

COMPETITIVENESS AS A RESULT OF CREATIVITY AND INNOVATION

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Abstract. The aim of this article is to highlight that critical thinking and creativity generate innovation that is at the core of long-term competitiveness. The creation of culture of critical thinking and creativity should start with the education system – in primary and secondary schools, then it should find its way in science and research activities of institutes and universities, and finally, it should be implemented at all business levels – with the purpose of achieving systemic innovation. It is only in the conditions of a strategic education-science-business synergy, in an environment of promoting critical thinking, creativity and innovation, that long-term competitiveness is possible, which can result in large-scale development of nations, societies and businesses. The achieved level of competitiveness should in its turn be protected against external and internal threats by introducing security measures that include the entire system of physical, technical, information and procedure security, while recognizing and protecting intellectual property and trade secrets. In terms of relevance and methodology, this article reviews existing significant challenges to innovation and competitiveness management; questions are proposed demanding further research in the field of regulations, as regards leading innovation in a global context. Conclusions are drawn about the need of strategic synergy of the priorities of state policies in the fields of science, education and business. It is stated that only coordinated long-term prioritization and planning in economy, science and education, which involves development of focused scientific research in priority sectors (industries) and creation of staff predominantly for these priority sectors of national business development, can ensure long-term competitiveness, sustainability and growth.

Keywords: creativity; innovation; competitiveness; security; entrepreneurship

Introduction

The most difficult managerial task in the business sector is how to improve an enterprise's ability to remain consistently competitive on a rapidly changing market

in the face of global, regional and national competition. The same is true for national economies and nations, and for societies that also compete in their respective regions or markets. It is also true for nations' individual representatives, i.e. individual persons. The usual theoretical postulates about the need of "flexible management strategies" (Chanpati 2023), the mandatory "creation of environment for generation of ideas" (Bwalya 2020), the ongoing "investment in R&D activities" (Lu 2023) or the consistent "promotion of collaboration" to improve market performance (Kraft-Todd 2015) have long been insufficient – neither applied separately, nor applied together. Nowadays, among the key solutions are: a requirement for strategic synergy between the investment in a business product and the investment in the relevant field of science and education (in other words, in people); a shift in managers' and employees' culture towards applying systematic critical thinking and creativity in task performance; the need to transform a creative idea into an innovative product that is adequately positioned on the market; deployment of a system of measures to make sure that in the conditions of strong competition, the following are fully protected against any unfair practices and during any crises: national and corporate assets, key scholars, teachers, managers and corporate staff; key knowledge, skills and data; and generally, the long-term competitiveness of work processes and their continuity.

Creativity, innovation, security and competitiveness

Throughout the history of progress, innovation and security have been in a complex relationship with each other, whereby the advancement of nations, industries and specific enterprises is possible only if a system of protection against real or potential threats is deployed. It is precisely the **interplay between innovation and security in the conditions of competition that traces the course of economic progress and the development of societies**. During the 18th and 19th century, at the height of the industrial revolution, intellectual property rights started to be recognised and developed. The recognition of the rights of authors over their creative achievements reflects the significance of innovation for the competitiveness of any enterprise (at microeconomic level) and for economic growth in general (at macroeconomic level). Some scholars attach even greater importance in their evaluation to the protection of innovation, pointing out that "there is no way to neglect intellectual property as a key factor of the wellbeing of societies" (Aleksandrov 2022) and that "a well-structured policy of intellectual property protection promotes economic growth" (Strijlev 2019).

The establishment of the institution of intellectual property in a global context began with the adoption of individual laws in individual countries. The signing of the main international conventions in Paris (1883) and Bern (1886) recognised and protected the interests of creative authors, but also promoted technical, technological and economic progress. **Thus, from the earliest patent systems up until the most advanced laws of today's digital world, where "in order to be successful, businesses**

must invest in the creation of digital technologies” (Petrova 2021), **the system of intellectual property is one of the pillars of security**, which entrepreneurs need as a guarantee to enjoy the outcomes of their innovation in a competitive environment. **A second key pillar of security needed by entrepreneurs to protect their innovation in the face of competition is the institution of trade secret.** Business secrets and industrial espionage have existed throughout the history of economic progress, since ancient times, during the industrial revolution, and in the present-day digital age and global connectivity, and all business ideas and concepts, along with their elements or aggregates that enable competitiveness, should be protected by a system of security measures against ill-natured – or unfair – competitive interest. The cat-and-mouse game between those capable of business innovation and those who seek to replicate their success through unfair practices leads to the development of security measures to protect all business knowledge, skills, experience and information that are relevant for enterprises’ market performance and long-term competitiveness.

