However, symbolic capital refers to socially recognized recognition, influence and validity, coming from other forms of capital and transformed into power and influence. Political capital is similar to symbolic capital in terms of credit granted through belief and recognition to a person or object, but they are governed by the powers that others recognize them as representing a group, encompassing the personal capital of notoriety and popularity. Thus, personal notoriety capital is defined by recognition for practices developed by people over time, considering their reputation and specific qualities. However, popularity already acts as a substantial aspect of political capital, relating to the degree of support and acceptance that an agent receives from the public. Thus, popularity implies acceptance by a wider and more widespread public (Bourdieu, 1996; Schirone, 2023). Within this context, these capitals are interdependent and can be reconverted and acquired, for example, the use of economic capital to acquire a high level of qualification or build relationship networks. Understanding these capitals and their interactions is essential to analyze social structures such as EE from the perspective of CAS and innovation strategies in this field.

We can also note that the dependence on agents is also relevant in EE, especially during crises. Within this approach, the initial advantages incorporated by agents, such as access to more capital and support from public policies, can be found in specific spaces, where certain capital and access to development become predominant. During crises, starting positions can determine which companies and sectors can adapt and survive. In this situation, innovation emerges as an important aspect of this process, allowing agents to improve their strategies or find new ways to create value. It is noted that in field theory, dependencies in this development and the initial positions of agents can influence their ability to innovate and adapt to changes by acquiring more economic and cultural capital through socialization.

Thus, even during crises, the high concentration of economic and cultural capital found in the dominant pole of the field offers ample opportunities for highly qualified study, as well as the development of cutting-edge research. Economic capital provides the financial resources necessary to invest in infrastructure, cutting-edge technology and qualified talent. In parallel, cultural capital, which encompasses obtaining a better level of education, academic

credentials and access to knowledge and innovation networks, allowing agents in the dominant pole to accumulate high-level knowledge and skills. Furthermore, the quality of innovations coming from the dominant pole is very high as they obtain greater rigor and scientific and methodological information made possible through greater available financial resources. Additionally, the number of innovations also tends to be greater, as they operate with greater financial resources and highly qualified human resources to execute multiple complex and simultaneous projects. Thus, the dominant position in the entrepreneurial field facilitates the attraction and retention of notable talents and substantial investments. It is understood, therefore, that investors are motivated by the potential return and robust and solid operations, while talents are motivated and attracted by opportunities for professional growth and possibilities of engaging in innovative projects. This flow of excellent financial and human resources contributes to the organization of a cycle, in which initial success develops increasingly more resources and opportunities, promoting the continuous influx of innovation observed in EE from the CAS perspective.

As stated above, the integration of CAS theories and Pierre Bourdieu's social fields can provide a more detailed and comprehensive view of innovation in business ecosystems. It can be noted that CAS theory focuses on the interconnectivity and adaptability of agents within a dynamic system such as EE, social field theory can explain the power relations of interconnectivity of agents and the forms of capital that influence the position in field poles and the influence of agents on the adaptability of the ecosystem. By combining these approaches, we can better understand how innovation arises from the strategies of agents who seek to accumulate and mobilize different types of capital (economic, cultural, social, symbolic and political) to improve their positions within the field and their relationship with the capacity to adaptation and response to changes.

Another reflection of a CAS is the internet and social networks, where it is observed that innovation can be promoted through interaction between billions of users, EE and governments. In this dynamic context, ideas and information can be disseminated quickly, facilitating innovation on multiple fronts quickly. Social networks operate as a concentration of interconnectivity, in which EE agents can analyze the acceptance of new products and services, acquire constructive and immediate feedback and connect with cutting-edge research, laboratories and researchers. This allows real-time strategy adjustments and the hiring of high-quality researchers on a global scale. The adaptability of social networks can also be noted by the way they evolve to keep up with new user requests and changes in the technological environment, such as through the recommendation of advanced algorithms, the adoption of new technologies derived from artificial intelligence and the application of new utilities that are means by which these interfaces adapt and conducive to continuous innovation.

However, the asymmetry in access to economic and cultural resources, similarly reflected by economic and cultural capital, can cause significant barriers to the emergence of innovation in the non-dominant pole in the social field. In EE, deprivation of access to economic and cultural capital results in obsolete technological infrastructure and limited access to interactions or contact networks, which can reduce the ability of various agents to actively participate in the innovation process. Regions that are not dominant or less developed regions often face additional adversities, such as difficulty in accessing communication and interaction, as well as a lack of resources, which intensifies the distance between the positions of agents belonging to the EE. This can generate a cycle in which the scarcity of innovation preserves inequality, reducing the quantity of innovation development and its quality.

To mitigate this barrier to innovation in EE from the CAS perspective, it is essential to promote partnerships with private organizations and public policies, aiming to increase access to resources and communication, as well as the inclusion of agents in terms of interaction in EE. This can contribute to generating financing programs for incubators and startups in the non-dominant pole EE or in disadvantaged areas. These programs can operate to develop initiatives for high-quality education, communication and interaction, as well as the creation of infrastructures that support local innovation. Furthermore, partnerships between companies, governments and educational institutions can contribute to creating a more opportune environment for increasing innovation with an inclusive perspective, ensuring that potential talents can also contribute in a non-dominant pole EE.

Therefore, by adding Bourdieu's social fields and CAS theory to understand innovation in EE, a more complete analysis can be constructed. The conception of the internet and social networks illustrates the way in which interconnectivity is expressed globally, aiming to boost innovation. However, the barriers involved and observed through disproportional access to economic and cultural resources must be considered, aiming to provide a sustainable and inclusive ecosystem to promote innovation. An ecosystem in which all agents have similar active opportunities to participate and contribute to the sustainable development of business ecosystems.

Furthermore, recent studies indicate that the CAS theory can fill the existence of gaps in the characterization of EE, by addressing dynamic and structural conceptions that consider the co-evolution of ecosystems, even during crises (Han et al., 2021). This approach contributes to the understanding of how EEs develop through phases of creation, impulse and structuring, showing the complexity resulting from their interactions and co-evolution. Innovation, therefore, would not only be a consequence of the capabilities of individual agents, but additionally a product of interconnectivity and complexity and of the system as a whole, as in the EE.

Additionally, the integration of Bourdieu's field theory perspective into EE emphasizes that innovation can be a consequence of capital and power dynamics within the field, in which agents modify their strategies quickly to remain interconnected and adaptable. In this way, when considering the CAS theory, in terms of the aspect of interconnectivity and adaptability, and the capital and power mechanisms of social fields, it is possible to obtain a more robust and inclusive approach to boost innovation in business ecosystems.

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Innovation x Modernization: a proposal for analysis considering productive globalization

By Jair Manoel Casquel Jr.

Abstract: The present text proposes to present a conceptual proposal and to make a small discussion related to the process of organizational innovation and modernization. The reason for this analysis is related to the different operating conditions of organizations due to differences in macro-environment, institutional conditions, availability of labor, material resources, configurations of production chains, especially when one keeps in mind that within the process of productive globalization, the participating countries do not have the same level of development. And even today, at the end of the first quarter of the twenty-first century, relations between central and peripheral economies continue to be maintained. In this sense, the proposal is linked to the analysis that could be carried out not for central countries, but for peripheral countries, which do not have high technological sufficiency, which still have research deficiencies, countries where the cost of capital is excessively high and for which the conditions of participation in the world market often suffer lobbying barriers that are made under environmental justifications, for example. The proposal that is made here is to consider the existence of innovation in central economies, but the existence of a modernization process of an innovative character, a modernization of a competitive character, and a modernization of an adaptive character, which would be the translations of organizational changes for peripheral economies. The idea itself is linked to the process of illustrating that what is valid for a given organization contextualized in a developed country may not, always, be valid for its branch operating in a less developed country. Therefore, the formulas evaluated on the innovation process, focused exclusively on organizations that have economic power, technological power, that are large, and are working on different fundraising fronts, are not always valid when carrying out analysis of smaller organizations, which are no less important, but are often forgotten in the analyzes of management theorists, and end up passing into the condition or being classified in a kind of mass grave, of unimportance. Furthermore, a critique is presented in relation to the modernization process, based on the technology import model, which ends up maintaining relations of dependence and colonialism between countries in central economies and countries in peripheral economies.

Keywords: innovation, modernization, dependency

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In the analysis of the process of economic changes in continents, countries or regions of countries, innovation, as a macro reference element for analyses related to competitiveness and income generation, for example, is seen in a positive way in an almost consensual way, among the different groups and fields of study that are dedicated to this theme.

Dodgson, Gann, and Phillips (2014) propose innovation as a way to achieve organizational growth and survival. Regarding the form of occurrence of this process, Schumpeter (1980) indicates: 1) the introduction of a new product; (2) the introduction of a new procedure; (3) the creation or opening of a new market; 4) access to new sources of supply and, 5) the construction of a new arrangement or form of organization of a given sector of activities. Tidd and Bessan (2015), in a broader view and within the conception of a society with a preponderance of the service sector, indicate that innovation can also be related to services, both in the public and private sectors. The Oslo Manual states that "An innovation is a new or improved product or process (or a combination thereof) that differs significantly from the unit's previous products or processes and that has been made available to potential users (product) or put into use by the unit (process)" (OECD/Eurostat, 2018, p. 20).

However, this process is not necessarily homogeneous and cannot be seen as a standard reference to explain, in part, the results obtained by the organizations, since their operating conditions are neither homogeneous nor standardized. Their business environment, i.e., the macro environment, within the conceptions of strategy, are not homogeneous because different countries, at different stages of development, have different institutional conditions of operation. The very division of countries into economic blocs, into groups such as the G8 and G20, shows this structural condition of the world economy.

In this sense, it may be interesting to note that the innovation process should not always be evaluated only in terms of the aspects that involve the organization itself, but also in relation to the aspects that involve other organizations within what can be called the economic ecosystem. And the justification for this is that even transnational corporations do not follow a homogeneous pattern in terms of product portfolio, of product and process development in its subsidiaries, adapting them to the institutional conditions of the local markets and to the products life cycles. The automotive sector, for example, is one of the sectors that best illustrates this situation.

Another example, in addition to the automotive sector, can be observed in the home appliance companies, in the electrical and electronic material companies, and it can be seen that in some cases, there is a delay between the launch of products in more competitive markets that form the core of the central economies, and the less developed markets of the peripheral economies. In other words, there is no absolute homogeneity in the offer of the product portfolio or in the composition of the portfolio of products and services of organizations with units that operate in different countries.

Therefore, what is proposed here is that, many times, the innovation process that occurs in some companies, in less developed countries, when observed from the point of view of productive globalization, does not have this innovative characterization, since it is effectively not new: it is only the replication or reproduction of something that was done in another unit, external to the country in which the company operates, in the case of transnational companies, or that was done in another company abroad, which will have the role of technology supplier and that, therefore, will not always have the same risk as the innovation process, since when it is incorporated or when it is made available in the product portfolio, processes or services of another unit or companies, have already passed the initial test of market acceptance or rejection.

And within this approach, in the case of the modernization process, the classification of possible organizational changes can be made into three categories: 1) innovative modernization; 2) competitive modernization and 3) adaptive modernization.

Innovative Modernization

Similar to innovation, innovative modernization is closely linked to the search for competitive advantages, both for organizations that are leaders in their segment or industry, and for those that are willing to attack some market leadership. Porter (1989) associates this search for advantages with innovation, and the leader, or the new occupant of a prominent position, will remain so as long as he is able to maintain the support of the position achieved. The difference, in this case, between innovation and innovative modernization, is the origin of the references of change, especially when considering the process of productive globalization. In this case, the source of the modernizing-innovative know-how is an operating unit of a transnational company, or other organization located in another country, setting up technology transfer operations, templates, brands, production processes and others. This business condition, configuring an association between national producer and foreign supplier that can seal a relationship of dependence and vulnerability, with the possibility of a profitable partnership for both; future purchase of one of the organizations by the other, or else, being the embryo of a technological leap through reverse engineering.

In short, innovative modernization resembles Porter's innovation, based on the relativization of the references, that is, it is modernization in the face of the global economy and will be innovation at the national level.

As a rule, innovative modernization can be considered to be generally linked to the following events: 1) impositions in the value chain; 2) government developmental plans characteristic of underdeveloped countries; 3) exploitation of the national market by organizations that are absent from the country, which opt for the condition of indirect participants in the economy as suppliers of technology to national companies; pressing or urgency of obtaining technology due to internal market opportunities and, 5) prospect of creating a domestic market for products successfully marketed outside the country, which would be produced nationally by a subsidiary of the company or group that produces the good in question, or by an internal licensee of the external holder of the rights and patents of the product to be launched internally.

In countries that import capital and receive from multinational companies, especially in Latin America, it can be said that a large part of the industrialization process, associated with the process of import substitution (Furtado, 1976) followed and still follows this pattern.

The entry of transnational companies into the countries implied the creation of a large production chain and both the backwards effect and the forwards effect generated a strong need to skip stages of industrial development, leading companies of national origin to seek external suppliers for production and product technology. As a result, in local terms, there were major modernizing innovations, in terms of organizational models, organizational management, production systems, labor relations, and forms of remuneration. It is a disruption process, similar to a Schumpeterian process, but within a local macroenvironment. The differentiated situation in this case, of this type of national innovation, is the external reference, since what was already done elsewhere was introduced internally.

Competitive Modernization

Unlike innovative modernization, competitive modernization is related to the search for advantages similar to those already obtained by market leaders or successful innovators, in a process very similar to benchmarking. In this case, the organization observes the innovator's movements and if the former's strategy proves to be viable, it will certainly follow it.

In fact, the search for competitiveness is one of the factors that put pressure on the management of most organizations, and it is often used and disclosed without much criterion and without also considering the structural conditions in which the organization is inserted, which can be a risk factor for the success of this type of modernization.

Considering a sectoral leadership model, after the success of the leading organization, a part of the other organizations set out to make the necessary changes, to adjust to the new reality that is beyond organization.

Adaptive Modernization

Adaptive modernization is classified as the third step in the modernization process, since this process can be associated with companies or organizations that, after verifying the new standards implemented by companies that have undergone innovative modernization and competitive modernization, must make the decision to adapt to the conditions of action of the industry or the macro-environment as a whole.

In this case, the organization is not seeking differentiated competitiveness, nor sectoral leadership, but rather adaptation to the operating conditions of the macro-environment, to avoid an even greater delay in terms of products and processes, in relation to other organizations in the industry.

It is a process that, in itself, comes in the wake of the modernization process, and it is possible to find, in some cases, that adaptive modernization can occur at the same time that a leading company is already promoting a new innovative modernization or even innovating. It is a situation in which product, process, management, service provision technologies, among others, are already solidified, representing little risk to the organization, allowing its survival, and may even bring some gains in terms of profitability.

Some Critical Aspects Related to Modernization

If, on the one hand, there is little questioning about the organizational needs for innovation and modernization, on the other hand, it must be taken into account that this process, by itself, does not ensure the success or survival of the organization. Risk factors or their critical aspects must be carefully evaluated, since the proposals presented are not always adequate to the established objectives and to the planning prepared or in preparation. After all, there are no miraculous recipes and no generic validity for prescriptions that must contain a certain specificity, which increases the chances of tactical and strategic errors and the need for constant monitoring of the "state of the art", in order to seek selective consistency for the available alternatives.

In this sense, one of the initial steps in relation to the decision to change an organizational change is the evaluation of the effective need for it, since imported novelties do not always find space in the domestic market. In other words, a distinction must be sought between change that effectively aggregates advantages for the organization and change resulting from fads or the search for a demonstration of a vanguard position in the business scenario.

It is always good to remember that the consequences of reengineering, one of the managerial fads of the 1990s, did not generate homogeneous results in all the organizations in which it was applied.

Therefore, it is important to point out that although it seems less risky, innovative modernization presents some risks that must be carefully evaluated before its implementation, in a way similar to innovation itself.

When considering the economy of a country as a whole, the different organizational conditions in terms of human resources; materials; economic power; way in which industry players operate; organization of the supply chain, not to mention the conditions of cost and availability of financial resources, environmental requirements and taxation, it is clear that innovation and/or modernization do not always bring certainty of success for the organization.

In terms of products, for example, mistakes can be made regarding the origin of the consumer's needs, starting from a social scenario of the country of origin, which is not very appropriate if compared to the conditions of the place of destination of the introduction of the novelty.

In the production area, there are at least three critical factors to be analyzed before adopting a model: 1) the availability of intermediate supply; 2) the gains associated with change or modernization, and 3) the maintenance of partnerships to ensure the modernization initiated.

Regarding intermediate supply, the problem is related to external dependence on raw materials or parts, among others, which links part of the organization's production costs to the exchange rate policy, the availability of foreign exchange, and the country's logistics conditions.

With regard to partnerships, in spite of the possible problems of poor business management, there is a risk of denationalization of peripheral economies due to the possibility that national capital companies will be absorbed by external partners or that they will have internal competition from these partners, by setting up subsidiaries in the countries that receive their technologies. because of the size of their domestic markets; low labor costs; fewer environmental restrictions, among other reasons, which is not always beneficial for the country and for stakeholders, both domestic and foreign.

Among other factors that must be considered, especially in relation to innovative modernization, is that there is a justification for the acquisition of external technologies due to problems related to research time, for example, for the development of new products and processes. As a result, the conditions for research in the countries that receive technology tend to become precarious, or they tend to be linked to transnational companies that set up their subsidiaries in less developed countries

This can generate, in the medium and long term, a situation of dependence or subordination of local activities to the interests of external groups and organizations, replicating the classic model of colonialism that characterized the occupation of the Americas, with the exception of the United States. However, in this new situation, instead of having a colony of a political and economic nature, headquartered in the metropolis that occupied the colonized region, we have technological colonialism, which ends up truncating the process of seeking autonomy and national independence, through the creation of its own technology, maintaining the eternal dependence that has always characterized the countries that were colonized.

It is not wrong to assume that spending on research might make companies and the country more independent, with the capacity to compete in international markets, but for this to happen, it would be necessary to have research and development policies – R&D – funded by private and public resources, which could be invested in research institutes, universities,

contributing to the practice of applied science in an institutional way, generating, in the long run, new conditions and competitiveness and insertion in the globalized market, making the process of generating and adding value occur with a certain level of national independence.