The global economic arena is a battlefield of aggressive competition on which nations and companies are fighting for market supremacy on the basis of advantages such as availability of resources, technical power, technology, logistics, pricing, personnel, managerial and other advantages. The balance of pursuit of long-term market competitiveness and its protection by security systems becomes essential. The protection of innovation has a special place in the security system, which requires the use of all capabilities of the institution of intellectual property, where and insofar as it is applicable; and beyond the legal protection of intellectual property, protection is increasingly applied by using the institution of trade secret, which enables business units to preserve and improve their role in the market on the basis of their innovations by applying their own security measures (internal corporate rules and procedures for practices and processes that are not protected by laws), so that they can remain competitive in the global market race.

Management of creativity and innovation: a basis to ensure long-term competitiveness

Managing creativity and innovation is key to competitiveness. From the perspective of the management science, creativity and innovation management should be considered on at least three levels:

- **Management of the cycle of innovation**, such as specific projects, specific products or specific services;
- **Management of creativity and innovation at micro level**, as a work environment that enables enterprises to improve and maintain their long-term competitiveness;
- **Management of creativity and innovation at macro level**, as a work environment that enables improvement and maintenance of long-term

competitiveness of the economies of countries or nations, of nations' individual members within a homogenous society that has a common culture of respect for and support of critical thinking and creativity.

The management of the innovation cycle (for a specific product), from the concept through prototyping until the finished innovative product is placed on the market, goes through distinct stages that should be managed consistently. If we consider the example of one of the most innovative industries – the pharmaceutical industry – both scientists and business representatives will point to the need of targeted management and a system to protect creativity. “Without a patent the attractiveness of the innovation to external investment will be reduced. Even if your innovation is not patentable, you will have other forms of IP, including “know-how”, copyright, trademarks and designs”, which will be applied so that business competitiveness is protected (Allen 2002).

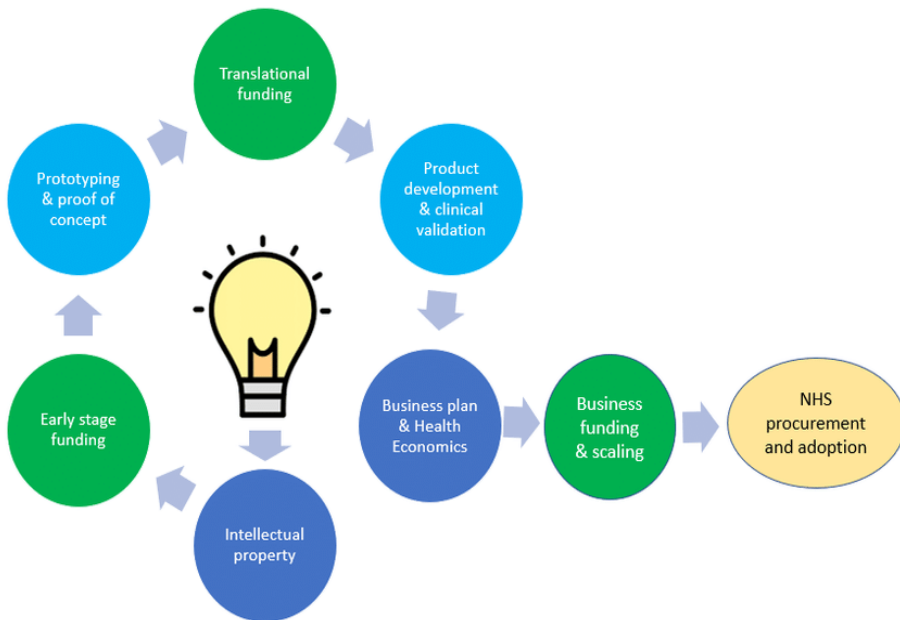


Figure 1. The typical innovation cycle in the pharmacological industry

Source: Allen, L., Malem, A., 2022. Innovating in Ophthalmology (on behalf of RCOphth Academic Sub-committee), The Royal College of Ophthalmologists, page 3, ResearchGate (may be found at: https://www.researchgate.net/publication/362508397_Innovating_in_Ophthalmology_on_behalf_of_RCOphth_Academic_Sub-committee)