In short, organizational change and the exchange of technologies, in the most diverse sectors of activities and in the most diverse areas of organizations, is inevitable, especially in a context of globalized economy. However, it must be considered that a high level of autonomy in terms of these technologies can contribute, in a consistent way, to the distribution of world income, which is still concentrated, for the most part, especially in per capita terms, in the same imperial powers that control the world since the sixteenth and seventeenth centuries.

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How Fintech is Changing the Scene of Financial Markets Worldwide

By Leonardo Barbosa de Souza

Abstract: Fintech companies are revolutionizing the global financial landscape by challenging traditional institutions with innovative solutions. They provide various services, including digital payments, peer-to-peer lending, investment platforms, digital insurance, and credit solutions. The 2008 economic crisis exposed weaknesses in traditional financial systems, paving the way for fintech to offer more agile and customer-centric alternatives. This initial wave of fintech used technology to cut costs, improve user experiences, and expand access to financial services, laying the groundwork for ongoing innovation and a more inclusive financial ecosystem. In Brazil, fintech has notably increased the number of investors and reduced banking concentration, fostering financial inclusion and economic growth. Despite challenges like regulation and security, fintech are set to drive financial inclusion and transformation globally through innovation and strategic partnerships.

Keywords: Fintech, Financial Inclusion, Digital Payments, Innovation, Economic Growth

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With innovative solutions, fintech companies have been transforming the world of finance, challenging the status quo of the traditional institutions. This text explores how fintech encourage financial inclusion and help to reshape the global market.

Fintech is an innovative technology companies that serve the financial industry by delivering financial services, including digital payments, peer-to-peer lending, investment platforms, digital insurance and credit solutions. The economic crisis of 2008 impacted the whole world and was led by traditional financial institutions and its bad decisions specifically on real estate financing, revealing their inefficiencies and rigid structures. This crisis created fertile ground for the emergence of fintech companies, which offered more agile, transparent, and customer-centric alternatives.

The early fintech pioneers took advantage of the growing distrust in traditional banks by offering innovative solutions that catered to the needs of a growing tech-adoption population emerging from the financial crisis and from the invention of the smartphones, specifically, the iPhone. These fintech companies brought in new business models that used technology to cut costs, enhance user experiences, and widen access to financial services. This initial wave of fintech laid the groundwork for the rapid growth and evolution of the sector, fostering ongoing innovation and building a more inclusive financial ecosystem.

Here are some of the key financial services often offered by fintech:

- **Digital Payments**

Digital payments refer to specific financial transactions conducted electronically. Examples include mobile wallets, online banking, and payment gateways like PayPal and Stripe, which facilitate money transfers without the need for physical cash or checks.

- **Investment Platforms**

Investment platforms provide users with tools and resources to invest in various financial products, such as stocks, bonds, and mutual funds. Companies like Robinhood, E*TRADE and Webull have democratized access to investment opportunities by offering low or no-fee trading options and user-friendly interfaces.

- **Digital Insurance**

Digital insurance companies leverage technology to offer more flexible and accessible insurance products. Insurtech firms like Lemonade and Oscar Health use data analytics, artificial intelligence, and user-friendly apps to streamline the process of buying and managing insurance policies, often at lower costs than traditional insurers.

- **Peer-to-Peer Lending**

Peer-to-peer lending platforms connect borrowers directly with lenders, bypassing traditional banks. These platforms, such as LendingClub and Prosper, enable individuals or businesses to obtain loans from multiple lenders, often at lower interest rates than conventional banks while the lender, usually an ordinary investor, can have nice returns on the investment (lending).

- **Credit Solutions**

Fintech in the credit sector use technology to offer more efficient and accessible credit products, with a lower interest level. These include online platforms for personal and business loans, credit scoring systems that leverage alternative data, and automated underwriting processes. Examples of credit fintech include SoFi, which offers personal loans, student loan refinancing, and mortgage loans, and Kabbage, which provides small business loans with a quick and straightforward application process.

So, financial inclusion ensures that people and businesses have access to affordable financial products and services that meet their needs, which include transactions, payments,

savings, credit, and insurance. This allows people to fully participate in the formal economy, leading to an improvement in their standards of living and the promotion of economic growth since the transactions can occur in a more efficient, secure, and transparent manner. By integrating more people into the financial system, there is an increase in economic activity as individuals and businesses are now able to invest, save, and spend more effectively. This inclusivity drives financial stability and encourages entrepreneurship, ultimately contributing to a more robust and resilient economy.

However, financial inclusion has been a challenge. Inaccessibility to banking services, high cost, complexity, and bureaucracies remain barriers to many people in the formal financial system, especially in developing countries. This is where the significant value addition by fintech comes into play.

Fintech can promote financial inclusion making financial services more accessible to underserved populations. For example, they can offer digital bank accounts that can be opened and managed via smartphone, eliminating the need for physical branches and simplifying the onboarding process. Additionally, microcredit and digital payment solutions help people without a credit history or limited bank access participate in the formal economy.

Also, the operational costs will be significantly reduced by fintech because of their way of offering services. Automating processes and taking advantage of technologies such as artificial intelligence, automatic risk assessments and blockchain allow fintech to provide financial services at much lower costs compared to what traditional banks incur.

Innovation and User Friendliness

Fintech excel in innovation and usability, making financial services more accessible and user-friendly. Mobile applications and intuitive interfaces enable even those with limited technological knowledge or financial skills to manage their finances effectively. Many platforms offer features that educate users on various financial products, helping them make more informed decisions.

For instance, financial education is a key focus for many fintech. They frequently include educational programs within their apps that cover topics such as saving, investing, and debt management. This not only promotes financial inclusion but also empowers individuals to take control of their finances.

In Brazil, fintech have revolutionized the investment process, making it faster and easier, leading to a significant increase in the number of investors. In 2018, B3 (Brazil's only stock exchange) had 800,000 people registered as investors. In 2024, this number had already grown to 5,000,000. This surge has had a profound impact, potentially reducing default rates, increasing savings rates, boosting capital market financing, and enhancing financial education.

Global Market Impact

The transformation of financial markets is taking place as fintech change the functioning of financial and economic systems. One good example is the introduction of new business models, such as peer-to-peer lending and crowdfunding models, that democratize access to capital.

In Brazil, according do Brazil's Central Bank, the banking concentration of the four largest financial institutions - Caixa Econômica Federal, Itaú Unibanco, Banco do Brasil, and Bradesco – dropped since 2017. The peak was in 2017, at 78.51%, but since then, overall market concentration has been declining. Renato Gomes, BC's director of financial system organization and resolution, noted a trend of "widespread deconcentration" across all measures used by the monetary authority. The Central Bank also highlighted the growing share of the non-banking segment, driven by payment institutions, fintech, and cooperatives.

Brazilian fintech have significantly altered the country financial landscape. The banking concentration historically limited access to credit for small and medium-sized enterprises and low-income individuals. However, fintech are changing this by offering more accessible and personalized credit solutions. For instance, Nubank started in 2013 with no-fee credit cards and expanded to digital accounts and personal loans. It has become one of Brazil's largest fintech, promoting financial inclusion for millions. The company started the rollout of its products and now have operations in Colombia and Mexico, with more than 100 million customers.

The Central Bank of Brazil has also mandated regulations that have further hastened digitalization in Brazil's financial sector. For example, Resolution No. 4,656 of 2018 defines the rules for the constitution and operation of Direct Credit Societies (SCD) and Loan Societies between People (SEP). This will give regulatory room, or rather a head start, for the development of fintech—cost-efficiently developed as these allow the fintech to operate without such intermediaries in traditional banking, thus cutting costs and increasing efficiency.

Another significant novelty happened with the creation of the instant payment system by the Central Bank, denominated Pix. Launched in 2020, it will allow anyone to make real-time money transfers 24 hours a day, seven days a week. This very innovation has facilitated the financial transaction of consumers and boosted the competitiveness of the financial sector, thereby making it lucrative both to the fintech and consumers.

Also, many fintech collaborate with traditional institutions, offering technology solutions that improve efficiency and customer experience. Examples include white-label banking services, where fintech provide technology for banks to offer new products under their brand. However, competition with well-capitalized traditional banks has sometimes hampered fintech growth of the ones that compete with the biggest corporations.

Successful fintech are found worldwide. In Africa, companies like M-Pesa have revolutionized mobile payments, enabling millions without access to formal banking to conduct financial transactions via mobile phones. In Asia, Alipay and WeChat Pay have transformed digital payments, becoming essential for e-commerce and daily transactions.

Despite the many benefits, fintech also face significant challenges and risks. One of the main concerns is regulation. Most countries are trying to catch up with the rapid growth of fintech by designing new regulatory frameworks. Security and privacy are also among concerns, knowing that with more transactions going digital, customer data protection is a priority. Fintech must ensure their platforms are secure and protect user information from fraud and cyberattacks.

Another concern relates to sustainability and genuine inclusion. As much as fintech can facilitate financial inclusion, the sustainability of such strategies only depends on how best they are executed and if it generates cash flow.

The future for fintech companies appears very optimistic, with a few emerging trends to shape the market. Significant innovations in financial technology include technologies such as blockchain, artificial intelligence, and data analysis. For instance, blockchain could change the way financial transactions get recorded and verified; transparency, in turn, would be

boosted while at the same time reducing the attendant risks in the perpetration of fraud. The branch focuses on the designing of more precise credit systems, personalized financial recommendations, and improvement of fraud detection through the incorporation of artificial intelligence and machine learning.

The future of the fintech world will depend on partnerships between fintech companies, traditional banks, and governments. These collaborations can strengthen the financial ecosystem by combining fintech innovation with banks' experience in risk management, regulatory compliance and capital allocation. Governments can play a crucial role by facilitating these partnerships and creating a regulatory environment that supports innovation while protecting consumers.

The long-term outlook for the social and economic impact of fintech is positive. Fintech need to focus on creating value for users and for its shareholders by addressing economic and social problems. Innovation should be guided by principles of responsibility and sustainability to ensure that the benefits of fintech are widely distributed, and risks are effectively managed.

In summary, fintech are playing a transformative role in promoting financial inclusion and impacting global markets, especially in developing regions where much of the population was excluded from financial services until recently. By expanding access to financial services and reducing costs, fintech promote financial education and economic growth. However, sustainable financial inclusion requires addressing key issues such as regulation, security, and adding value for investors. Moving forward, fintech must adopt a balanced and collaborative approach to ensure benefits are widely shared and risks are minimized. Through proactive innovation and responsible partnerships, fintech will continue to drive financial inclusion and economic transformation globally.

Chapter 3. Driving forces of Innovations

Innovation as a Catalyst: Bridging the Past and Future in Technology, Business, and Culture

By Aleksandr I. Shmelev

Abstract: Innovation serves as a vital engine of progress in our rapidly evolving world, continually reshaping the landscapes of business, technology, and culture. The term "innovation" itself carries varied interpretations across different fields, often viewed as a simple novelty in one area while acting as a driver for significant change in another. This essay examines the multifaceted nature of innovation, exploring its definitions, applications, and impacts within diverse domains. By delving into examples ranging from technological advancements to cultural shifts, the essay highlights how innovation acts not only as a mechanism for development but also as a bridge connecting historical foundations with future advancements.

Keywords: innovation, economic development, technological progress, business innovation vs. invention, socio-cultural movements.

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Wheels, Pushkin, Innovation

Every time we start talking about innovation, it is worth considering how broad and multifaceted this topic is. Innovation is not just new technologies, products, or ideas, it is an engine that powerfully influences economic, social and cultural development. In our modern world, where the speed of change is accelerating, the role of innovation is more critical than ever. The essay you are about to read will immerse you in the world of innovation, reveal its meaning and importance in our days, and examine the different areas of its application. Also, I will try to show the journey of a student who at first has no idea what the word "Innovation" means, but in the end, after reading a lot of opinions and absorbing a lot of information, gains confidence in his own knowledge.

A little retrospective - At the beginning of my studies in the Innovation program, I received my first assignment in my major. Just at that moment, I had no idea what the profession I was studying for was all about. And the assignment was to make a small report on one innovative product from the modern media field. Without thinking much, I chose a smart home and a smart outlet. Further, in the process of preparing the assignment with my head began to form an image of the future kind of my professional activity. Briefly, I thought that an innovation manager is someone who sells smart sockets. Of course, I was exaggerating a bit by saying exactly that about selling. However, somehow, I imagined myself in the production chain of some new technological stuff. Funnily enough, I turned out to be partly right. However, after the question "Why is a smart outlet an innovation?" I slowly began to realize how deep the rabbit hole was.

In one way or another, almost everyone has encountered the term "innovation" in their lives. People will interpret the meaning in different ways, but the general idea is similar and quite simple - "innovation is something new". However, in today's day and age innovation means much more than just novelty. It is the driver of change and its role in shaping the future is undoubtedly very important. But let's not get too far ahead of ourselves. Let's look at how innovation appears to us now.

The most respected definition from the Oslo Manual 2018 states - innovation is a new or improved product or process (or combination thereof) that differs significantly from the unit's previous products or processes and that has been made available to potential users (product) or brought into use by the unit (process). This particular definition, unlike previous iterations of the Oslo Manual, is rather broad, but the focus on products and processes suggests that it should be understood in the context of business innovation.

Regarding business innovation, I have encountered one interesting question in my practice. It sounded as follows: what is the difference between an innovation and an invention? Answering this question, one can often be guided by the following logic: innovation is a commercialized invention. Or an invention that is going to be commercialized. This may not seem like a very convenient definition, but there is a very interesting example that I will remember for the rest of my life.

The wheel is not an innovation. An important reminder - this statement is relevant if we look at innovation from a business perspective. What is the point: the wheel has not been commercialized. The wheel is exactly that - an invention. Also, there was probably no such thing as "commercialize" at the time the wheel was invented. Nevertheless, if we imagine that the inventor of the wheel would have patented his invention, opened production, and set up all logistic chains (by the way, exclusively using his own invention for this purpose) and started selling the product in a competitive market environment - the wheel could be called an innovation.

This example is rather clumsy and controversial. It works only in the context of "business innovation" and rather only helps to answer the question about the difference between invention and innovation. However, business is by no means the only area where innovation can be applied. Now the narrative moves smoothly to a broader topic - the economy. In a world where scientific and technological progress is becoming a key success factor, innovation plays a crucial role in the development of the economy.

Some countries and regions devote enormous attention and resources to research and development (R&D). Such initiatives allow them to lead the way in creating new technologies, products, and services. Such states actively invest in research, develop education and infrastructure for startups. This leads to the emergence of innovative ecosystems where entrepreneurs and scientists can interact and bring their ideas to life. The unifying effect of innovation will be mentioned later in the essay.

In addition, some states create conditions that promote the active export of startups and innovative products. This kind of activity gives them an additional advantage in the global market and strengthens their economic influence. An example of such a strategy is Israel, which is known for its successful technology export program. It is also thanks to the bet on the development of innovative activity that such a young state, founded in 1948, has been able to achieve significant economic success.

Innovation in the economy not only creates new opportunities for development, but also contributes to resilience in times of economic crisis. It can also help address complex global societal challenges, such as climate change and resource sustainability, and provide tools to improve the quality of life of the population.

Innovation in society is also an incredibly interesting and noteworthy topic. In some ways, even some global socio-political events can be attributed to them. Revolutions, reforms, and human rights movements are all forms of social innovation aimed at changing outdated structures and improving the lives of citizens. For example, the environmental movement demonstrates how social innovation can lead to change on a global level.

Also, social innovation is a source of endless intrigue and fascination. Humans throughout history have been gravitating towards something new, and innovation causes them to experience flashes of interest and enthusiasm. The innate desire for innovation can be observed at all levels of society to some extent.

Among us there are those who are called "innovators" - people who are ready to search for new ideas, solutions, and ways of development, and to try them in practice among the first users. They act as catalysts of innovation, contributing to various spheres of life. Innovators are not limited to one field of endeavor - they can be scientists, entrepreneurs, artists, activists, and even ordinary citizens willing to come up with out-of-the-box ideas. Their importance lies in the fact that they help society move forward by inspiring others to experiment and be creative. And creative impulses contribute to the creation of collectives united by common interests. Such collectives evolve and even create the entire ecosystems mentioned earlier.

Through creativity, we move smoothly to the meaning and importance of innovation in culture. An example of how innovations in language and literature can change public perceptions and reflect cultural transformations is the work of the great Russian poet Alexander Pushkin.

Pushkin was not only a master of words, but also an innovator in the use of language. He boldly played with vocabulary and style, mixing elements of different languages and dialects. One of the most notable innovative moments in his work relates to the use of French jargon, which was popular among the Russian noble elite. However, Pushkin did not limit

himself to this. Combining, as it may seem at first glance, incongruous things, the poet also introduced elements and true peasant vernacular into his works.

This approach of Pushkin epitomizes the importance of innovation in culture. He not only reflected the diversity of social groups and their linguistic features, but also became the creator of a new literary reality. His work had a great influence on the development of Russian literature, and his experiments with language helped to expand the horizons of literary expression.

Innovations in culture, whether in language, art, music, or design, allow us to enrich our cultural heritage and create new meanings. It contributes to the evolution and change of cultural norms and values, which in turn shape and influence culture and society itself.

Also continuing the theme of creativity and culture, it is worth remembering that sometimes innovation is simply born out of the human ability to dream and invent new things. This is an important and rewarding aspect of innovation that can broaden horizons and inspire new ideas. The nature of innovation origin is always creative, so dreams and fantasies act as a catalyst for creativity and innovation. When people give themselves permission to think outside the box and boldly explore new ideas, it can lead to amazing discoveries and cultural change. Many cultural and even technological innovations began as purely conceptual ideas or creative fantasies. After all, space travel was once just words on the pages of paper books, but now it is an integral part of the research and media field.

Innovation is very multifaceted and can be considered from different points of view and have some specifics depending on the sphere in relation to which we consider it. But despite the diversity of innovation manifestations, there is at least one similarity between almost all modern innovations. Returning to the definition given in Oslo Manual 2018 "innovation is a new or improved product or process...", in most cases in the modern world most innovations are exactly that "improved product or process". It builds on a certain base, improving and supplementing it. Even the automobile is a logical heir to the wheel, which was once an invention, even if it is not the best example in terms of the MVP (Minimum Valuable Product) concept.

Innovation does not go against heritage and the past; it builds on that foundation by making changes. It is the unifying factor for innovation in different fields, be it scientific discoveries, new synthetic materials, technological solutions, or socio-cultural movements. In this context, innovations can be seen as links in the chain of scientific, technological, societal, and cultural development that rise on the shoulders of previous achievements.