Management of creativity and innovation at micro level (at enterprise level) in terms of environment, functions and business processes. An environment where respect for creativity, creative work and innovation is shown to be imperative in business, and this statement needs no special argumentation. The functions of creativity management in the approach to tasks, creative work and business processes related to creativity and innovation include the following: **1) strategic and tactical goal-setting** “from concept to market”, which includes planning of specific cycles of individual innovations to achieve the set goals of improved and long-term competitiveness. In parallel: **2) planning of all key activities by assigning a responsible person for their implementation and deadlines** for implementation through their written endorsement in a *programme* (multi-annual document) or a *plan* (annual document). Along with goal-setting and planning, other management functions are focused on: **3) prioritization within R&D activities** (including prioritization in budgeting) **and organization of R&D activities** in detailed coordination with all organizational structures of the enterprise which are relevant to innovation – manufacturing, marketing, logistics, finance, legal department, security department, human resources, etc. Further management functions include: **4) motivating participants in work processes** to think critically and creatively in solving tasks, and **5) systematic monitoring of performance** allowing both goal-setting and innovation cycle plans to be updated. Finally, among managerial functions comes **6) accountability**. The accountability of performance is a crucial function of management because it is used by managers to report on the results of their innovation management activities to stakeholders. Government leaders are accountable to society. Corporate managers are accountable to shareholders, to other members of the management team, to their own teams, but also to counterparties and to clients.



Figure 2. Management of creativity and innovation at micro level (enterprise)

The management of creativity and innovation at macro level (state level) is of key significance because the main success factor in all spheres of life and business is the factor of “creativity” in human thinking, scientific research, daily management analyses and recommendations, and in ordinary business activities – ranging from experts to leaders. State policies should create strategic synergy whereby creativity is developed, encouraged and supported in all fields: science, education, health, priority sectors of the economy, energy, tourism, and transport. It should be clearly stated that creativity, in the context of a state, should be considered quite broadly and should combine, on the one hand, the creative capacities of specific individuals who should be encouraged and supported (ranging from children, pupils and students, to experts, managers and leaders) and, on the other hand, an environment of creativity and innovation, in which creative work processes and innovative results exist. **Encouraging and supporting individuals who are capable of creative work, and testing and protecting innovation that results from their creative work, should be seen as a key strategic task of government investment in national competitiveness.**

Competitiveness management

Competitiveness management is only possible once a work environment has been created of respect for creative work, creativity and innovation in their interconnected totality. The creation of such an environment is a long process and requires targeted management. First and foremost, the development of creativity inherently involves fostering a culture of respect for creativity at every management level. In the state (at central and local level), that respect for critical thinking and creativity should be cultivated through the education system: in primary and secondary schools, and of course, at universities. This means consistent support to all pupils, students and teachers who are capable of creativity, while being fully and firmly aware that only a tiny share of people are capable of creativity. This is the ability to discover or propose a new approach to familiar objects or processes, or directly create brand new strands of research and development. Second, strategic management in a state context should facilitate and streamline processes that link investment in specific highly competitive products (in business) with investment in relevant research (in research institutes) and training of staff for these industries (in schools and universities). In this context, long-term streamlined planning of the science – industries axis (academia – business) is required, whereby the leading role of the business, from the perspective of marketing competitive products, should be reliably supported by state policies in the field of science and education by generating relevant scientific achievements in this field, as well as trained staff. Third, business should protect the entire process of a competitive product realization, including people, key information, corporate assets and processes, and the outcome of their creative work, which is a condition for ensuring long-term competitiveness.