Returning to the beginning and to the foundation of this essay, we would like to talk about the role of innovation in management and highlight the most important aspects on this topic.

First, modern businesses face constant change. And whether it is changes in legislation, consumer preferences or technological advances - innovation allows an organization to adapt to these changes while maintaining its reactivity. The topic of innovation also comes up repeatedly in various guides to agile management methodologies such as AGILE, for example. "Willingness to change is the basic rule of the game" - these overlaps very conveniently with the concept of novelty provided to us by innovation.

Secondly, the process of innovation can enthuse employees, rallying the team around a common goal. When employees see that their ideas and suggestions are heard by others, it can increase their engagement and commitment to their work, therefore to the profit of the company. This aspect follows directly from the societal and cultural value of innovation.

Innovation in management can take many forms, including management techniques, corporate culture, strategic planning, and many other aspects of an organization. Innovation

is becoming an integral part of successful management in today's world. And it is definitely more than selling smart outlets.

I have come some way from being a student with almost no idea what innovation is to today where I can give my opinion on innovation in different areas. What is remarkable is that even in the process of writing the essay, I discovered new meanings and thoughts about the nature of innovation from other angles, even though I had originally planned only to write out my existing knowledge in a structured way. This certainly reminds us of the infinitely wise phrase "live and learn". This is especially noticeable in the context of working with new products and processes, in which innovation basically is in and of itself.

In this essay, we have examined innovation from different perspectives. Traveling through these different spheres has demonstrated how wide and deep the contribution of innovation to our modern lives is.

Innovation is an engine of progress, capable of changing standards and norms, expanding opportunities and promoting development. In business, it keeps us competitive and enable companies to adapt to a rapidly changing environment. In society, it inspires change and increase interaction between groups. In culture, it creates new ideas and forms of expression, leaving a mark on history. In the economy, it is a key driver of growth.

Innovation serves as a bridge between the past and the future, paving the way for improvement and development. It is the engine of progress, regardless of the field of application, and play a key role in shaping our modern world. It is crucial to recognize and support innovation as a source of inspiration, growth and improvement in our lives and society.

Innovation In Companies: Fostering Innovation Culture In Corporate Environment

By Kseniia A. Shilina

Abstract: The essay examines the role of innovation in enhancing business performance, driving growth, and maintaining competitiveness within companies. The risks and challenges associated with innovation processes are considered, emphasizing the importance of fostering an organizational culture that promotes and supports innovation. Through a comparative analysis of different innovation cultures, including those of corporations and start-ups, the essay explores strategies for companies to strengthen their innovative capacity and adapt to evolving market dynamics. The potential benefits of collaboration between corporations and start-ups in driving innovation and achieving mutual growth objectives are discussed.

Keywords: innovation, open innovation, innovation culture, startup culture.

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The term «innovation» can be defined as the process of applying new ideas or technologies into existing procedures in different spheres. In the context of companies or enterprises, innovation projects are aimed at strategic development, decreasing production costs, improving efficiency, and achieving higher competitiveness by implementing new business models, creating new products, and constantly improving existing ones. It involves the development and implementation of new goods, services, operational processes, marketing, organizational and managerial methods in business practices. These days, innovations are seen to be a critical component that improves business performance and plays a major part in promoting growth and development.

It is hard to underestimate the importance of innovations. First, introducing some innovative solutions allows organizations to create new or added value, which can lead to improved efficiency and competitive advantage. Second, it helps us to stay relevant in today's constantly changing world and adapt to modifying market conditions and customer needs. Finally, it is crucial for improving market share and creating new products.

Despite all the advantages mentioned, innovation processes are also associated with risks and challenges that need to be considered when designing relevant innovation strategies. Implementing new technologies and procedures always involves additional expenditures that are sometimes much higher that was initially planned. Not every company can afford to create or implement innovations without any additional external funding. Innovations require significant investment in research and development, technology, and talent acquisition. Also, all the transformation processes are always connected with a high level of uncertainty. Some research and development projects take years to come up with a new solution or technology that can be implemented or transferred into a new product or result fruitless. Thus, there is a risk of failure associated with innovation, as not all innovative ideas or projects may be successful. Moreover, some modifications can disrupt existing processes and systems, leading to resistance and challenges in implementation requiring continuous adaptation and learning to keep up with the changing landscape.

Taking into account all the risks and in order to reduce the number of expenditures on research and development activities, some organizations have decided to implement an open innovation approach. This way they have the possibility to reduce additional costs on organizing all the processes connected with innovations inside the company. However, despite some beneficial effects, opening up this process causes negative consequences for many organizations due to different reasons. The main risks of open strategy include loss of knowledge and, therefore, competitive advantage due to misconduct on the part of the partners, problems with implementation of know-how because of inadequate appropriation systems and lack of competent management abilities and behaviors. Therefore, successful organization of the innovation process requires making great efforts to form strategies that represent the safest way for the company and correspond to its specific characteristics and further development goals.

The way the company organizes its innovative activity including internal and external processes related to innovation is mainly characterized by its innovation culture. Innovation culture refers to the set of values, beliefs, and behaviors inside an organization that is supported by all management and employees, promoting and supporting innovation on each level. It includes both formalized processes and unwritten rules related to organizational culture that contribute to firms' innovational performance. Innovation culture influences all the departments, processes and parts of the company’s operations including external relations, teams, organizational context, individuals, and leaders. Culture plays a crucial role in understanding why innovation is successful in some companies and challenging in others.

Organizational innovation climate has a potential to have a positive impact on employees' behavior, motivating them to take initiative and participate in innovational development, which finally results in a beneficial effect to the whole organization.

Different companies have their own specific features in terms of innovation culture. For instance, there is a big difference between big corporations and start-up innovation culture. Corporate culture in terms of innovations is considered rather limited due to different factors, that is why companies may face significant issues and difficulties related to the development and implementations of innovative solutions. It is often disregarded in the analysis of their performance, but understanding and developing the innovation climate can lead to efficient improvement within organizations.

Many large corporations struggle with a lack of innovations despite having robust managerial structures and methodological processes. The reason is the lack of a well-established and widely disseminated innovation culture. In large corporations, features like formalized processes, resistance to change, and an inflexible hierarchical structure may overshadow the significance of organizational culture and unwritten rules as drivers of innovation. A firmly established hierarchy and limit to specific responsibilities does not make employees go beyond their duties and push their innovative ideas. Slow adoption of innovative initiatives can block the development of new products and solutions in such companies. Big corporations may also face challenges in adapting to ongoing external market shifts and embracing continuous change, which are essential for a culture of innovation. In this way they risk being overshadowed by more innovative competitors and losing their market advantage.

In contrast, start-up innovation culture can be described as a «nature born» innovation culture. Start-ups often have a strong focus on innovation development as it is crucial for their success and growth. Unlike big corporations, small enterprises have the advantage of being more agile and flexible, which allows them to foster a culture of innovations more easily, keeping up with the times and quickly adapting to the changing needs of customers. Also, start-ups typically have a flat organizational structure, which promotes collaboration, creativity, and open communication, making up important elements of an innovation culture. They often prioritize experimentation, risk-taking, and learning from failures, creating an environment that encourages innovation and entrepreneurial thinking. Start-ups also tend to have a strong emphasis on hiring individuals who are passionate, open and creative, who are able to contribute to further innovational evolving.

Regarding the challenges related to the approach described, as start-ups expand and scale, they might have to implement more formalized procedures and structures, which could impede innovation. As a result, they might find it difficult to preserve their innovative culture. However, many successful start-ups prioritize saving their innovation culture even as they grow, recognizing its importance in staying competitive and driving continued success. One example of a company known for maintaining a start-up-like innovation culture even as it has grown into a tech giant is Google. Since the beginning, Google's founders have placed a strong emphasis on fostering an innovative, risk-taking, and creative culture. Even though Google has developed and evolved, it still places a high value on ongoing innovation and encourages staff members to think creatively and try novel approaches. Thus, Google's culture is one of the factors that helped it to maintain its leadership position in the tech sector. Another example of such a company is Spotify. Today is a huge company that represents one of the most used streaming services in the world. The organizational culture of the company assumes the presence of separate and independent working groups with free action and autonomy, while fulfilling the tasks assigned to them (Failory, 2023). Such a structure allows the company's

employees to maintain a level of independence and freedom, favorable for the emergence and development of innovative ideas.

In order to improve their innovative capacity in the context of the situation described, large companies interact with start-ups at different levels. There is an interconnectedness that takes place where start-ups collaborate with large corporations for mutual benefit, which contributes to the development or spread of innovations. Examples of such synergies include investing or taking over small companies, helping start-ups lacking sufficient budget or possibilities to innovate. However, to date, this process can be quite challenging for both sides due to various reasons. After finding suitable start-ups to work with, corporations may face difficulties in the process of investing in them, bringing them to the stock exchange with investors before public trading or taking them over.

In my opinion, one of the aspects that complicates this kind of interaction is the difference in innovation cultures. If large companies develop their own innovation culture and make it more similar to that in start-ups, then the costs and expenses of these processes of working with start-ups will go down and the interaction process will become faster. Through these actions, large companies will not only be able to establish easier and more effective interactions with innovative companies but will also create a culture that fosters their own internal innovation development.

The following methods can be used in order to strengthen innovation culture in big traditional corporations. Overall, these are the features of start-up culture that, when applied, can unlock the innovative potential of such companies. First, it is necessary to foster a culture of open communication and collaboration, encouraging employees to share ideas and perspectives. According to studies (Chernysheva, Kuzina & Yudin, 2022), employees are often the main drivers of innovation initiatives in companies, but the task for managers is to create the right environment for this process. Businesses need to recognize and reward innovative ideas and contributions, creating stimulus for employees to actively engage in innovation. It is crucial to empower employees by giving them autonomy and decision-making authority, allowing them to take ownership of their work and contribute to innovation. It is also important to provide resources and support for continuous learning and development, enabling employees to acquire new skills and knowledge that can contribute to innovation. In this way, the company can cultivate highly qualified employees without having to spend resources on finding specialists from outside. It is a good practice to set a good example for others to follow by having managers and leaders show and promote creative behaviors and mindsets. Businesses should also promote risk-taking and experimentation, fostering a safe environment where staff members can try new things, fail forward, and build cross-functional teams. Moreover, promote a diversity of viewpoints to foster cooperation and the sharing of ideas among individuals with various backgrounds and specialties. In this way, companies will be able to nurture a learning culture that values curiosity, creativity, and continuous improvement, encouraging employees to constantly seek new knowledge and innovative solutions.

Of course, due to crucial differences in the type of activity and structure of large companies and local start-ups, not all elements of innovation culture can be adapted to corporations or can be applied with modifications or limitations. For example, it is nearly impossible to ensure maximized flexibility to a big corporation, which consists of many departments and employees with roles and responsibilities established over many years and fixed manufacturing processes. Also, a high rate of creative work and flat structure does not suit any business as sometimes it will be hard to keep all the organizational processes functioning in an appropriate way. Finally, the start-up culture could contradict the mindset of

conservative leaders and employees. However, even some non-cardinal changes can serve as a ground for favorable changes, which in the future can provide the company with a more efficient functioning and stable position in the market.

To conclude, I want to emphasize the importance of innovations in the corporate sphere. Despite the challenges and costs, cultivating a climate of innovation is necessary to keep the company relevant and competitive. There are many examples of businesses that have lost market share because of their inability to adapt to the current innovation agenda. The Kodak company is a classic example of a company with a low innovative culture which failed to maintain its position in the market. For many years, Kodak was one of the dominant photography corporations, but its inability to adjust to the digital revolution finally caused it to go out of business. Due to its strong cultural ties to traditional film photography, Kodak was hesitant to adopt the rapidly advancing digital imaging technology of the late 20th century. The company lost out on opportunities as a result of its unwillingness to change course and make investments in the development of digital photography and declared bankruptcy. Kodak's case serves as a cautionary example of a once-innovative company that could not adapt to changing technologies and market dynamics, ultimately leading to its decline and loss of industry leadership.

It can be hypothesized that the spread of startup culture of innovation or its separate features to large corporations, as well as the expansion of innovative startups into major players in the market, are some of the most winning and most likely to happen innovation strategies for companies in the near future. This way, companies will be able to adapt to a rapidly changing world with the ability to develop and implement innovations in various processes quickly and efficiently.

The Role of Innovation for Economic Development in The World Economy

By Ilya M. Sergeev

Abstract: The paper examines the role of innovation as one of the main elements of the transition to a new technological order. The key concepts in the field of innovation policy are analyzed, the role of business in the development and emergence of innovations, as well as the features of modern technology development are considered. It is noted that in order to overcome grand challenges special attention should be paid to the development of the national innovation system, human capital, and the IT sector.

Keywords: innovation, globalization, economic development, economy of knowledge, private sector, national innovation systems, technologies, IT sector

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In contemporary discourse, the term "innovation" encompasses a myriad of definitions. When defining the essence of this phenomenon, it is important to underscore the quality of novelty inherent in an object (idea, technology, process, product, etc.) conceived and implemented for its introduction into the market and subsequent utilization by others (Schumpeter, 1934). Frequently, broad categories of innovations emerge, encompassing technical, process-oriented, and organizational, which are typically further subcategorized. Additionally, innovations can be classified based on the specific domain of their application. This essay will examine innovation within the context of economic development in today's globalized world.

Historically, innovation has invariably coexisted with and propelled societal progress, thereby substantiating its intrinsic association with the advancement of human civilization. For example, the early to mid-eighteenth century witnessed substantial progress across various areas of life through innovation. This epoch, commonly referred to as the Age of Enlightenment witnessed intellectual, social, and industrial advancements. Sectors like textiles and manufacturing burgeoned, instigating scientific breakthroughs and novel agricultural technologies, revolutionizing transportation, and communication, and influencing art, literature, and the evolution of political thought. These innovations laid the groundwork for the Industrial Revolution, fundamentally reshaping the economy, culture, and lifestyle of that era.

At the present stage, the issue of adapting innovations and undertaking technological modernization to ensure sustainable economic development and transition to the sixth technological mode has become paramount for nations. Innovation is widely perceived as a fundamental component within the framework of socio-economic strategies and science & technology policies. In 1992, after the publication of the first edition of the Oslo Manual, a methodological document providing recommendations in the field of innovation management surfaced, which is actively used by OECD member-states and other countries. Subsequently, three more new editions of this manual were released (in 1996, 2005 and 2018), which emphasizes the complexity of this phenomenon and its importance for the socio-economic development of the state.

Key features of the current interphase transition include rapid technological advancements and widespread digital technology usage. The volume of information generated by humanity is exponentially escalating in accordance with Moore's Law, surpassing individual cognitive capacities at the biological level. The concept of a knowledge-based economy revolves around the principle of value addition, underscored by the synergistic interaction of four essential factors of production: 1) the innovation system; 2) human capital; 3) institutional framework; 4) information and communication technology (ICT). These elements collectively constitute the foundation upon which the modern economy is built, emphasizing the centrality of knowledge generation, dissemination, and utilization in driving economic growth and development. Furthermore, strategic science, technology and innovation (STI) objectives exhibit a discernible evolutionary trajectory, transitioning progressively from a focus on technological advancement, industrial expansion, and economic growth to encompass broader societal transformations, such as enhancing the quality of life and addressing pressing global challenges. This paradigm shift underscores a nuanced understanding of the multifaceted roles of STI policy in contemporary governance, emphasizing its pivotal role in orchestrating comprehensive responses to complex socio-economic and environmental imperatives.

A gradual decline in international trade and investment, with a concurrent elevation of the significance accorded to technological innovation poses significant challenges to

globalization. This paradigmatic shift was accompanied by a heightened recognition of the pivotal roles played by human capital and the fluidity of technology across borders. Moreover, global innovative development faces challenges such as insufficient investment, imprudent fund utilization, skepticism towards economic institutions, and a shortage of creative individuals (Karpova, 2014). Within the realm of measuring international trade, the concept of the Technology Balance of Payments (TBP) emerges as a pertinent framework. The TBP serves as a valuable metric for gauging a nation's degree of technological independence. Specifically, technology payments within this framework signify the acquisition of knowledge immediately applicable within national productive systems, serving as inputs that could potentially supplement or even substitute a country's domestic R&D endeavors. Conversely, technology receipts, another facet of the TBP, are contingent upon a nation's R&D efforts and correspond to the foreign sales of marketable innovations stemming from domestic endeavors.

As the importance of innovation grows, the role of the National Innovation System (NIS) in STI policy of states increases. NIS refers to the interconnected network of institutions, organizations, policies, and resources within a country that collectively contribute to fostering innovation and driving economic growth. It encompasses various stakeholders, including government agencies, research institutions, universities, businesses, and venture capitalists, among others. Each NIS has its own structural elements that have developed under the influence of various historical and economic factors. The primary objective of an NIS is to facilitate the generation, diffusion, and application of knowledge and innovation to enhance the competitiveness and productivity of a nation's economy (Lundvall, 1992). Thus, a well-built national innovation system allows to respond to grand challenges, strategic interests, and requests from stakeholders, which ultimately benefits all sides and contributes to the economic prosperity of the state.

When discussing the emergence of new innovations and technologies, the private sector plays a pivotal role in fostering, advancing, and financing innovation. In OECD countries, the primary drivers of advancements in the science and technology sector are nations where private organizations contribute approximately two-thirds of the total investment in Gross Expenditure on Research and Development (GERD) expenditures, with the remaining share financed by the state (Sergeev & Sergeev, 2022). It is a business that actively creates innovative solutions and products, as well as new technologies, which has a significant impact on the development of science and technology. Protecting the rights and interests of private organizations, as well as providing them with benefits, is one of the effective ways to stimulate the country's STI policy. However, the task of stimulating the development of innovations by business is complex since it is necessary to consider many contradictions and peculiarities.

In the rapidly evolving landscape of technology, the integration of advanced and emerging technologies is reshaping industries and revolutionizing the way humanity approaches various sectors. The following list, compiled from the Survey on Advanced Technologies (SAT) names advanced and emerging technologies which were adapted and used by Canadian enterprises in 2022:

Advanced technologies:

- Material handling, supply chain and logistics;
- Business intelligence;
- Design and information control;
- Processing and fabrication;

- Clean technologies.

Emerging technologies:

- Geomatics or geospatial;
- Nanotechnologies;
- Biotechnologies;
- Artificial Intelligence technologies;
- Internet of Things;
- Blockchain or distributed ledger technologies;
- Robotics;
- Virtual reality, augmented reality, or mixed reality technologies;
- Advanced medical devices for human health.