Fourth, a protective mechanism is also required to support R&D activities and innovation once a competitive innovative product has been marketed. The dynamic approach to competitiveness management in today's highly competitive market requires **knowledge, skills and successful professional experience in the field of economics and business; law and intellectual property; security and prevention against industrial espionage; management of people and processes; marketing and logistics**. All listed above should be applied within a **system that enables timely managerial navigation in the rapidly changing landscape of the global economic scene**.

In order to have competitiveness management in place, it is necessary to identify key competitive advantages which should be protected against external and internal threats in a strategic context. At the same time, it is well known that competitive advantages have all kinds of manifestations and dimensions, and their identification requires in-depth practical knowledge and managerial experience in the specific industry, on the specific market, and in the specific historical conditions. In terms of the practical aspects of management, the wider picture of available sources of competitive advantages should be known in order to decide which key partnerships, logistical decisions, manufacturing and sales processes, sources of resources, portfolio safeguards, etc., should receive protection using the system of intellectual property, the one of trade secrets, or the broad mechanisms of a security system.

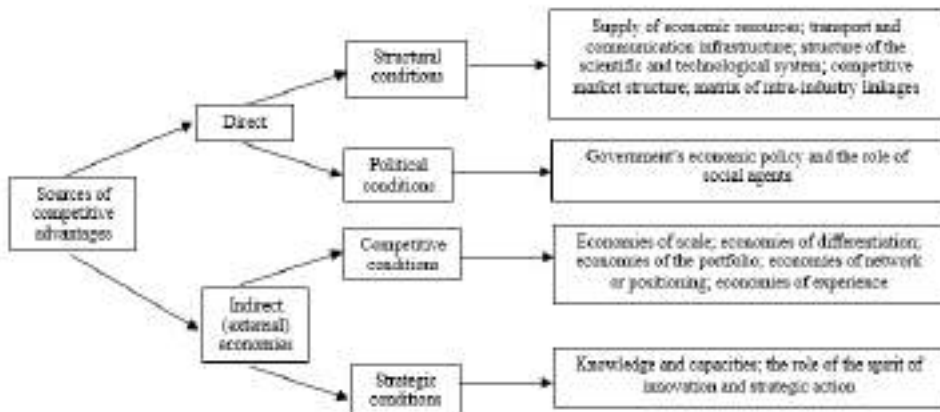


Figure 3. Sources of competitive advantages

Source: Mirchev, M., Sheremetov, G., Stoyanova, Ts., 2009. *Strategic Management*, p. 113, Economy Publishing House, UNWE

Besides the inherent difficulties in identifying competitive advantages in any process, primarily because of the wide scope of manifestation of competitive advantages, we should also bear in mind that the world is connected in real time and the geography of innovation is global, and also the dynamics of innovation development are so intense that it is practically untraceable.

On the one hand, innovation is developing in a global geographical sense, and on the other hand, its development in a specific market is so rapid that the management of intellectual property and trade secrets has become a critical task. **In terms of management of intellectual property**, this means: pursuit of own creative results (in the conditions of global competition) which allow protection of innovation through patents, trademarks and copyrights, or acquisition of such rights with licenses – for a certain market and for a certain period of time. **In terms of management of trade secrets** this means: mandatory identification of key corporate data and documentation in the enterprise; identification of key programmes and plans, as well as contracts and conditions negotiated with key manufacturing, logistical and commercial counterparties; and identification of key technical and technological information, all manufacturing and communication infrastructure and work processes, while protecting all identified business knowledge of key importance using the necessary measures, so that knowledge is not available to competitors. Underestimating the protection of trade secrets – something that is currently observed in the Western World – results in rapid reduction of the competitiveness of every enterprise and every product, and the competitiveness of the enterprise's inherent work processes.

From a competitiveness management perspective, the key issue here is the need to be aware of different options to protect competitiveness once it is achieved on the basis of creativity and innovation:

The results of creative work, which meet certain regulatory criteria, are considered *intellectual property*. The authors, under the same regulatory conditions, obtain a legal monopoly on the use of the results of their creative work.

The results of creative work, which fail to meet legal criteria for protection, but can be protected by a system of “necessary measures” in the field of security, and which represent innovative results, are considered *trade secrets* and cannot be disclosed. The protection of trade secrets involves the application of “necessary measures”, which are implemented by means of security measures: internal regulations, organizational rules and strict operating procedures. Security a priori includes four subsystems: physical security, technical security, information security and procedure security. The deployment of a security system is a prerequisite for protecting the competitiveness of enterprises in a microeconomic context.