...among numerous others.

It is imperative to acknowledge that this list is not exhaustive, as the field of advanced and emerging technologies continues to evolve. Debates persist on the optimal integration of these innovations across various sectors, challenging conventional notions of industrial production and fostering a paradigm shift in technological landscapes.

According to Gartner, top 10 strategic technology trends for 2024 include:

- AI Trust, Risk and Security Management (AI TRiSM)
- Continuous Threat Exposure Management (CTEM)
- Sustainable Technology
- Platform Engineering
- AI-Augmented Development
- Industry Cloud Platforms
- Intelligent Applications
- Democratized Generative AI
- Augmented Connected Workforce
- Machine Customers

Researchers are surprised not only by the fast pace of technology development but also by the speed of trend development and the frequency of changing one group of trends to another. Thus, in order to gain competitive advantages, it is necessary to be able to adapt rapidly to current technological trends and changes.

The Information Technology (IT) sector plays a pivotal role within the economy of knowledge concept by steering technological advancement, fostering economic growth, and contributing to societal development. It catalyzes digital transformation across all sectors, augmenting process efficiency and propelling the creation of innovative business models. IT tools accelerate research and development, contributing to the emergence of disruptive innovations in various fields. In addition, the IT sector fosters entrepreneurship by providing startups and entrepreneurs with platforms to create innovative solutions. A strong IT sector enhances a country's global competitiveness by developing globally competitive products and services. Governments play an important role in fortifying the IT sector, deploying policies conducive to research, digital infrastructure, and regulatory frameworks.

The move towards an innovation-led economy, alongside the development of science and education, and integrating innovations into the corporate sector are crucial for addressing

global challenges. Consequently, technological innovations and the quality of human capital are poised to determine the future competitiveness of national economies, facilitating economic restructuring toward post-industrial development, and mitigating sluggish rates of economic progress. The imminent phase of new industrialization requires technological modernization and the emergence of breakthrough and disruptive innovations. It is necessary to invest in the development of human capital and possess the skills of long-term strategic forecasting. The emergence of new advanced technologies requires constant improvement of people's professional skills, which forces companies and institutions to adapt to the changing technological landscape. In turn, policy-makers face problems related to the protection of citizens' rights, personal data, and copyrights, ensuring high-quality public education, social and cultural adaptation, and ethical considerations (Karpova, 2014).

In conclusion, the importance of innovation in our interconnected and globalized world cannot be overemphasized. Innovations transcend borders, cultural landscapes, and economic spheres, constituting the lifeblood of progress and development. The multifaceted nature of innovation manifests across diverse sectors of the economy. Innovations emerge as the primary drivers of economic growth, social well-being, and environmental sustainability. They serve as a bridge between nations facilitating cooperation and enhancing the exchange of ideas and mutual learning. Innovation becomes a central and unifying element within the economic system, facilitating breakthroughs and the attainment of overarching goals.

Innovation in The Spotlight: Negative and Positive Effects

By Boris Senin Carhuallanqui Parian

Abstract: This paper undertakes a comprehensive examination of the concept of innovation, analyzes its multifaceted nature and profound implications for society and ethics. By giving some popular examples, an attempt to explain various dimensions of innovation is given, spanning from technological advancements to societal transformations. The positive impacts of innovation are also shown, such as increased access to information and enhanced connectivity, while also addressing the negative consequences, including privacy concerns and ethical dilemmas. Furthermore, ethical considerations surrounding innovation are delved, exploring instances of planned obsolescence and corporate misconduct. The importance of balanced is highlighted, emphasizing the need for ethical guidelines and responsible practices to ensure that innovation serves the betterment of humanity while mitigating potential harms.

Keywords: innovation, overused, performance, discovery, product, technology, impact, technology, education.

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The word innovation is something these days that is part of our lives, even in the most common fields. It also has many different but related meanings, and it is one of the most overused words in the world. When talking about innovations in our lives, we have to consider that an innovation can be a very small change in our behavior to make us feel more comfortable; it can also be a new set of already existing procedures that increase the revenue or performance of a company, or it can be the discovery of a new product, technology, or model that can affect not only us but the entire world. Indeed, it is also needed to mention that innovation is so important that it can affect us positively or negatively, and most companies (when discovering something new or improving a product) only highlight the positive impacts and benefits of this product, technology, model, etc., but they never mention the negative impacts it can have in our lives (or they even try to make these negative impacts as negative as they really are); thus, in this essay, I will mention how innovation in different fields such as social media, technology, and transportation impacted in our lives positively and negatively. Then, I am going to expose the lack of ethics of companies and research that were documented, and finally, I will give my opinion with regards to the topics addressed in the essay. Let's start with the Internet.

Internet

The Internet is the main technology of the 3rd industrial revolution that happened in the mid-20th century. It is the most accepted technology in the world, and in 2023, more than 65% of the whole population of the world has access to it. Now, the internet is considered a human right.

The positive impacts that the Internet has had in our lives are immense, but we can sum it up by mentioning its impact on the access to information and education, economic opportunities, communication and social interaction, healthcare access, research and innovation, civic engagement and political participation, and environmental impact. In this case, I am going to focus on access to information and education. At first glance, it seems magic to have all the information we want or need in just our hands (in our smartphones) or on our personal computers, at any time and almost anywhere. It is also impressive that now we can get certified courses or even master's degrees on the Internet that are offered by prestigious international institutions. Besides, the Internet provided us with tools that, in theory, make our learning experience better and more efficient by the use of forums, online discussion groups, digital material, e-books, and electronic gadgets that ease the labor of teachers and enhance the experience of the students.

Nevertheless, what has not been deeply explored yet is the impact this exposure to this huge amount of available information and overstimulation can have on our cognition and brains, and this is what I am going to expose here. We have to start this by stating that many studies have convincingly demonstrated that our brains change according to the environment and stimuli we receive. We have to mention that some activities like learning a second language, learning a new sport, or getting a formal education can cause long-term changes in the neural architecture of our brains, but could you imagine that something as simple as a smartphone's touchscreen interface can also have similar impacts on our brains? Of course, not all interactions with the internet are negative, but many interactions, especially in our young years, can have a devastating effect on our cognition and our brain's function. Other pieces of evidence show that the act of disengaging from the real world in favor of virtual for long periods (6 weeks) can cause a reduction of gray matter within the orbitofrontal cortex. Other aspects in which the internet affects us are our attention span, as many teachers and

people who are involved in the teaching activity state that today's technology is creating an easily distracted generation because of all hyperlinks, notifications, and prompts that overload our brains. All this over stimulation is performed at a shallow level but leads us to media multi-tasking, and this overexposure to media multi-tasking activity makes our performance worse in task-switching scenarios, in sustained attention activities, and along with high levels of internet use, it also decreases gray matter in prefrontal regions associated with maintaining goals in the face of distraction. Another thing to mention is how the Internet has changed the way we access information because, by making all information available at any time and anywhere, we are more likely to remember where the information is rather than the information itself. This has also caused individuals to be better at searching for information than recalling the information accurately. It is also worthy to mention that this internet searching activity reduced the homogeneity and functional connectivity of brain areas involved in long-term memory formation and retrieval (an experimental study demonstrated that this is avoided by using printed encyclopedias). Now, I would like to talk about the positive and negative impacts of social media.

Social media

About social media, I will first mention the positive impacts and then the negative ones. Social media was a revolution for all the people because when it first appeared, it made the world a "smaller" place where we can interact with people from all over the world that we have never even met. It gave voices to almost all of us, it also helped education in some way by providing us with a humongous amount of information and knowledge that at first, we thought we could not handle. Social media also gave education a very interactive platform that encourage students participate in the learning process; it also helped introvert people interact with others easier because they are behind a screen and don't feel so intimidated to start a conversation or express their thoughts and problems more openly. Social media also helped us discover talents easily and the fact younger and younger people are closer to electronic devices, it makes easier for them to become familiar with these tools and use them easily.

However, not all that glitters is gold, and many problems came along with the benefits we could get from social media. For instance, our privacy has almost been lost because a lot of people publish what they do almost every day, which increases the risk of being assaulted or kidnapped (like some studies show). Social media also creates addiction, which leads to visual issues, backbone pains, carpal tunnel issues, and more. Another thing to mention is that excessive social media usage diminishes the educational performance of students. Although there is an abundance of verified information, most teenagers tend to rely more on the information they get from influencers than on scientific papers. This is very dangerous because it causes a lot of problems due to the quality and the unverified sources of information students can read and interiorize (some clear examples of this situation are the "flat-earthers society," which is growing; another example is the huge amount of disinformation we got during the pandemics). In addition, the ability to retain and remember information has decreased in young people, and what appeared to be a great opportunity for introverts to socialize more made some people lose their social abilities and are not able to socialize face-to-face. To finish about the bad impact of social media, I can mention that, due to the ease with which people create profiles, many people create fake accounts, which they use to scam, rob, lie, do cyberbullying, and even involve other people in situations they could have never heard of.

To continue, I need to mention how transportation changed our lives, how it affected us negatively, and talk a little bit about the electric car trend.

Transportation

Since the invention of the wheel, we have experienced how easier the transportation of goods and people would be. Then, the different breakthroughs in transportation have greatly contributed to the development of society by allowing for faster and more efficient movement of people and goods. Nevertheless, all of them required certain types of fuel to work, which caused a huge increase in CO2 emissions. As far as I know, around 20% of CO2 emissions are accounted for by transportation, and within this 20%, road transportation (automobiles and trucks) accounts for around 74% of the emissions of CO2. Even though different innovations were used in the combustion engine to make it more efficient and less polluting, it still remains the main source of CO2 emissions in the transportation sphere. Therefore, I consider that it is a better option to focus on public transportation instead of personal ones because we know that good and environmentally efficient public transportation can be a very good, easy, and cheap option for reducing CO2 emissions. Now, I want to focus on automobiles and trucks because, in recent years, there has been a huge fascination with electric cars because they are seen as a more sustainable alternative to traditional gasoline-powered vehicles. But are they really more sustainable alternatives? Are they a 'green' option? Because it is important to consider the entire lifecycle of electric cars, including their production and disposal, The production of electric cars does require certain resources, such as lithium for batteries and rare earth metals for electric motors. Extracting these resources can have environmental impacts, including habitat disruption and water pollution. Regarding battery pollution, while electric vehicle batteries do contain materials that can be harmful to the environment if not properly managed, advancements are being made in battery technology and recycling. Therefore, to ensure the sustainability of electric cars, it is crucial to focus on improving the efficiency of resource extraction, promoting responsible manufacturing practices, and investing in battery recycling infrastructure. Also, more research and development efforts aimed at addressing the environmental concerns associated with their production and disposal are needed if they want to be a real sustainable option. The following topic I am going to talk about is the lack of ethics in industries.

The lack of ethics

Even though innovation is directed at improvements or changes that can benefit society and companies, this is not always the case because there are situations in which an innovation can be too good for the consumer and threaten the company's existence or business model. Thus, I am going to talk about two specific cases in which the innovation was so good that the company had to make it worse on purpose, violating the consumer's rights. The first problem with ethics I am going to talk about is "planned obsolescence," and the example I am going to provide is related to the "battery gate" scandal in which Apple was involved. The "battery gate" case refers to the controversy that arose in 2017 when it was discovered that Apple was deliberately slowing down the performance of older iPhone models with aging batteries. Apple admitted that it had been slowing down the iPhones to prevent unexpected shutdowns caused by degraded batteries. This practice was not disclosed to users, which led to accusations of planned obsolescence. Apple not only slowed down older iPhones but also deceived customers about the difficulties faced by iPhone batteries in running the

latest iOS software. Instead of recalling the devices or providing replacement batteries, Apple advised consumers to download the latest software updates. The justification Apple gave to their consumers (at least for me and for a huge number of consumers) was not the most convincing because the lack of transparency and disclosure by Apple to users led to accusations of planned obsolescence. Apple later apologized and offered discounted battery replacements for the affected iPhones. The controversy ultimately led to changes in iOS software that allowed users to monitor their iPhone's battery health and disable performance throttling. This is an example of how a company can control the performance of its products just through the installation of software, and I think this is an acceptable practice as long as it benefits consumers, but the behavior Apple took was intended to slow down its phones and encourage people to buy the new brand versions of them and get more profit.

The second case I am going to show in this essay is a very old one; it is known as the "light bulb" conspiracy. The maximum time a light bulb can last is 2,000 hours (according to some research), and this life-span of the light bulbs was attained in around 1920, and it was in this year that the life-span of this product stopped to increase and started to decrease. In Ginebra, Suiza, 1924, there were very important executives from the most important companies in the light bulb industry: Phillips, International General Electric, Tokyo Electric, OSRAM, AEI, and others. They started the Phoebes cartel to work together and control the world demand for light bulbs because, at the time, this sector was a huge business. They behaved in this way because they noticed that the longer the life-span the light bulbs had, the less they sold (they prioritized their revenue instead of the benefits of the consumers). Therefore, this cartel decided to reduce the life span of the light bulbs to 1000 hours. This is a clear example of how innovation can be used to make a product worse instead of improving its performance, because we can see how the life-span of the light bulb went from 2000 hours to just an average of 1000 hours, and the main motivation was to obtain more revenue. I am going to continue with my conclusion and opinions.

Conclusions and opinions

To conclude, we can see that in general, every innovative idea has both positive and negative impacts. What is important is to acknowledge these negative impacts, manage them, and communicate about these negative impacts to the final consumers. In general, we could notice how innovation changed our lives for the better. Even though it brought some problems and challenges, we can say that, when compared to past times, we are living in a world with a higher life level than ever before. Innovation is a pillar of humanity because we can see that we can attain things that, for past generations, didn't even exist or were impossible. Another thing to mention is the importance of ethics in the actions of entrepreneurs and corporations because they depend on us and the environment to keep existing. With regards to the challenges, I would like to mention what I consider the most important challenge, which is the negative relationship between economic growth and the predation of our environment. This challenge is the most complicated to solve (a lot of people consider this problem to be impossible to solve), but I am sure we are going to thrive and find a solution to this, and if not, we are going to find another way or a different approach in which these two elements can have a not-so-negative relationship, which can lead to a bright future.

Beyond Boundaries: The Impact of Innovation

By Anna V. Lipatova

Abstract: The essay delves into the significance and implications of innovation in driving economic and social progress, highlighting its role in transforming industries and improving the quality of life. It explores innovation as a catalyst for economic progression and social transformation which drives the creation of novel ideas, processes and technologies that shape industries and impact various areas of life. In addition, the essay delves into the dark side of innovation by examining its unintended consequences and ethical implications. The essay advocates for a balanced approach to innovation — one that leverages its benefits while mitigating potential drawbacks.

Keywords: innovation, innovation management, entrepreneurship, economic growth, dark side of innovation, technological advancements

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Introduction

Innovation serves as a catalyst for economic progress by stimulating the creation of new ideas, processes, products, and technologies. From the invention of the steam engine during the Industrial Revolution to the digital transformation of the 21st century, innovation has consistently been a key driver of progress and has changed the way we live, work, and interact. Innovations are not limited to a specific field or industry and drive advancements across a myriad of fields: technology, medicine, economics, management, finance, education, etc. Furthermore, the impact of innovation goes beyond its economic implications. It has the power to reshape social structures, transform cultural norms and improve the overall quality of life. In addition, global challenges for society, such as climate change, extreme poverty or the lack of quality education worldwide, demand innovative solutions that advance Sustainable Development Goals. Tackling these complex problems requires the application of diverse innovations across various sectors.

This essay explores the pivotal role that innovation plays in driving economic and social progress, as well as its multifaceted impacts on society.

The Concept of Innovation

According to the Joseph Schumpeter's there are five types of "innovation" including: a new or improved product; a new or improved process; the opening of a new market; the acquisition of a new source of raw materials or semi-manufactured goods; an organizational change [Schumpeter, 1934]. In general, the concept of innovation refers to the creation and implementation of new ideas or practices that lead to meaningful and transformative improvements. Innovation involves identifying and addressing existing challenges or inefficiencies by introducing fresh perspectives, new approaches or technologies that will drive progress and growth or invoke changes.

Innovations for Economic Growth and Business

First and foremost, innovations influence economic growth by creating new opportunities and markets. As new ideas are transformed into tangible products or services, they generate economic value and contribute to the expansion of industries. Companies that embrace innovation are able to gain a competitive advantage, as they are better equipped to meet the evolving needs and preferences of consumers. By implementing innovations into their strategy, companies can increase market share and revenue and further stimulate economic progress from a macro perspective. For example, after placement of financial sanctions on Russia's major banks, many Russian users were unable to use Apple Pay and Google Pay on their smartphones. As a result, there was a surge in the demand for phone-based payment options. To accommodate this demand, Russian banks introduced payment stickers that were an incremental innovation based on the existing technology of NFC chip in plastic debit cards.

According to the calculations of the researchers, in January-March 2023, more than 1 million payment stickers were issued in Russia. According to a survey conducted among users, 64% expressed a strong desire to return the convenience of contactless payments via their smartphones, while 88% showed interest in incorporating payment stickers into their banking experience, driven by their interest in new technologies and enhanced financial capabilities [SmartRanking, 2023].

The provided information highlights the increasing popularity and demand for contactless payment methods in Russia. Furthermore, the introduction of a payment sticker as a new payment method has resulted in a notable expansion of the customer base for several prominent banks in Russia. This innovation served as a significant competitive advantage in the market because other banks did not offer a comparable solution for that moment and, in addition, there were no alternative payments options for users of Apple devices with IOS mobile operating system.

It can be concluded that embracing innovation as a fundamental strategy is not just important but crucial for businesses to thrive in today's ever-changing and fiercely competitive market landscape. The rapid pace of technological advancements, shifting consumer preferences and evolving market dynamics require companies to constantly adapt and stay ahead of the curve. By incorporating innovation into their core strategy, businesses can find new profitable opportunities, differentiate themselves from competitors and drive business growth.

Moreover, innovation leads to advancements in technology and directly influences economic development. Breakthrough technologies have historically revolutionized industries and move economies forward. From the Industrial Revolution to the modern-day information age, innovations in technology have transformed the way people live and work. Technologies such as artificial intelligence, digital education and renewable energy have the potential to reshape entire sectors, creating new business models and driving economic growth.