And here competitiveness management is faced with two significant tasks:

1. It should find all elements of key corporate information in the conditions of full awareness of the value chain of each of the manufactured products or of-

ferred services by the enterprise (company) and managers should know the essence of competitiveness that ensures market success (price of raw materials; logistical chain and market locations; the type of manufacturing equipment; simplified work processes; turnover rate; labour productivity of individual teams, etc).

2. It should strike a balance between: a) the need to share corporate information freely **inside any organization** – among the various teams – in manufacturing, R&D, logistics, sales, the financial or the legal team, and on the other hand: b) the need to protect key corporate information through imposing a ban on sharing that information **outside the organization**.

Current challenges facing the protection of creativity and innovation for the purposes of competitiveness

Naturally, this article does not attempt to identify all major challenges on a global scale, but the following among them have to be mentioned:

1. The need to create an updated global regulatory framework that promotes innovation in areas identified to be ones of key significance for the development of global economy, business and entrepreneurship.

As mentioned above, the establishment of a regulatory framework that encourages entrepreneurs and provides safeguards for their innovative businesses is essential for the existence of progressive nations, initiative, creative thinking and economic growth. In past historical periods such as the Renaissance, when innovation flourished in art, science and technology, creative authors were faced with the challenge of protecting their creative works against copying or theft, and therefore discussions on the recognition of intellectual property emerged. Later, during the times of the Industrial Revolution, innovation in machinery and manufacturing processes, which are at the basis of fueling economic growth, saw the emergence of laws against industrial espionage and protection of trade secrets (Simova, 2023, pp. 163 – 182). For the development of creative industries in the middle of the last century (especially with the recognition of rights similar to the copyright by the Rome Convention of 1961), an essential role is played by global legal regulation, because “at the heart of each of the creative industries is the ability to create competitive intellectual property” (Nachev 2022). In the digital age, which quickly advanced in the first two decades of this millennium, the skyrocket development of computer hardware, software and networks led to concerns about the possibilities for real identification of authors, intermediaries and users, and therefore, rules were adopted in the field of personal data protection and cybersecurity. “The digital transformation requires new rules and relations between businesses and users in a digital environment” (Stoyanova 2023) and the deficiencies of the regulatory framework are causing uncertainty about a number of issues in the following serious innovative industries:

- uncertainties about the rules and liability in the use of artificial intelligence;
- uncertainties about the rules and liability for direct manipulation of human genes, heritable traits of human cells, human organisms or a population of humans;
- uncertainties about the rules and liability in the development of cryptocurrencies and crypto payments.

As might be expected, of course, whenever the topic is global innovation, there is simply no way that the regulatory landscape keeps in step with the rapid development of technologies that are being created in parallel, but absolutely independently on different continents by different creators and organizations, with different focus, different scope and dynamics of outcomes, and under different regulatory and market conditions. At the same time, the mentioned areas of global innovation, such as: artificial intelligence, human gene editing or cryptocurrency payments have the potential to fundamentally change existing paradigms in the absence of global regulations. **In order to encourage creators, business units and nations to generate and use innovation that changes the current models of business existence, decision-making in any context with the help of artificial intelligence, and the models of human beings through change of genes, the legislation in the field of liability and management should be expanded and made specific.**

The deficiencies of the legal framework in a global context may be illustrated by several questions:

- Who has the right to create artificial intelligence platforms or human gene-altering laboratories, and for what purposes and intentions?
- Who owns the results of this creative activity of generation of artificial intelligence platforms or human gene-altering laboratories? (this creative activity is implemented on the basis of already existing data and information from various studies by endless different organizations and researchers)
- Who may use the results of creative activities that end up as artificial intelligence platforms or human gene-altering laboratories, and under what conditions?
- To whom are these artificial intelligence platforms or human gene-altering laboratories subordinated, as they not only generate new knowledge, but that knowledge is applied too, and exactly who is responsible?
- How are artificial intelligence platforms or human gene-altering laboratories protected against cyberattacks and who is responsible for the security of creative results offered by such creative hubs in case the latter have been hacked?
- The questions on cryptocurrencies have similar characteristics.

It should be pointed out clearly that so far, in a global context, there is no readiness to adopt specific legal norms of universal nature in the key areas of global innovation, so that entrepreneurship and investment is promoted in these areas.

Regulatory deficiencies are present in other areas too: “On a global, highly saturated and very well-developed digital market, tools are needed to build a digital business identity in order to differentiate a business entity and its business performance from other market participants. Internet sites and domain names, through which goods and services can be offered in the virtual space, have become an important object of economic interest, while at the same time there is no unified national legal framework governing their adequate protection.” (Todorova 2019).

2. Creating a culture of critical thinking and creativity of nations, individuals, employees

With the purpose of creating and nurturing a culture of conscious pursuit of innovation, an academic and work environment should be promoted which values, encourages and fosters the search for new solutions, creative thinking, experimentation and ongoing learning. An illustration of that is offered by scholars from Oakland University Leadership Academy who use the following tabular representation of an environment that shows respect for new idea generation, to which every conversation should be oriented, **with the goal to achieve an outcome of encouragement of idea sharing**, rather than conversations aimed at stopping the discussion of ideas, as is the case with the “traditional culture”:

Table 1. Conversation pathways to create a culture that supports and encourages new idea sharing

Traditional Conversation Pathway		Culture of Innovation Conversation Pathway
<ul style="list-style-type: none">● Present idea● Focus discussion on desired state and/or fully-developed solution● Discuss inhibitors first● Propose financial needs and sacrifices required to proceed		<ul style="list-style-type: none">● Present idea● Focus discussion on impact to the organization's reputation● Discuss what is possible● Propose setting short-term goals to envision how the idea can grow
Outcome: Conversations about ideas stop.		Outcome: Culture encourages and supports idea sharing.

Source: Oakland University Leadership Academy, 2021.
(May be found at <https://er.educause.edu/articles/2022/8/creating-a-culture-of-innovation>).

A culture of critical thinking and respect for creativity also requires an attitude towards innovation as a finished result – something ready for the market – and this culture also includes: use of diversified sources of information; systematic collaboration with academic institutions; risk investment in research and development. It also requires readiness to take risk-prone management decisions at all levels: at macro level (the state at central and local level) and micro level (households and business organizations), based on critical assessment of data and expert analysis of any emerging trends. **A culture of respect and support of critical thinking and creativity are at the core of the potential for competitive presence at the forefront of technological progress from a macroeconomic perspective and a condition for long-term enterprise competitiveness in a microeconomic context.** However, it should be made clear that “the creation of ideas in any given setting does not guarantee the existence of innovation in any degree, until the process of creativity is implemented into tangible products and services which form a solution or improvement” (Bwalya 2020). In other words, in order to achieve long-term competitiveness, the culture of critical thinking and creativity should be supplemented by efficient corporate management of innovation “from concept to market”. The culture of critical thinking and creativity should be also supplemented by strategic government policy in the field of education, which is targeted at training staff for the industries showing the most rapid and successful development (which cannot operate without trained staff). And finally, it also takes targeted government policy in science to create scientific and research results in these competitive national industries, because science should be linked to the business and its needs; science alone is unable to generate, support and develop innovation for the purposes of the market and economic growth.

3. Achieving synergy of investment in new and competitive industries, products and services with the investment in industry-relevant fields of science (scientific institutes and research universities) and education (schools and universities)

It should be made perfectly clear that **innovation may and should be planned only in sectors (industries) that have already been identified as competitive in terms of available potential** (state, economic, geographic, demographic, managerial, technical, technological, transport and logistical potential, etc.). It should be also crystal clear that **scientific research innovation is impossible, from a systematic point of view, without being linked in the long term to a specific business industry that is subject of priority development**: such innovation cannot be tested, implemented, evaluated and further improved. Everyone involved in strategic management and planning should be perfectly aware of these two pre-conditions from the very beginning.