Through the introduction of groundbreaking ideas and technologies, organizations ignite entrepreneurship and foster job creation. By revolutionizing existing industries or creating entirely new ones, innovation opens up opportunities for startups and encourages the growth of small businesses. This, in turn, leads to the creation of jobs, as new companies require a workforce to bring their ideas to life and support their operations.

The cycle of innovation, entrepreneurship and job creation contributes to overall economic development and societal progress. It may promote competitiveness, reduce unemployment, enhance living standards, and foster social well-being.

Improving the Quality of Life

In recent decades, innovations have emerged as a crucial strategy for addressing pressing social risks and threats and plays an important role in improving the quality of life and driving sustainable development. By introducing new ideas, technologies, and processes, it becomes possible to transform societies and address daunting challenges such as poverty, climate change or a lack of health care.

Through sustainable innovation practices we can find alternative energy solutions, promote resource efficiency, and minimize negative environmental impacts. For instance, the impact of fossil fuel consumption on CO2 emissions since the beginning of the Industrial Revolution. This has disrupted the global carbon cycle, resulting in a warming effect on our planet. The growth of renewable energy technologies and their increasing affordability have contributed to a more sustainable energy system, reducing greenhouse gas emissions and mitigating climate change. By harnessing renewable sources such as solar, wind and hydroelectric power, we can work towards a greener future and create a more resilient and environmentally conscious society.

Another example is medical innovations, such as new treatments, diagnostic tools and medical devices, which enabled earlier and more accurate diagnoses, more effective treatments and improved patient care. These advancements not only save lives but also

reduce healthcare costs, freeing up resources and contributing to economic progress. Furthermore, medical innovations attract investment and fuel the growth of the biotechnology and pharmaceutical industries, creating jobs and driving economic development.

Innovation plays a pivotal role in advancing society by tackling such issues and bolstering our collective capacity to act. It enables us to find sustainable and efficient solutions, often through the development of new technologies. These novel technologies, products and services not only meet societal needs but also contribute to improved capabilities and more effective utilization of resources. Furthermore, addressing these complex social problems requires collaboration among the private, public, and non-profit sectors, as each has a role to play in finding viable solutions. The demand for new innovative solutions brings together individuals and organizations from different countries with unique insights, expertise, and skills. Collaborative innovation efforts lead to the development of more comprehensive and effective solutions that can solve global issues.

The Fuel Driving Innovation

Creativity is the fuel that drives innovation. It allows individuals to envision new possibilities and conceptualize unconventional solutions to complex problems. The ability to think imaginatively and generate original ideas is the driving force behind innovation across industries, be it science, technology, arts, or business. It involves connecting and combining seemingly unrelated ideas, drawing inspiration from diverse sources, and pursuing unexplored avenues.

Developing innovative solutions requires the creation of a culture of creativity and environment of diverse thoughts and experiences where teamwork is valued and rewarded. Innovation is rarely the result of a solitary effort. Collaborative environments foster the exchange of ideas, provide a support system for experimentation, and facilitate the development of diverse solutions. When individuals work together, complementing each other's strengths and compensating for weaknesses, collaboration enhances creative problem solving and drives innovation. Nurturing a culture of creativity and fostering a diverse and inclusive environment are key components for cultivating innovation.

The Dark Side of Innovations

While innovation has brought significant advancements and positive changes to society, it is important to acknowledge that there can also be negative aspects associated with it. One potential drawback of innovation is the unintended consequences it may have on various aspects of our lives.

Technological innovations have led to increased automation and the integration of artificial intelligence in various industries. While these advancements offer efficiency and convenience, they also have the potential to disrupt job markets and lead to unemployment for individuals in certain sectors. One example of this is the manufacturing industry. Advances in robotics and automation have significantly transformed production processes, replacing human labor with machines that can perform tasks more efficiently and consistently. As a result, traditional assembly line jobs have dwindled, leading to job losses for many workers in this sector. However, it is important to note that while innovation can lead to the disappearance of certain professions, it also creates new job opportunities. For example, the rise of technology has spawned entirely new industries and job roles, such as software development, data analysis and cybersecurity. Moreover, innovation often leads to increased

productivity and economic growth, which can stimulate job creation in other sectors of the economy. Another concern is the rapid pace of innovation, which can sometimes outstrip our ability to fully comprehend and mitigate the potential risks and ethical implications.

The widespread use of Artificial Intelligence (AI), particularly in areas like facial recognition or data analysis, raises concerns about privacy and surveillance. AI systems can collect and analyze vast amounts of personal data, which raises questions about consent, data security, and the potential for abuse or misuse of sensitive information. Furthermore, another drawback of generative AI technology is the potential for generating and spreading inappropriate or NSFW (Not Safe for Work) content. AI models trained on large datasets can sometimes generate outputs that are offensive, explicit, or otherwise inappropriate. This becomes a concern when AI-generated content is shared online or used in public-facing applications without proper safeguards. For example, AI-generated text, images, or videos can be manipulated to create realistic yet inappropriate or harmful content. This can include deepfakes, which are manipulated videos that make it appear as though someone is saying or doing something they never actually did. These types of AI-generated content can be used for malicious purposes, such as spreading false information, defaming individuals, or even engaging in harassment or blackmail. It is important to establish clear ethical frameworks for innovation and new technologies. As technological advancements continue to shape our society, it is crucial to ensure that these innovations are harnessed in a responsible and ethical manner and align with societal values and norms.

Conclusion

Innovations and new technologies have the potential to shape a better world in numerous ways. Innovations offer significant advantages that can transform industries, improve efficiency, and enhance the overall quality of life for individuals and communities. From advancements in healthcare that save lives and increase access to treatment, to sustainable technologies that combat climate change, innovation plays a vital role in addressing pressing global challenges. Moreover, new technologies have the power to connect people across the globe, fostering collaboration, knowledge sharing_ and cultural exchange on an unprecedented scale. By harnessing the advantages of innovation responsibly and ethically, we have the opportunity to create a more inclusive, sustainable, and prosperous future for all.

Nevertheless, embracing innovation and new technologies requires a balanced approach that considers both the positive advancements and the potential negative consequences. By acknowledging and addressing ethical concerns, social and environmental impact, accessibility issues and unintended consequences, we can navigate the challenges and maximize the benefits of innovation. It is through responsible and ethical use of innovation that we can ensure its positive impact on society and work towards a better future for all.

Building a Culture of Innovation: concepts, characteristics and attributes

By Vitória Rapello Roque

Abstract: Culture, whether societal or organizational, embodies multifaceted elements that shape identities, behaviors, and values within groups. This paper delves into the complexities of culture, defining it as a set of norms, beliefs, and practices that influence how individuals perceive and interact with the world. Specifically, it examines how organizational culture, deeply rooted in societal norms, has the capacity to promote innovation within companies. Key attributes to promoting a culture of innovation such as curiosity, diversity, collaboration, and risk-taking are explored as fundamental drivers of an innovative culture. Ultimately, this study aims to demonstrate the potential for organizations to align their cultural frameworks with innovative practices to enhance competitiveness in today's dynamic market.

Keywords: Innovation Culture, Culture, Organizational Culture

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Culture is a concept that is challenging to define. In addition to being composed of many elements, the concept of culture has various applications. When we talk about the society we live in, we refer to social culture. When we talk about the company we work for, we refer to organizational culture. Each group or organization can possess its own culture. First and foremost, it is important to understand the significance of this broad concept.

Culture can be defined as the way of seeing the world, moral and evaluative appreciations, different social behaviors, and even corporal postures are products of a cultural heritage, that is, the result of the operation of a particular culture (LARAIA, 2003). In other words, culture can be understood as a set of elements related to the identity of a group, encompassing customs, behaviors, values, and more. Thus, we can understand culture as the elements that help shape our identity, or those relevant to it.

According to Çakar and Ertürk (2010),"organizational culture is based on shared values related to employees that are influenced by culture at the societal level" (p. 328).In other words, the authors mean that organizational culture is indirectly based on the culture of the society in which the company is embedded, as it consists of workers who are also embedded in that society. Therefore, we can say that organizational culture is related to and influenced by social culture.

According to Knox (2002), organizational culture has the power to support an innovative organization, as the ability to innovate resides in the company's workers, their attitudes, and skills. That is to say, just as organizational culture is based on social culture, a company's capacity for innovation is based on the innovation capacity of the individuals who work in it.

Considering that a company's innovation is intrinsically connected to the individuals who work in it, the importance of having a culture that promotes innovative environments, conditions, goals, and behaviors for its employees becomes clear.

This is because by influencing employees' behavior towards innovation, it can be achieved that they accept it as a fundamental value in the organization and commit to it (Hartmann, 2006; Naranjo-Valencia, Jiménez, & Sanz-Valle, 2011). In other words, by having a culture that promotes the adoption of innovation as a value, it’s possible to influence employees' behavior to promote innovation. Thus, we can say that organizational culture can have the power to stimulate innovation within a company.

It can be said, moreover, that organizational culture is one of the determining factors in the consolidation of innovation in a company. This is because organizational culture can either promote or inhibit behaviors that contribute to innovation generation. In other words, just as organizational culture can instigate innovative behaviors, it can also be responsible for offering various barriers to innovation. Thus, it is important to deeply analyze the organizational culture of the company and see to what extent it is a culture of innovation. That is, to what extent the company's culture promotes innovative values, behaviors, and practices.

A culture of innovation is one that encourages continuous improvement, experimentation, and adaptation to changing circumstances. At its essence, a culture of innovation cultivates an environment that promotes curiosity, views changes as opportunities, does not have an aversion to error, but rather accepts it as part of the learning process and a catalyst for new opportunities. In addition to those mentioned, there are several elements and characteristics that make up a culture of innovation. I would like to highlight in this text some of the values of an innovative culture that are also important social values pertinent to society as a whole.

Curiosity

A culture of innovation values curiosity as a fundamental trait, encouraging individuals to question the status quo and explore new possibilities. The desire to know and learn more is essential for fostering an innovative environment, as research and knowledge acquisition are essential parts of the innovation process. Moreover, we do not need to go far to see that the search for knowledge, in addition to being an important value for innovation, is a value of extreme importance to society.

Curiosity is a great driver of the search for new ideas, approaches, ways of thinking. It is responsible for continuing the cycle of learning and adaptation, helping to cultivate an investigative mindset. Thus, curiosity proves to be an extremely important characteristic for employees of a company that wants to have a culture of innovation.

Diversity

When we talk about diversity, it is easy to imagine why this is an important characteristic for any society. Because, if we look at the composition of societies, it is easy to see that we as a human race are diverse. However, due to financial, social, and historical conditions, the diversity that we find as a society is not always reflected within the corporate context.

Therefore, it is extremely important that organizations actively seek to promote diversity within their contexts. In addition to its social importance, diversity plays an essential role in an innovation culture. This is because innovation values the plurality of ideas. Wide variety of viewpoints is extremely enriching for promoting diverse innovative behaviors, such as creativity.

Moreover, it is crucial that a culture of innovation includes a wide variety of perspectives, viewpoints, experiences, and skills. An organization that values diversity recognizes the importance of representation within its company, and the benefits that come with obtaining ideas from different people with different educational, professional, and cultural backgrounds.

This variety of viewpoints not only enriches the creative process but also strengthens the organization's ability to tackle complex challenges comprehensively and effectively. Moreover, by fostering an inclusive environment where everyone feels valued and empowered to contribute fully, a culture of innovation expands opportunities for creative collaboration and co-creation of innovative solutions that meet the diverse needs of customers and the market.

Collaboration

From a social perspective, collaboration is simply fundamental. We as a human race and as a society depend on each other. That is, we live collectively by nature. Thus, collaboration is essential for our survival and prosperity. Collaboration is essential because it promotes an environment of trust and mutual respect, encouraging workers to share findings, thoughts, feedback, and more in order to achieve success and expected results. In other words, collaboration is essential for developing a cohesive workforce.

Looking from the perspective of innovation, collaboration is a central pillar of a culture of innovation, encouraging interaction among individuals from different disciplines, departments, and hierarchical levels. By promoting open exchange of ideas and knowledge, collaboration facilitates the merging of diverse perspectives and co-creation of robust and

creative solutions to complex problems.

Moreover, collaboration also aligns with another important aspect of innovation: continuous learning. Exchanges of knowledge, experiences, and feedback are essential to the innovation process, and these elements cannot be found in an environment that does not promote collaboration.

Risk taking

Within a culture of innovation, the spirit of taking risks is essential to drive creativity and advancement. Perhaps more than just the propensity for taking risks, it is necessary to accept errors and failures. In any case, taking risks is an intrinsic and fundamental part of innovation.

Encouraging employees to take risks also encourages individuals and teams to explore new ideas and approaches, even if they involve uncertainties or the possibility of making mistakes. By creating an environment where learning from mistakes is valued and successes are celebrated as a result of courageous attempts, a culture of innovation stimulates the pursuit of growth opportunities and continuous improvement, allowing the organization to remain agile and adaptable in the face of changes and challenges. It is not always that we see this characteristic reflected in society, in the sense of being encouraged to take risks. But we cannot deny that taking risks is part of living in society.

In summary, we see that building a culture of innovation is done through the development of an organizational culture oriented towards values, behaviors, and elements that aim to promote innovation. Furthermore, such organizational culture is based on elements of the society's culture in which the company is inserted. Also, beyond aiming for innovation, it is important that the characteristics, behaviors, values, and mindset that will compose the organizational culture already be part and intrinsically related to the innovation process.

In this context, organizational culture acts as a catalyst for innovation, offering a shared framework that guides employees' behavior towards generating new solutions and developing products and services that meet emerging market needs. Thus, by seeking to promote a culture of innovation, companies strengthen their competitive capacity.

Technology and Humanity: Exploring the Limits of Innovation

By Fernanda Fernandes

Abstract: When we mention the word innovation it can give us the feeling of just another novelty, a change, a modification, but innovating is much more than that, innovating is creating something, introducing new things, renewing, recreating and surpassing yourself. Historically, human beings have gone through countless evolutionary processes, where they had to adapt to alternative realities that emerged over the centuries and within these processes, they were forced to reinvent themselves every day to survive. The following text is intended to demonstrate how innovation can add to humanity's evolutionary process, what we can expect from a society where we live in a constant process of technological change and understand a little more about how innovation can change society for the better. good and for bad. Innovation is not limited to developing new products, it also promotes new business models, offers new services and improves processes to make people's lives easier. In this way we can observe that one of the greatest complexities of the innovation process for humanity is the need to achieve a balance in all aspects of life. When we are successful in life, innovation forces us to try every day to obtain results and overcome a series of technological, economic, social, regulatory, environmental and human obstacles. Therefore, understanding and navigating these complexities becomes crucial to fostering an environment where innovation can flourish and shine through in society.

Keywords: Innovation; Technology; Humanity; Society;

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In recent years we have been forced to go through this process of innovation in a more violent way, especially during the COVID19 pandemic, which forced all of humanity to change several lifestyle habits, and technological introduction became more present in people's lives, in this way according to Han, Fan and Xue (2024) the growing demand for biomedicine has intensified competition in biomedical technologies, often resulting in disrespect for legal, ethical and moral standards, including the use of unauthorized clinical applications. Scientists looking for a new biomedical technology that would help in the process of creating vaccines and medicines became much more for the sake of profitability than the salvation of humanity. This scenario is exacerbated by economic pressure and capital's desire to overcome systemic limitations, increasing the risk of technological abuse and illicit economic gains, in addition to the political reach that this pandemic process has forced us to go through due to the losses that humanity has suffered, thus We can also see that if all these processes did not occur, many more lives would be lost. But will we pay a very high price for such technological advances and the “possible” violations that were “necessary” to save society?

Validation of biomedical technologies requires a continuous cycle of data collection, risk assessment and adjustment of governance rules, but the scientific community can only assess safety and ethical issues based on assumptions, which thus create more speculation about the What is produced and for whom is it produced? This delays the creation of adequate and legalized regulatory systems, which provides more credibility and reliability to society. Thus, according to Han, Fan and Xue (2024), especially in China, the difficulty in determining legal causes and effects of biomedical technologies and criminal intent impedes the effectiveness of laws as deterrent tools. Thus, the process of capitalism forces us to live to make a profit and not necessarily to innovate in a healthy and humane way.

Humanity represents both the essential nature of human beings and their ethical and moral conduct, and much of these aspects have been lost over time. It is a critical concept because it defines our ability to reason, create and interact in an empathetic and responsible way with the world, which nowadays we can reflect that little happens, due to the use of technologies not being empathetic, often hurting the morality of society and even being used by unscrupulous and moral criminality, but it can also be critically examined due to the inconsistencies and ethical failures that sometimes arise in individual and collective behaviors, which makes it difficult for future generations to visualize the collective and think, project and idealizing a world of collectivity and collaboration, thus leading us to reflect on how we are going to make the world of innovation better and worthy for future generations?

The evolution of humanity through ethics and morals is an intrinsically complex process and often marked by conflicts, therefore values and principles are in a constant process of questioning and redefinition due to the evolutionary changes that society has undergone over the years, the Each change of era brings a different aspect, which ends up rebuilding values and ideals again. This process is not only shaped by the present, but also paves the way for a future and how it will directly influence, however, this depends on how humanity will progress in relation to technological, economic and social with fundamental conceptions and convictions of the integrity of people, in addition to justice and mutual respect, in this way the route of the historical narrative demonstrates that these changes do not develop continuously or without conflicts, and are often accompanied by significant resistance and challenges, which encourages human beings to innovate to remain on your current status.

Another point of innovation in which humanity has encountered difficulties is in economic factors. Do ethics and morals still exist within the world economy? According to Shah and Shah (2024) brings us the argument that trust plays a crucial role in social well-being and

in the digital economy, thus enabling the use of a social well-being function based on an analytical structure of Markov that was used to model trust as a dynamic variable in the digital economy, allowing us to study how trust between economic agents evolves over time and influences social well-being, thus this trust is modeled as a dynamic variable influenced by interactions of agents in the system, within these simulations, thus demonstrating that there is a positive correlation between trust and social well-being, with advanced digital economies reaching stable states of well-being more quickly, however we can highlight that there is a need for policies that promote public trust through measures such as data protection, digital literacy and robust legal frameworks, aiming for a sustainable and equitable digital economy, so that distrust of a technological innovation process like this can be discredited, which can create a delay in humanitarian innovation, in addition to the fact that the economic factor is something extremely complicated for the entire society, as unfortunately it is this aspect that mainly determines the social classes in which individuals are “placed” nowadays, thus being a delicate matter for the entire society. humanity.