Strategic synergy of prioritization, specialization and programme funding in consistently linked industries **is required**. The key to innovation management is

the understanding that **in relevant strategic priority sectors (industries) that have potential**, it is obligatory to have a systematic process of commissioning, generating, nurturing and implementing innovative ideas from a point of view of business units; however, from a practical point of view, this is possible only **in combination with a strategic state policy of commissioning, creating and applying science and scientific research to scientific units whose results are immediately implemented in the country's education system in order to train staff for those industries identified as development priority – to meet business's needs of well-trained specialists. The results are also implemented by the business in the priority industries.**

Table 2. Science-education-business synergy with the purpose to ensure long-term competitiveness of nations, societies, businesses and economies

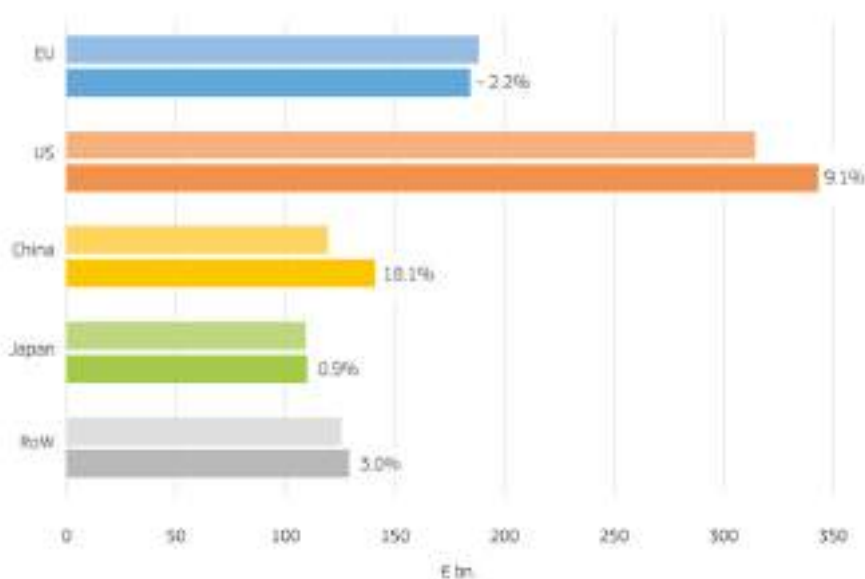
SCIENCE	EDUCATION	BUSINESS
Scientific and research activity in priority sectors (industries) chosen as strategic (for 10 years ahead)	Education and training in critical thinking and creativity with priority funding and specialization in established strategic (for 10 years ahead) priority sectors (industries)	Implementation of innovation generated by the science with the help of staff trained by the education system in established strategic (for 10 years ahead) priority sectors (industries)
INDICATIVE COORDINATED STRATEGIC PRIORITIZATION OF SCIENCE, EDUCATION AND BUSINESS IN DEVELOPMENT SECTORS (INDUSTRIES) THAT ENABLE COMPETITIVENESS		
SPECIALIZATION OF SCIENCE IN Energy Road transport Balneological tourism Software innovation	SPECIALIZATION OF EDUCATION IN Energy Road transport Balneological tourism Software innovation	SPECIALIZATION OF BUSINESS IN Energy Road transport Balneological tourism Software innovation
Priority funding of scientific research in the established strategic sectors.	Priority funding of education in the established strategic sectors.	Tax incentives and state aid for entrepreneurship and investment in the established strategic sectors.
Generation of ideas and scientific research by institutes and universities in the established strategic sectors.	Selection of teachers with knowledge and skills in the established strategic sectors who train pupils in primary and secondary schools.	Private funding of R&D in enterprises for products and services intended for the market in the established strategic sectors.

Transforming selected scientific concepts, research and results into products, services or processes through creation of prototypes.	Promoting creativity in the education of pupils in primary and secondary schools to generate knowledge, skills and research in the established strategic sectors.	Evaluation and prioritization of innovative projects based on factors such as feasibility, market potential and compliance with enterprises' strategic objectives.
Ongoing adjustment of the focus of science and research in the priority sectors on the basis of regular (annual) meetings with the business.	Annual meetings between representatives of teachers in subjects relevant to the established strategic sectors and representatives of the business and universities in order to adapt training curricula.	Selection of innovative projects, elaboration and creation of prototypes of market products or services.
Making sure the research is adaptable to the market and allows market realization on the basis of regular feedback from the business (every 6 months) in order to take into consideration dynamic market conditions.	Practical sessions devoted to fostering pupils' skills to meet the expectations of the business. Business representatives in the established strategic sectors should also take part in such sessions.	Roll-out in manufacturing, placing innovative products on the market, marketing and business scaling.
<p>AS A RESULT, THE SYNERGY IN SCIENTIFIC RESEARCH AND EDUCATION THAT TRAINS STAFF FOR THE BUSINESS AND BUSINESS INNOVATION CREATE COMPETITIVENESS ON A NATIONAL, REGIONAL AND GLOBAL SCALE</p>		