Thus, with the basis of a great reference in innovation, which was visionary within its time, Schumpeter presents us with a vision like this, in accordance with Paiva et al. (2018) of a capitalist system that are inherently evolutionary, based on the continuous ability of individuals to adapt to the economic environment, thus he brings an argument about the essence of capitalism lies in continuous adaptation and innovation, not in superficial changes, in addition to this, he cited the development of a distinct and spontaneous phenomenon that permanently disturbs the existing balance, differing from circular flow and the tendency towards balance. Thus, this theory specifically addresses this phenomenon and its inherent processes, thus presenting a more theoretical view of innovation.

Innovations not only improve the competitiveness of individual companies, but also have the potential to transform entire sectors, promoting broader economic and social progress. However, within the capitalist vision, innovation is often motivated by the search for profit and competitive advantage, driving companies and individuals to constantly improve and differentiate their offers in the market, which ends up taking away the essence of the meaning of the verb to innovate, so although this dynamic can generate significant advances, it can also lead to inequalities and prioritizing profit over social well-being , raising questions about the balance between innovation, ethics and social responsibility, once again makes us question whether this is how we should treat innovation and whether this is how we will leave it to future generations?

To talk about innovation, we cannot fail to show the perspective of philosophers of the past and how they saw this whole issue of innovating, of creating something new, or even recreating something, in this sense according to Costa (2018) who brings us the insight in his research on Michel Foucault, that although he does not focus exclusively on technological innovation, he explores how changes in structures of power, knowledge and social practices drive significant transformations in society, in addition to violence, by coercing and imposing control over the others, which marks a decisive distinction between power relations, which require the freedom of subjects, and domination, which restricts it, in this way power relations are not confused with violence, which emerges when the possibilities of the free subject are limited, so despite his criticism of violence as a political strategy, he does not explore his potential action dynamics, which ends up impacting the innovation process since the domination he mentions creates an impediment to human innovation, leaving him full of constraints. and limitations where it ends up simply reproducing and ceasing to produce.

Humanity and the entire process of innovation brings us a bias that we must challenge ourselves every day, that we always have to create something new and be responsible for the

great innovations that can revolutionize the world, creating expectations about ourselves, arising from the demands for profitability and socioeconomic potential, which can make you better and propel you towards all of this, or generate a lot of frustration and disappointment in relation to not achieving what you want.

According to Schiller (2013) in recent years, economists have produced theoretical and empirical studies that are inserted in the contexts of technological innovation; however, innovation is not restricted only to companies, but also a diversity of organizations, institutions, individuals who become extremely crucial for the development of society as a whole. Going far beyond companies, universities play a vital role, both in the creation and dissemination of knowledge. In this way, we can place researchers as intermediaries of these factors, as innovations can begin within classrooms and end up changing the concepts of many of humanity's questions. In this way, Schiller (2013) presents us with a view that public research centers are also fundamental, as are the functioning of innovation laboratories, thus these processes benefit from users' experience, forming innovative niches and contributing to a dynamic development more comprehensive.

So, what remains to be considered about being an innovative individual is that of a person always looking for new ideas, creative solutions and ways to improve products and processes, in this way we define that innovation is vital for the survival and success of any business or organization and humanity itself.

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Chapter 4. Innovation Policy and Sustainable Development

Toward a Comprehensive Understanding of Innovation Policy

by Angélica Pigola

Abstract: This essay delves into the evolving landscape of innovation policy (IP) and the imperative of a comprehensive understanding of its multifaceted nature. While IP has gained traction as a driver of economic success, its role in addressing societal and environmental challenges is increasingly prominent. However, gaps persist in the literature, with limited comprehensive assessments and systematic reviews of IP's holistic impact. It explores the plurality in IP design, shaped by contextual factors, innovation conceptualizations, and evolving policy terminologies. It notes the transition from a narrow economic focus to a broader consideration of sustainability and environmental engagement, necessitating a fuller IP definition encompassing societal implications. The multidimensional view of IP research stresses deep contextual understanding and long-term perspectives in policy design and implementation. Effective IP requires coordination across levels and domains, engaging diverse stakeholders to foster innovative ecosystems for societal progress. Re-evaluating the IP view advocates for a holistic approach integrating diverse perspectives and insights from global practitioners. It emphasizes transitions to sustainable bioeconomic systems and evidence-based policy making, encouraging learning and innovative development. In conclusion, advancing IP understanding requires embracing its multifaceted nature, considering diverse perspectives, and fostering collaboration to address societal challenges. A comprehensive review of IP literature is proposed as a roadmap for maximizing its impact in shaping sustainable futures.

Keywords: innovation policy, holistic viewpoint, Innovation

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Presently, innovation policy (IP) draw influence from various territorial innovation models, among which the regional innovation system approach stands out as a prominent example (Pinto, 2023). IP is a somewhat recent topic in literature (Faderberg, 2016). It emerges as a field of politics with increasing attention on innovation as an essential cause of economic accomplishment and more recently as a means to tackle societal and environmental challenges. However, few works have been comprehensive assessments of the IP literature (Edler & Boon, 2018; Edquist, 2019; Fagerberg, 2017; López-Rubio et al., 2021), and no holistic systematic literature review has been conducted. Following Edquist (2019), the *holistic approach of IP is defined as a policy that integrates all public actions that influence or may impact innovation processes*. Major literature reviews that mentioned IP have focused on specific streams and contexts of research, such as global problems with science, technology, and innovation policies (Manyuchi, 2018; Ozkaya et al., 2021); policy mixes (Kanger et al., 2020; Scordato et al., 2018); health policy innovations (Grundy et al., 2009); and environmental policy integration (Weber & Driessen, 2010), among others.

Plurality in Innovation Policy Design

Different understandings of innovation reflect different designs of IP; it is founded on the emergence of ideas, the diffusion of innovations or sometimes it is limited to a product occurrence, process creation or a way of doing things. Or yet, it is considered in different contexts, regions, or business segment separately. The definition of IP may to some extent reflect the purpose of analysis; however, even though innovation is a fascinating topic, it is not the main reason why policy makers are interested in it (Fagerberg, 2017). Instead of being interested only in the beneficial economic effects that an innovation assumes for a country or region, today they are also keen on having sustainable and environmentally engaged innovations. From this angle, the fuller definition provided in the previous section makes the most sense because what mainly matters is not only innovation per se but also its subsequent reflection on society (Fagerberg & Hutschenreiter, 2020).

On the other hand, it is relevant to consider the plurality of IP for the understanding of research because terms and theories that support its development change over time, as presented by Fagerberg (2017). Its evolution since the 1960s with the term "science policy", and later as "technology policy" and currently as "innovation policy" (Boekholt, 2010; Lundvall & Borrás, 2005), has demonstrated its Bergsonian characteristic of process alive (Bergson, 1984). Thus, IP design has been influenced over the years by the evolution of innovation activities in different countries and regions, and its publication has been presented under various labels (Rothwell, 1982). Therefore, it is important to add this pluralized view associated with the study of IP evolution and the broader systems in which it is inserted (Fagerberg, 2017).

Additionally, in practice, challenges associated with IP making (for instance, transitions to bioeconomy or sustainability) are impacted by electoral cycles, shifting government majorities, top management turnover into business and unpredictable associated situations (Rabadjieva & Terstriep, 2020; Tuomi, 2012). Therefore, in this context, IP plurality demands well-developed analytical capabilities to nurture strategic broad-based “ownership” by influencing a broad spectrum of innovation stakeholders in business environments and societies (Fagerberg & Hutschenreiter, 2020).

Multidimensional View of Innovation Policy Research

The literature by Edler and Fagerberg (2017) brought a multidimensional view of IP research based on innovation principles found in the literature in which innovation is an outcome of 'new combinations' (Schumpeter, 1934) of existing resources, capabilities, and knowledge. Thus, it is considered a dominant source of changing activities in rich as well as pour economies (Fagerberg et al., 2010), in high-tech and low-tech sectors (Von Tunzelmann & Acha, 2005), in service sectors (Gallouj & Djellal, 2010; Rubalcaba et al., 2012) in manufacturing, and in the private or public sectors (Osborne & Brown, 2013). They put a precise emphasis on IP definition (what it is); theoretical explanations (why IP is needed); and its design, implementation, and governance (Edler & Fagerberg, 2017).

The main contribution of Edler and Fagerberg (2017) is that to develop an effective IP, an exhausting assignment requires a deep contextual comprehension of the proposed policies. This requires policymakers' capabilities that need to be nurtured. Moreover, a challenge-driven policy aimed at systemic innovation will require a long-term perspective, and setbacks and failures are likely to be unavoidable to some extent (Edler & Fagerberg, 2017; Mazzucato & Semieniuk, 2017).

All policy instruments that affect innovation in a nontrivial manner must be contemplated. (Fagerberg, 2017). The IP view from a multidimensional perspective should not only encourage creativity but also make a difference in practice in its national innovation system approach, which evolves through interactions between the economic, societal, and political systems of a country or region. Differences in characteristics or structures among innovation systems may be overcome because innovation and diffusion follow certain regularities extensively analyzed and documented by researchers (Edler & Fagerberg, 2017; Fagerberg et al., 2011; Fagerberg & Hutschenreiter, 2020).

The possibility for IP success is intrinsically and extrinsically related to a country or business's ability to address the close coordination of policies, issues correlated, modern patterns of governance and supportive knowledge bases across several different levels and/or domains in the process, which might not be taken for granted. The challenge is identifying the factors that influence the possibilities for taking the most out of IP. Eric von Hippel (2006) argued that 'democratic innovation' engages the know-how of the larger public, being not only more egalitarian but also more efficient (Hippel, 2006), as seen by Fagerberg (2016) as also applicable to IP.

Re-evaluating Innovation Policy view

Today, much of what is classified as IP consists of policy instruments or policies in general with a much longer history than its existence. Perhaps the most prominent academic proponent of the IP term, before it became commonly used, was Roy Rothwell, who described innovation policy as a 'fusion' of previous policies or policy instruments executed under distinctive labels [(research policy, science policy, technology policy, etc. (Rothwell, 1982)].

While scholars have developed modern methods, the traditional approach appears in much research, such as policy implementation (Kapsali, 2011; Wang & Li, 2021), policy instruments (Bach et al., 2014; Xu & Su, 2016), policy governance (Könnölä et al., 2021; Zhang, 2021), policy mixes (Kern et al., 2019), capabilities of policymakers (Lewis et al., 2022), and national innovation systems (Kapetaniou et al., 2018), which still dominate this research area. One of the key findings present in the literature is the need for an effective IP view to emphasize different approaches in coevolving and competing problem solutions because uncertainty about the best solution is already an inherent property of innovation (as originally proposed by Edler and Fagerberg, 2017). IP took the high policy makers' agenda in

approximately 2000 and became a tidal part of economic policy. Nevertheless, the current mindset about continuing economic growth is not viable, demanding a transition to a sustainable bioeconomic system (Fagerberg et al., 2016; Fagerberg & Hutschenreiter, 2020).

This ambition starts to be part of some recent publications (Cappellano et al., 2021; Gatto et al., 2021; Kirs et al., 2021) but without any holistic view that may be taken from practitioners in different regions. IP should not be legitimized only by facts, even evidence-based policy making being practically useful in the sense that it brings about an accepted frame for policy deliberations because it neglects learning, problem redefinition, and innovative development of new empirically important categories. The IP view and efforts might best be organized by reflecting knowledge creation as its theoretical framework (Tuomi, 2012).

Seeking a holistic view in literature, Edler and Fagerberg (2017) provide a framework for the IP view until 2016. They identify the meaning of the IP term, its theoretical rationales, innovation-system framework, and policy instruments for IP legitimation. They also detailed the policy process, i.e., design, implementation, assessment, and reexamination of policies, actors involved, and diverse policy instruments evolved in various contexts, assuming that 'IPs are not drifted entirely from theory.

This emphasis that IP is not derived exclusively from theory supports the decision to have a literature review including the view of specialists about areas and issues associated with IP evolution. Considering the current number of publications related to the effectiveness of the IP in population life quality (Danilova, 2020), revitalizing cities (Horbliuk & Dehtiarova, 2021), societal changes (Cappellano & Kurowska-Pysz, 2020), and climate changes (Tokunaga et al., 2020), it is crucial to understand where IP should be heading to maximize its valuable contribution. Nowadays, the intrinsic connection between innovation systems and policy design is evident, where the strength of a country's research base significantly influences its innovation policy design, thereby driving the design of systemic policy instruments through institutional factors (Howoldt, 2024).

Conclusion

The evolving landscape of IP reflects a growing awareness of its multifaceted nature and its potential to address not just economic accomplishments but also societal and environmental challenges. While the literature on IP has expanded significantly, there is a notable absence of comprehensive assessments and systematic reviews, leaving gaps in understanding the holistic impact and potential of IP initiatives.

One critical aspect is the plurality in IP design, which varies based on contextual factors, conceptualizations of innovation, and the evolving terminology used in policy discourse. IP is no longer solely focused on economic gains but also encompasses sustainability and environmental engagement, reflecting broader societal concerns. This shift necessitates a fuller definition of IP that considers its societal implications alongside economic benefits.

The multidimensional view of IP research emphasizes the complexity of innovation processes, highlighting the need for deep contextual understanding and long-term perspectives in policy design and implementation. Effective IP requires coordination across various levels and domains, engaging a broad spectrum of stakeholders to foster innovative ecosystems conducive to societal progress.

Re-evaluating the IP view calls for a holistic approach that integrates diverse perspectives, methodologies, and insights from practitioners in different regions. The evolving discourse around IP acknowledges the need for transitions to sustainable bioeconomic

systems and emphasizes the importance of evidence-based policy making while also encouraging learning, problem redefinition, and innovative development.

In conclusion, advancing our understanding of innovation policy requires embracing its multidimensional nature, considering diverse perspectives, and fostering collaborative efforts to address complex societal challenges effectively. A comprehensive review and synthesis of IP literature can serve as a roadmap for maximizing its impact and relevance in shaping sustainable and inclusive futures.

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Innovation, Innovation Policies, and Sustainable Development Goals: Economic and Social Aspects

By Vaibhav Chaudhary

Abstract: In the realm of sustainable development, innovation has emerged as a critical driver that not only spurs economic progress but also ensures inclusivity and environmental sustainability. This essay delves into the intricate interplay between innovation and sustainable development, elucidating how technological advancements, social innovations, and organizational transformations contribute to economic growth, social well-being, and environmental stewardship. It also underscores the transformative power of innovation in addressing complex societal challenges and advancing the United Nations' Sustainable Development Goals. By examining diverse examples ranging from renewable energy technologies to social entrepreneurship initiatives, the essay emphasizes the multifaceted impact of innovation on fostering competitiveness, reducing inequality, and promoting sustainable practices. Moreover, through a nuanced analysis of innovation policies, best practices, and use cases, the essay advocates for a holistic approach that integrates technological progress with social and environmental considerations to pave the way for more sustainable and equitable future.

Keywords: innovation, sustainable development, inclusive growth, social innovation, innovation policies

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Innovation broadly refers to the creation and implementation of new or improved processes, products, services, or business models that specifically create value. The United Nations defines sustainable development as the way to meet the needs of the present without compromising the ability of future generations to meet their own needs, encapsulated in the 17 Sustainable Development Goals (SDGs) (United Nations, 2015). In this context, innovation plays a crucial role in the realm of sustainable development referring to technological progress as well as social, organizational, and institutional developments that bring forward sustainability (Edquist, 2011). Therefore, a broad understanding of innovation as conveyed by the Oslo Manual is crucial to tackling complex challenges related to sustainable development (OECD/Eurostat 2018).

Technological innovation is a critical driver of sustainable development, directly impacting economic growth, social well-being, and environmental sustainability. Just for an example, the proliferation of solar photovoltaics has seen costs decline by 82% over the past decade, facilitating widespread adoption and contributing to SDG 7 (Affordable and Clean Energy)and SDG13 (Climate Action).Innovations such as precision farming, vertical farming, and genetically modified crops increase agricultural productivity while minimizing the use of water, fertilizers, and pesticides. These innovations are crucial for achieving SDG 2 (Zero Hunger) and SDG 12 (Responsible Consumption and Production) (Qaim, 2010).

Social innovation involves new strategies, concepts, ideas, and organizations that address social needs and foster social relationships and collaborations. These innovations are essential for promoting social inclusion, equity, and access, contributing significantly to sustainable development. Microfinance models, such as those pioneered by the Grameen Bank, provide financial services to low-income individuals who lack access to traditional banking. By enabling entrepreneurship and improving livelihoods, microfinance supports SDG 1 (No Poverty) and SDG 10 (Reduced Inequality) (Yunus, 2007). E-learning platforms and digital classrooms expand access to quality education, particularly in remote and underserved areas. These innovations play a crucial role in attaining SDG4 (Quality Education)(UNESCO, 2020). Organizational innovation pertains to modifications in corporate procedures, workplace structure, or external interactions that result in more socially responsible and environmentally sustainable business operations. Businesses that include fair labor practices, community development, carbon footprint reduction, and other sustainable practices in their business models are examples of companies that accomplish this. Several SDGs are supported by this alignment, such as SDG 12 (Responsible Consumption and Production) and SDG 8 (Decent Work and Economic Growth) (Murray, 2004). By designing products for lifespan, reuse, and recycling, businesses that embrace the circular economy concepts contribute to SDGs 12 and 13 by conserving resources and decreasing waste (Edler & Georghiou, 2007).

Institutional innovation includes reforms in policies, regulations, and governance structures that facilitate sustainable development. Strong national innovation systems (NIS) are associated with policies that promote R&D, safeguard intellectual property rights, and encourage collaboration between the public and commercial sectors. Strong NIS, for instance, has been built in Finland, which promotes innovation-led growth (OECD, 2017). Simplifying rules and offering rewards for eco-friendly operations can spur innovation in companies. For example, carbon pricing schemes assist SDG 13 by providing financial incentives for lowering emissions (Hall et al., 2009).

Innovation is a key driver of economic growth and development and plays a crucial role in enhancing productivity, fostering competitiveness, and creating new economic opportunities. In the context of sustainable development, innovation is particularly significant

as it not only spurs economic progress but also ensures that such progress is inclusive and environmentally sustainable.

Technological advancements increase productivity, cut expenses, and open up new markets. For example, the cost of clean energy has dropped dramatically due to breakthroughs in renewable energy technologies, encouraging uptake and investment (IRENA, 2019). Such inventions help achieve SDG 7 in addition to promoting economic growth. The adoption of artificial intelligence (AI), robotics, and other modern manufacturing technology improves productivity through reduced downtime, improved precision, and optimized supply chains. According to Brynjolfsson and McAfee (2014), these technologies allow businesses to produce more with fewer resources, increasing economic production and decreasing waste.

Innovation can stimulate job creation by generating new industries and expanding existing ones. One industry that has had a notable increase in employment due to technological advancements is the renewable energy sector. The International Renewable Energy Agency estimates that 11 million people were engaged worldwide in the renewable energy industry in 2018 (IRENA, 2019), directly supporting SDG 8. New business models and industries have emerged as a result of the digital revolution, including the gig economy, fintech, and e-commerce. Traditional industries have changed as a result of these innovations, which have also promoted economic inclusion by opening up new markets and job opportunities (World Bank, 2016). Socially disadvantaged groups now have access to new financial options thanks to innovations in social business models like impact investing and microfinance. In order to fulfill SDGs 1 and 10, social companies provide economic value while addressing social and environmental concerns (Yunus, 2007). The connection between innovation and employment is nuanced, though. Innovation has the potential to boost employment, but it can also drive out workers in more established sectors. Autor et al. (2020) highlighted that in order to minimize adverse effects and guarantee equitable growth, measures that support skill development and labor transition are essential.

Innovation-focused nations typically have a higher level of competitiveness in the international market. A nation's competitive edge is increased by innovation policies that promote R&D, intellectual property rights, and entrepreneurial endeavors. Trade prospects are also improved by increased competitiveness. Innovative goods and services have the potential to take root in other markets, increasing exports and diversifying the economy. For instance, South Korea's economy has benefited greatly from its investment in innovation, which has made it a major exporter of high-tech goods. Innovation increases the distinctiveness and quality of goods and services, increasing their appeal in global marketplaces. Due to the creation of jobs and foreign exchange revenues, this expansion in exports promotes economic development.

As innovation promotes inclusive growth, it can significantly contribute to the reduction of economic inequality. Financial services are becoming more accessible to formerly unbanked populations in developing nations thanks to digital advancements like mobile banking and fintech solutions. Demirgüç-Kunt et al. (2018) claim that mobile banking has had a particularly significant impact in sub-Saharan Africa, where it has enhanced low-income populations' access to banking services and economic prospects.

The social aspects of innovation in sustainable development encompass the ways in which new ideas, technologies, and practices contribute to social well-being, equity, and inclusion. Innovations that address social challenges can transform societies, enhance the quality of life, and promote inclusive growth. Social innovations are particularly critical in achieving the SDGs as they directly impact education, health, inequality, and community development.

Technological advances in healthcare have revolutionized the provision of healthcare, especially in rural and hard-to-reach areas. MHealth, telehealth, and pharmacogenomics have boosted healthcare delivery and advanced healthcare results. For instance, the increased adoption of mobile health technology in sub-Saharan Africa has helped increase health information and availability and thus has played a part in lowering maternal and infant mortality rates (WHO, 2018). Furthermore, advancements in medical science and biotechnology have seen new treatment and vaccine production, pertaining to diseases that mainly occur in low and middle-income countries. The swift pace of the COVID-19 vaccines' development can be regarded as an example of how innovation helps to tackle global health issues and contribute to the attainment of SDG 3 (Good Health and Well-being). Any social changes that include community involvement in health interventions like community health first and second, and other health education programs enhance the people's health. Such programs strive for primary prevention and health enhancement, which has a positive impact on people's health (USAID, 2015).

Access to high-quality education has become more widely available thanks to advancements in education including digital classrooms, AI-based individualized learning, and e-learning platforms. By giving everyone fair access to education, these innovations are essential to reaching SDG 4. For example, the Khan Academy greatly improves access to education by offering millions of students globally free online learning tools. E-learning systems allowed millions of students around the world to continue their education during the COVID-19 epidemic, underscoring the significance of digital advancements in education (UNESCO, 2020). Moreover, innovative training approaches used in skill development programs help people get ready for the changing employment market. For example, online courses and coding boot camps have given students the skills they need to pursue professions in technology and other in-demand industries, improving their employability and social mobility (Davidson & Goldberg, 2020).

Useful strategies for promoting development as a fair process involving all society members are the presentation of social innovations contributing to turning society into an inclusive society. For instance, community development projects, social businesses, and participative business solutions seek to provide solutions to social problems while embracing vulnerable groups. Those social business ventures are to give shelter at a cheap rate, energy from renewable resources, and safe drinking water to foster social welfare and minimize inequality (Schwab Foundation for Social Entrepreneurship, 2019). Education and skill development for women as well as self-employed schemes give women an opportunity to be economically independent thus changing their social status. Most of this includes embracing advanced solutions which include computer education and other small enterprise lending schemes (UN Women, 2019). For example, the micro-credit management of Grameen Bank helped millions of poor women in Bangladesh to take loans and do business, thereby changing their status because such availability gives a big change in their socio-economic status (Yunus, 2007). This improves SDG 5 (Gender Equality) and SDG 10 through economic and social relations, hence, achieving the country's development agenda.

Technological advancements in financial services, for example, mobile money and other forms of digital payments through gadgets such as mobile phones have made a huge difference by increasing the number of finances included among the formerly excluded groups.

These innovations enable people to save, borrow, and invest, push for financial inclusion, and, therefore, decrease inequality (SDG 1, SDG 10) (Demirgüç-Kunt et al., 2018). For instance, M-Pesa in Kenya can best be described as a flagship innovation of mobile money services that enabled millions of individuals to perform financial activities without banks.

Further, advancement in the legal profession, for instance, the use of mobile courts and online legal aids enhances the delivery of legal aid to the disadvantaged. These innovations democratize legal services and make them affordable to everyone so that people can fully invoke their rights. Civil rights and advocacy for the disadvantaged in society like the disabled and members of ethnic minorities are examples of social justice policies. The inclusion of such groups to policy measures makes sure that they are involved in decision making hence ensuring that their issue are considered and noted (OECD, 2018).

Innovation policies play a critical role in guiding and fostering the development and implementation of new technologies and practices that support sustainable development. These policies are designed to create an enabling environment for innovation, addressing economic, social, and environmental challenges in a holistic manner. Effective innovation policies align with the SDGs by promoting sustainable economic growth, social inclusion, and environmental protection.

NIS are policies, institutions, and practices that provide the scientific and technological basis to enhance the innovation processes. A good NIS has close collaborations with industry, sufficient funding for research, and favorable regulations. NIS exemplars like Finland and Korea have achieved Innovation for Sustainable Development and Growth (OECD, 2017). For example, Finland is focused on the cooperation between the actors from academia, industrial/business, and governmental sectors, which results in a well-developed system of innovations that contribute to the economic and social development of the country (Edquist, 2011). In the same way, South Korea has taken R&D investment and technology commercialization to advance its innovation status.

Several policy measures are in place to foster innovation in the countries, including income tax relief, grants, subsidies, and public procurement measures. These instruments stimulate the private sector to invest in knowledge-intensive activities such as research and development as well as innovation. For instance, the European Union's Horizon 2020 supports great research and innovation projects that deliver solutions to societal concerns, and this supports the accomplishment of the SDGs (European Commission, 2020). Policies in public procurement that include innovation in contracting can also create demand for green goods and services. Thus, governments can act as lead customers in specific markets to support demand for novel solutions that alleviate environmental and social issues (Edler & Georghiou, 2007).

Environmental policies such as those that support the advancement and uptake of green technologies are very important as they help organizations, countries, and the wider community in the achievement of sustainable environmental goals. The government can participate in green innovation by offering subsidies to renewable energy projects and offering grants for environmental or ecological research to be done. For instance, the EU Green Deal has set to make Europe climate-neutral by 2050 through financing green innovation, as well as shifting to circular economy systems (European Commission, 2020). Those innovation policies that aim to support the circular economy are associated with efforts to decrease waste, encourage product recycling, reuse, and refurbishment, and, therefore, achieve a decrease in adverse effects on the environment and advancement towards sustainable production and consumption (SDG 12). Sustainability can also be encouraged by government-set rules and policies, accreditations, and codes of practices that enhance the environment. For example, the 14001 international standards dealing with environmental management systems enable organizations to work on enhancing their environmental impact (ISO, 2015).

Another aspect that needs to be incorporated in innovation policies is social consideration and equity since innovation initiatives should be made across people in society.

They are measures that make sure that minority groups and the underprivileged gain from innovation. This can embrace money for community-based schemes, funds for social business ventures, and projects that engage the populace in the innovation drive (Heeks et al., 2014). Supporting gender mainstreaming in innovation should therefore be considered as a key approach to achieving optimal utilization of the human capital in society. Such policies as women in STEM, funding of women entrepreneurs, and eradicating gender bias in innovation systems lead to the attainment of SDG5. For example, Women in Innovation in the UK focuses on removing gender barriers that restrict women from participating in the innovation sector through providing funding (Innovate UK, 2020).

In conclusion, understanding innovation in the context of sustainable development requires a holistic approach that integrates technological, social, organizational, and institutional dimensions. Innovation and innovation policies are crucial for achieving the SDGs, particularly in the multifaceted economic and social realms. By driving economic growth, creating jobs, enhancing competitiveness, and reducing inequality, innovation contributes to sustainable economic development. Simultaneously, social innovations improve health outcomes, enhance education, and promote social inclusion and equity. Effective innovation policies that support R&D, address barriers to innovation, and foster public-private partnerships are essential for realizing the full potential of innovation in achieving the SDGs. By fostering innovative ecosystems, addressing challenges, and leveraging the opportunities presented by new and emerging technologies, societies can advance towards achieving the SDGs and creating a sustainable future for all.

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De facto innovation intermediaries: their importance and the drawbacks they face in sustainability transitions

By Luis Henrique dos Santos Figueiredo

Abstract: This essay breaks with the impersonal way of approaching innovation, highlighting the importance of innovation intermediaries in sustainability transitions, and some drawbacks they face when they are not formally recognized in this role. It explains what they are and the literature field to which they pertain. Next, it describes their different identities, the functions they perform and why there is a recent surge in studies about them. After, the essay addresses the sustainability transition, its dynamics and effects on intermediation demand. The author then contextualizes situations that contribute to the emergence of what he calls "De facto innovation intermediaries". He proceeds with the description of various activities carried out by these actors to foster the adoption of sustainable practices. The essay introduces some drawbacks faced by innovation intermediaries in situations where their activities and contributions lack fit with the organization's strategy and structure profile. The author concludes by arguing the importance of aligning their de facto roles to the organization's strategy to achieve their full potential as driving forces of innovation.

Keywords: De facto innovation intermediaries, innovation studies, sustainability transitions, sustainable development

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The innovation intermediaries are organizations or groups within public or private organizations acting as agents in any of the various aspects of the innovation process, enabling, directly or indirectly the innovative capabilities of companies, sectors regions and countries (Dalziel, 2010; Howells, 2006). They operate within national innovation systems comprised of institutions interacting with their peers to implement, develop and spread new technologies, influencing the innovation performance of companies, regions and countries. Much has been said about the triple helix model (dr. Etzkowitz, 2002), which focuses the spotlights on the main components of innovation systems, namely university, industry and government.

The innovation intermediaries are the secondary actors working in the shadows surrounding the spotlights, without whom [the author is tempted to say] the show does not go on. In scientific literature, all these actors are brought together in the emerging field called "innovation studies"(Fagerberg et al., 2013). As components of complex systems, they are versatile and called many different names: bridging organizations, broker, boundary organizations, enabler, intermediary, mediator, even though the preferred denomination is "intermediary". Their typology is also varied. Brokers are identified as representatives of firms, organizations, and departments in higher education institutions. Intermediary associations comprises industrial, commercial, and business associations. In universities, we may find the science shop or technology transfer office. There are also consultants, technological parks, business incubators, and startup accelerators. More recently, there are references to web-based and crowdsourcing intermediaries. Regarding their functions, the connection between two or more companies, including knowledge and technology transfer is attributed to brokers and bridging intermediaries. Information scanning and processing within networks (Howells, 2006)and the spread of best practices(Bessant & Rush, 1995) may also be attributed to them. Industrial associations, for instance, may also have lobbying functions (Dalziel, 2010). Technology development can be a function of innovation intermediaries (Dalziel, 2010), with their complementary activities, such as access to equipment or state-of-the-art knowledge and new technology testing and validation. Innovation intermediaries potential offerings also provide working space, training, and capacity building (Howells, 2006). Examples of innovation intermediaries include public, private or non-profit organizations, industrial or trade associations, economic development agencies, chambers of commerce, science parks, research institutes, among others (Dalziel, 2010) .

In addition to the usual focus on the role they play in relation to different types of innovation systems (Caloffi et al., 2023), more recently, the literature on innovation intermediaries has been interested in the role they play in sustainability transitions (Friedrich & Feser, 2023; Gliedt et al., 2018; Kivimaa et al., 2019). The challenges of global sustainability include the supply of energy, water and sanitation, cargo and passenger transport, agriculture and food, among other activities and services. The technologies available to face these challenges reach a wide range of behaviors, ways of life, and a varied set of institutions. As a result of this interdependence, existing socio-technical systems advance through incremental changes, giving rise to transition studies towards more sustainable systems, constituting a new field of research according to Markard et al. (2012). The resulting external environment changes, and their implications for the positions and interconnections between actors increase the need for intermediation actions (Kivimaa et al., 2019; van Lente et al., 2020).

Kanda et al. (2018) investigates intermediaries supporting eco-innovation in Europe, identifying their multiple roles, from forecasting and road mapping to information gathering and dissemination, from fostering networking and partnerships to commercialization and branding, and from resource mobilization to prototyping and piloting. Cardona et al. (2021) investigates the role of intermediaries' engagements to address gaps between research,

education and practice during shifts oriented to sustainable agri-food systems, and argue that a sense of equity towards farmers and scientists regarding their production of knowledge, the fact of being both a farmer and an expert, and their commitment in fostering the development of local and sustainable agri-food systems, while sharing their knowledge equitably, are positive to bridging activities. de Mello et al. (2024) explore two Brazilian institutions operating at meso-level, one national program to improve milk quality, and another national program to control vehicular emissions, to illustrate that socio-technical transitions might be promoted when meso-institutions play the three key-roles of translation, monitoring, and enforcement.

Regarding urban sustainability transitions, Ehnert et al. (2022) compare four German cities to assess how and why niche and regime intermediaries develop cooperative partnerships to transition towards sustainable practices. While two of them succeed and two fail, the authors suggest that such outcomes are related to interaction dynamics between urban structural conditions, priorities set by political reasons and institution-building processes.

Kivimaa et al. (2019), when investigating intermediaries in transitions, highlight that some of them are created for that specific task, while others must adapt their practices during the socio-technical change. As the literature on intermediaries engaged in the sustainability transition gains momentum (Kanda et al., 2020; Kivimaa et al., 2019; van Lente et al., 2020) limited insights into how innovation intermediaries that have been created for different purposes adapt to the changes that this transition entails. Recently, while developing a multi-case study to check if selected organizations could be categorized as innovation intermediaries, the author came across unexpected facts with two of them. The first is a municipal secretariat for development, tourism and innovation in a Brazilian city with 300 thousand inhabitants. The other is a non-profit, private association entity that promotes entrepreneurship, training and empowering micro and small businesses, with more than 20 million services per year. After the necessary analysis, both could be clearly categorized as innovation intermediaries due to their roles, activities, projects and programs. The surprise was that the 2021 law that created the municipal secretariat used “innovation” as a mere label, without detailing its specific innovation attributions, and that there was not a single reference to the term “innovation” in the association entity’s bylaws (25 pages, 37 articles). That is a glaring contradiction with the verifiable intermediation achievements of these organizations. When conducting semi-structured interviews, new surprises came up.

First, while answering distinct questions, the two interviewees referred to lobbying activities, for different reasons. However, while the private association’s interviewee mentioned the successful lobbying, they had done to create and approve important laws that benefited micro and small businesses(their customers), demonstrating company pride, the secretariat’s interviewee mentioned that he had suggested the vice-mayor to hire someone with the specific attribution of lobbying provincial and federal authorities permanently to favor their community because the city’s high dependency on their taxes cash back. It was a surprise to realize that while for one of them lobbying is part of the organization’s mission, for the other, lobbying is a political act under responsibility of the mayor’s office. Such reaction was because according to the literature, lobbying is one of innovation intermediary’s key functions (Dalziel, 2010). This means that there is room for such a Secretariat representative to revendicate the lobbying function for his department as a functional attribution, even if the mayor’s final decision differs.

Second, while answering a common question on how the interviewees measure their project’s sustainability performance, both answered with a half-hearted smile: “under construction!”, said one; “tough!”, said the other. In one case, each project team collects their

own performance data, and the sustainability projects' performance is a no-consensus metric. In the other case, even some key financial data had to be produced by the interviewee's non-specialized team because of unavailability of statistical data from the official data source These two events evoke Chandler's famous phrase stating that structure follows strategy (Chandler Jr., 1962). What these cases suggest is that the lack of clear references of the innovation intermediary function in the official documents that have created both organizations has a collateral effect: lack of its integration into the strategies of both organizations. As a direct consequence, if the innovation function is not included in the strategy, there is no justification to measure its innovation performance. The indirect outcome is that, in these specific cases, the organization structure follows the lack of strategy, meaning that no functional team is created to measure the intermediation performance. This lack of alignment between the organizations' intermediation activities and its strategies may make it difficult to measure the impact of sustainability initiatives due to the lack of resources and clarity of objectives. In the case of the private association entity, this misalignment is multiplied because of the organization's high capillarity across the different regions in which it operates. In a data driven decision-making environment, like nowadays, such misalignment jeopardizes the measurement of the innovation intermediary's performance. In both cases, the follow up conversations about these insights confirmed the lack of resources, lack of standardized metrics availability, and their implications.

From a theoretical perspective, the lack of fit between de facto innovation intermediaries' contributions and strategy-structure dynamics can implicate insufficient resources to operate (p.ex. no headquarters team in charge of developing standardized sustainability metrics for niche innovation teams), leading to workload duplication. It may also contribute to inadequate coordination of activities, jeopardizing synergy among teams and a best practices culture. Moreover, the lack of sustainable innovation metrics may hinder scalability of sustainable practices.

The recommendation that emerges from the study is that the innovation intermediation function must be clearly incorporated in the official documents that regulate the operation of innovation intermediaries, especially if they were created prior to the sustainability transition starting point and/or have acquired the de facto characteristic during the process of socio-technical change. By integrating the intermediation role into strategy, followed by structure adjustments, the organization favors the strengthening of collaboration and communication, speeds up sustainability assessment expertise, and boosts team morale to achieve their its full potential as driving forces of innovation.

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The Relationship Between ESG and Corporate Innovation: Implications and Benefits for Sustainable Development

By Renata Oliveira Pires de Souza

Abstract: In the contemporary global landscape, environmental depletion has emerged as a critical concern, driving the emphasis on green and sustainable development. The balance between economic growth and sustainability has become a primary objective for businesses. This study explores the intersection of Environmental, Social, and Governance (ESG) criteria and corporate innovation, highlighting their implications and benefits for sustainable development. ESG, comprising environmental, social, and governance pillars, promotes best practices within organizations to enhance sustainability, competitiveness, and growth. Integrating ESG with business practices not only yields environmental and social benefits but also fosters innovation, particularly green innovation, which focuses on reducing environmental impact through new products, processes, and practices. Despite challenges like long investment cycles and high risks, green innovation, driven by ESG pressures, significantly influences sustainable performance and corporate value. ESG performance enhances supplier innovation and optimizes green innovation structures through monitoring and incentives. Furthermore, companies with robust ESG practices tend to produce higher quality and more complex innovations, offering competitive advantages. Thus, integrating ESG principles and innovation is essential for achieving sustainability and long-term economic viability, positioning companies to thrive in a competitive, environmentally conscious market.

Keywords: ESG, Corporate Innovation, Green Innovation, Sustainable Development

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In a global scenario in which companies are inserted, the depletion of the environment is an issue that has attracted the attention of society as a whole. Given this, green and sustainable development are central themes that gain prominence in social and business debates and in people's daily lives. Looking for ways to innovate so that there is a balance, that is, a “win-win” between economic growth and sustainability has been the main objective today.

Meeting stakeholder expectations regarding social responsibility has become a vital driver for sustainability, competitiveness and corporate growth. Given this panorama, the concept of Environment, Society and Governance (ESG) emerges as a driving force for promoting best practices within organizations. ESG is a central theme in the current corporate world that aims at sustainability, it emerged in 2004 initially by the United Nations Environment Program, and in 2006 Goldman Sachs included it in its research report.

ESG is made up of three pillars. Environmental, social and governance. The first pillar deals with the company's relationship with the environment and includes actions such as natural resource management, prevention and reduction of carbon emissions, waste management and preservation of biodiversity. In this way, the company must aim to reduce its ecological footprint and develop sustainability within the company and its community. The second pillar deals with the social aspect and consists of the impact that the company and its practices generate on society, in this way the company must pay attention to fair treatment of employees, think about diversity and inclusion, respect human rights, assist in the development of the community in which it operates, and maintain a good relationship with its stakeholders. Thus, organizations contribute positively to society.

Finally, the last pillar is governance, this pillar is related to the leadership structure and decision-making processes within the organization, to this end it must include transparency practices in management, protection of shareholder rights, anti-corruption practices, structure of its board of directors. In this way, the company ensures that it operates in a fair and responsible manner.

Integrating ESG with business practices generates several benefits, promotes sustainability, generates competitive advantage, improves the company's reputation and is a fact that has been analyzed by the company's investors and consumers. In addition to these benefits, ESG practices are also associated with innovation.

Parallel to this scenario concerned with sustainability, there is a highly competitive scenario. As a way to obtain a competitive advantage, there is innovation.

Innovation can be understood as the introduction of new production factors and conditions into a system, it is the process of creating, developing and implementing new products, processes, positions or even paradigms.

Innovation is an essential process for companies as it allows them to adapt to changes that occur, thus increasing their chance of survival, growth and profitability.

Among the forms of innovation, there is green innovation, which is a subcategory that aims to create products, processes and practices that reduce environmental impact and thus promote sustainability. They may include technological, managerial or organizational innovations as long as they reduce environmental risks, pollutant emissions and consequently the harmful consumption of natural resources.

Green innovation is divided into two categories. The first is process and content innovation, which involves innovation design, the innovation process and innovation objectives, including the use of green and clean technologies aimed at reducing environmental impact. The second category is substantial innovation, which refers to significant

improvements in products and processes, which is crucial for sustainable corporate development.

Despite the benefits of green innovation, it faces challenges mainly linked to long investment cycles, high risk of failure and low returns, which can lead companies to implement symbolic green innovation, just to meet requirements.

At this point the relationship between ESG and green innovation comes to the fore. Since companies are under pressure from society to comply with ESG requirements and this has the potential to encourage and improve green innovation, they are therefore directly connected.

The pressure to meet stakeholder expectations regarding sustainable development forces companies to adopt green innovation practices. Research shows that green innovation has a strong influence on sustainable performance, mediated by service innovation capabilities and financial performance, which can act as a mediator in the impact of green innovation on company value.

ESG performance also has a strong influence on supplier innovation, because customers with good ESG performance demand materials and products with green attributes. Furthermore, these customers tend to share knowledge, promoting stable and efficient relationships in the supply chain, which reinforces innovation.

Additionally, the ESG classification optimizes the green innovation structure, due to monitoring and incentives. The ESG classification provides information to investors about the company's environmental responsibility, therefore it is necessary to maintain these actions, therefore they must be monitored and encouraged. This way, investors will choose the company.

ESG is not only related to the quantity of innovation, but also the quality of innovation. Studies show that good ESG performance is associated with more complex and higher quality innovations, which are difficult for competitors to imitate and, therefore, offer the company a competitive advantage. Furthermore, companies with better ESG have lower financial constraints and more risk tolerance, which makes it easier to carry out high-quality innovation.

Therefore, the integration of ESG into corporate practices and the promotion of innovation emerge as fundamental strategies to achieve not only sustainability, but also a competitive advantage in the current scenario. ESG with its three pillars (environmental, social and governance) guides companies to act responsibly, promoting a positive result for the environment and the community while ensuring ethical management. Green innovation, in turn, drives the development of technologies, products and processes that minimize environmental damage, contributing to sustainability.

Therefore, the integration between ESG and innovation not only meets stakeholders' expectations, but also offers a significant advantage by improving the company's reputation and attracting new investors. The pressure to adhere to ESG requirements encourages companies to innovate to align economic growth and sustainability, generating a cycle of improvement. Furthermore, ESG directly influences the quality of innovations, generating better products and processes that are more difficult for competitors to replicate.

In this way, adopting ESG and green innovation are not only advantages for the environment and society, but also essential for the long-term economic and competitive viability of companies. Companies that adopt these two principles in their strategies are well positioned to prosper in an increasingly competitive market, but at the same time more aware and demanding.

Sustainable Development Goals and Manufacturing Sector in Developing Countries: What does Innovation have to do with it?

By Nágela Bianca do Prado

Abstract: This essay emphasizes the relationship between Sustainable Development Goals (SDG) and the manufacturing sector. This sector plays, on the one hand, an important role in improving the economic growth of a nation by creating jobs, profits, etc. On the other hand, the manufacturing sector has, over the years, used a lot of natural resources as a source of raw materials and has already been greatly harassed by environmental impacts. By adopting innovative practices, however, the manufacturing industry can offer products with a lower environmental impact, in addition to solving social inequalities. Thus, as a conclusion of this essay, it is possible to mention the manufacturing sector, through the adoption of (Environmental, Social, And Governance) ESG practices and processes guided by the United Nations (UN) framework composed of 17 SDGs, can be considered a guide to sustainable development, especially in developing countries.

Keywords: sustainable development goals, manufacturing sector, developing countries, innovation

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Currently, sustainable development has been identified as an important area of focus for managers, universities, the media, policymakers and non-profit organizations. According to the most widely accepted and globally employed definition by the Brundtland Commission (United Nations - UN) report, "sustainable development is development that meets the needs of the present, without compromising the ability of future generations to meet their own needs" (WCDE, 1987, p. 46).

With discussions accentuated and encouraged by the UN from 1970 onwards, sustainable development became more evident with the global financial crisis of 2008 and has been promoted by the UN through several initiatives that highlight the importance of a global strategy, which includes three pillars: i) economic growth, ii) efficient protection of the environment and natural resources, and iii) global social development.

In 2000, as part of global strategies to achieve more sustainable development, the UN created the so-called Millennium Development Goals (MDGs), which consisted of eight major objectives that aimed to make the world progress quickly towards achieving the elimination of poverty and hunger, factors that especially affected the poorest societies in less developed countries. The MDGs were selected with quantifiable targets to be achieved by 2015, however, countless of them were not achieved, especially in less developed countries.

After two years of intense negotiations organized by the UN, 193 countries voted to replace the MDGs with the 17 Sustainable Development Goals (SDGs) at the United Nations General Assembly in September 2015 in New York. At this Assembly, world leaders pledged their commitment to the 17 SDGs, including ending extreme poverty, correcting climate change, and combating inequality and injustice, in a bid to achieve a more prosperous, equitable, and sustainable world. The SDGs came into force on the first day of 2016 and will have a useful life of 15 years, ending in 2030.

By 2030, the United Nations expects the global fulfillment of the so-called "Agenda 2030". This agenda is based on four main dimensions: social, environmental, economic and institutional. 2030 Agenda includes actions regarding poverty eradication, food security, agriculture, health, education, gender equality, reducing inequalities, etc. There are issues that depend on the action of governments and large global companies, but there are also more specific recommendations, with a focus on the communities and specificities of each location in the world. In this context, the 17 SDGs serve as a guide for this agenda to be fulfilled.

The 17 SDGs have 169 goals and more than 300 indicators, with a strong economic, social and environmental focus to strengthen the three dimensions of sustainable development and protect the planetary and human future, which are part of an Agenda to be achieved by 2030 (Nylund et al., 2022). According to the UN 2030 Agenda, urgent and accelerated actions are needed to face the global challenges faced by the economy, environment, and society, and, in this sense, the SDGs have contributed to creating a consensus on terms such as sustainability and responsibility.

The SDGs are considered a major step towards improvement, as they address some systemic barriers to sustainable development and contain better coverage and balance between the three dimensions of sustainable development and its institutional and governance aspects. Furthermore, the SDGs apply to all countries, not just developing nations, as the MDGs did. It should be noted that the SDGs expanded the agenda to include issues such as climate change, sustainable consumption, innovation, and the importance of peace and justice, requiring all countries to act, including those with high levels of development.

The objective of undertaking an economic activity based on social enrichment began to be seen as incongruous with human and environmental development (Amoiradis & Stankova, 2020). Companies with conventional production models, in which the environment

was seen as a supplier of raw materials and inputs and responsible for absorbing waste and pollution, began to be considered responsible for the negative impacts of economic growth, by contributing to the degradation of environmental heritage, with the increase in the concentration of wealth as well as social pathologies.

There has been an increase in debates about sustainable development, including increased critical awareness among consumers regarding the origin of products. Thus, profit, as a central concept in business, began to face the challenge of integrating social and environmental aspects. Companies began to play a leading role in providing the economic base to achieve sustainable development in many urban centers, generating wealth and employment, and producing goods and services that meet needs and improve quality of life.

The shift to more sustainable production systems, however, has required disruption and system redesigns in the business community (Nylund et al., 2022), to promote cleaner production, prevent pollution, and minimize waste. Eco-efficiency has become part of the industrial mainstream. Therefore, businesses with the capacity to change and adapt quickly are standing out. New forms of cooperation with suppliers, customers, and other interested parties have ensured corporate citizenship combined with competitive advantage.

Implementing SDGs has required external organizational capabilities, so consider enhanced capabilities to constructively engage non-commercial counterparts operating in the same business ecosystem. Internally, companies need to ensure a balance between the creation of economic and social wealth. To this end, business as usual has been replaced by ethics and engagement.

Another way in which companies have demonstrated their commitment to the planet is through Environmental, Social and Governance (ESG). ESG is a measurable indicator of social and sustainability efforts with regard to environmentally sustainable and correctly managed activities, as it includes the environment (E), society (S) and governance (G). ESG practices are therefore constantly being discussed in boardrooms and are demanded by customers, employees and investors, as well as guiding corporate operations and educating the public about a company's beliefs, objectives, and risks.

With the Covid-19 pandemic, ESG practices have become the lens through which consumers, business leaders, investors, employees and other stakeholders identify and nurture prosperous and responsible corporate behavior. Companies that prioritize ESG are more engaged, have more vital competitive values, healthier balance sheets, and more capable leadership than those that do not. ESG can influence the post-Covid-19 era by mitigating companies' financial risks.

In short, companies concerned with environmental, social and governance (ESG) issues are being considered highly efficient and profitable, even though they are breaking conventional paradigms of production arrangements. The number of companies employing sustainability strategies and disclosing ESG information is still expected to continue to increase, which has caused fundamental changes in business models and management theories (Xie et al., 2019).

Constituting one of the crucial pillars of modern society, the manufacturing sector has already used a lot of natural resources as a source of raw materials and has already been greatly harassed by environmental impacts. This situation has challenged manufacturing companies around the world to remain competitive in the market by developing and implementing sustainable manufacturing techniques and tools.

This sector has been highly responsible for implementing the transformative sustainable development agenda, integrating the SDGs and ESG into their respective strategies and business plans (Perello-Marin et al., 2022). Such companies are rethinking their

production and supply strategies and have played a highly considerable role in achieving the SDGs. Offering products with a lower environmental impact, raising consumer awareness, implementing sustainable production and management practices, and breaking the pro-sustainability organizational culture are directly related to the path towards more sustainable development.

Manufacturing, however, is a sector that provides great productivity potential, which spreads throughout the economy as a whole, stimulating the process of economic growth, and, therefore, is responsible for the creation of jobs, income, and the growth of a nation, especially the emerging economies.

Usually, developing nations face difficulties in accessing basic items such as food, water, housing, and sanitation. Even today, it is possible to find slave labor, violations of human rights, and child exploitation, among other calamities. Developing nations generally have natural resources that are exploited without limit, causing serious socio-environmental damage. In this way, the consequences of climate change caused by global warming hit precisely those regions that already have limited resources. On the other hand, there are natural resources that could, if exploited correctly, represent an improvement in income and quality of life for entire families.

Based on the above, sustainability efforts aim to create models that allow human development in balance with the preservation of natural resources. SDGs, in turn, play an important role in "pressure" on firms to disclose their actions and practices toward a more sustainable production. In fact, nowadays, stakeholders are increasingly seeking to invest in companies aligned with sustainable development.

In the manufacturing sector, for example, today's ESG practices are closely related to the 17 UN SDGs. However, the main driver that drives these firms to sustainability is investment in innovation. Through innovation, it is possible to develop products and services with less environmental impact, make production and logistical processes more efficient from an energy point of view, in addition to creating more sustainable business models (Yu et al., 2025).

Innovation is a means for building sustainable solutions and essential for identifying and understanding current and future problems. Innovating, however, is very challenging, especially when it comes to sustainable innovations. However, there is no way to build a sustainable future without innovation.

Innovation within the manufacturing sector involves three main pillars: i) reduce costs and waste; ii) avoid risks and costs of non-compliance; and iii) face increasing public awareness and scrutiny.

In the first pillar – reducing costs and waste – manufacturing firms must make their operations more environmentally friendly and succeed amid growing competition, in addition to minimizing waste and making more efficient use of energy and resources.

Every day, firms around the world tighten standards, and new legislation and regulations are being implemented. Thus, regarding the second pillar – avoiding risks and costs of non-compliance – manufacturers are seeking smart supply chain solutions that can track compliance requirements in real time and help them automate their operations accordingly.

Finally, the third pillar – facing increasing public awareness and scrutiny – encompasses the adoption of the named "Smart Business" systems by manufacturers in order to monitor and report on social media trends, giving businesses the opportunity to get out in front of any concerns and reassure customers that meaningful action is being taken.

In general terms, the principles of sustainability in manufacturing, supported by innovation, aim to optimize circular and recycling supply chains, implementation of renewable

energy, use of green and ethical raw materials, conservation, sustainable product design, including the use of less packaging, minimalist design, in addition to the adoption of ethical principles that protect workers in terms of diversity, inclusion, and protection of human rights.

It is nothing new that technology and innovation are closely interconnected. In this way, new green industrial technologies are being developed at rapid speed. In the manufacturing sector, smart, cloud-connected production solutions can provide surprising insights and lead to continuous improvements in efficiency and productivity.

Examples of resources and tools that currently help improve green production include *Cloud-connected industrial IoT networks*, which serve to collect and share disparate and valuable data from assets and machines across the enterprise and can even help improve and simplify human tasks and teams.

Predictive analytics, which can include customer feedback, weather or natural occurrences, sudden consumer trends, economic and market information, and even political or social events.

Supply chain control tower that helps unify operations across the supply and value chain and enables supply chain managers to deal with disruptions or unexpected events in real time and share and coordinate action plans in real time in the entire global enterprise.

Blockchain and sensors that in addition to ensuring materials meet ethical and sustainability standards, blockchain tools can also monitor potential fraud and other types of risk that help reassure investors and shareholders. Additionally, sensors can be configured to gather other types of data, such as temperature and handling.

Artificial Intelligence (AI) and Machine Learning that can identify patterns, make sense of qualitative content, and compare and contrast unstructured data sets.

Enterprise Resource Planning (ERP) that can help integrate production technologies and data with other relevant areas of the company, such as finance, human resources, or marketing.

Finally, *automation and the use of collaborative robots* can automate production in real time and operate without human intervention, which allows companies to separate certain production lines that can operate without lights or ventilation, increasing efficiency and reducing energy costs.

If sustainable innovation in all economic sectors, including manufacturing, is capable of addressing growing consumer trends, encouraging brand value, making the company more attractive to stakeholders and shareholders, as well as bringing savings and reducing costs, the socio-environmental benefits are huge.

The repercussions of sustainable innovation help reduce social inequalities, create jobs, and relieve hunger and poverty. Consequently, living conditions in developing countries can increase, providing a greater quality of life for humanity. Similarly, in the environmental aspect, sustainable innovation is capable of using natural raw materials in a way that does not harm the natural resources that the future generation will have.

In conclusion, the manufacturing sector, through the adoption of ESG practices and processes guided by the United Nations framework composed of 17 SDGs, can be considered a guide to sustainable development, especially in developing countries.

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