If there is no strategic synergy of: 1) targeted and respected creativity at all levels, and 2) practical implementation of the results of creativity in the priority sectors (industries) of the three interconnected strands: **scientific and research policy** (institutes and universities creating science in the priority sectors), **education policy** (schools creating trained staff in the priority sectors) and **business enterprises** (using the trained staff and implementing the achievements of science and education in the priority sectors to create competitive products or services), **then innovation is irrelevant to economic growth.**

Table 3 below offers numerical illustration of the correlation between R&D investment levels and economic growth rate by regions in 2019/2020, and could be used as an example of the absence of a link between innovation investment levels and economic growth, bearing in mind that this is valid for the European Union:

Table 3. R&D investment levels and economic growth rate by regions 2019/2020 by region/country



Note: Growth rates have been computed for 399 EU, 778 US, 337 Chinese, 232 Japanese, and 427 RoW companies for which data are available for both 2019 and 2020.
Source: The 2021 EU Industrial R&D Investment Scoreboard, European Commission, JRC/DG RTD

Source: EU Science Hub, The 2021 EU Industrial R&D Investment Scoreboard, European Commission, JRC/DG RTD, ISBN 978-92-76-44455-8 ISSN 1831-9424 doi:10.2760/248161 (pdf), published: Luxembourg: Publications Office of the European Union, 2021, p. 4.

4. Deployment of a system of measures to ensure long-term competitiveness and economic growth

The great Bulgarian historian academician Georgi Markov points out that “prehistoric humans evolved under the constant threat of predators to whom they could easily fall prey” (Markov 2016). This statement clearly illustrates the link between creativity, security and progress. Maintaining the level of competitiveness requires coordinated management of creativity, innovation and security. This is true on a global scale. **In conditions of strong competition, corporate assets, key scholars and key corporate staff, key knowledge, skills and information, key work processes and their continuity must be fully protected.** This protection

is implemented by using a system of measures in the field of security, which fall into four categories: physical security, technical security, information security and procedure security.

– Physical security: e.g. fences, walls, checkpoints to restrict access to key production facilities and sensitive R&D areas, etc.

– Technical security: CCTVs, sensors, detectors, chips (and in a cyber context: network infrastructure, corporate databases, usernames, passwords, electronic credentials, access levels, antivirus and firewalls, etc.) to authorize access to sensitive infrastructure, assets and data.

– Information security: collecting relevant information, creating specialized databases, strategic analyses of the market and competitors, forecasts and recommendations in the field of security, etc., all that with the purpose to support management.

– Procedure security: internal rules and procedures for identification and protection of intellectual property, protection of trade secrets, response during cyber attacks, fishing, etc.

Apart from the four categories of a security system, other activities are also relevant to competitiveness protection, namely: consistent training of security officials and officials dealing with protection of trade secrets (also along the whole supply chains including suppliers, counteragents and clients), on the application of non-disclosure agreements too (NDAs), and on prevention in a wider context.

“Without common goal-setting and without monitoring and analysis of achieved goals it would be impossible to counter any threats” (Tzankova 2022). The security system has specific capabilities to support strategic management (both in a state-related and corporate context) in the process of goal-setting, and also in monitoring the implementation of programmes and plans in a way that ensures protection of competitiveness.

Conclusion

From the times of the Industrial Revolution to the present times of knowledge economy and global connectivity, the technical and technological progress of nations and companies should be looked upon with concerns about security, because any view on economic growth and market success should take into account the need of long-term competitiveness of markets that are extremely well-informed, interrelated and dynamically changing. In the past decades, globalization has increased competitiveness considerably and enterprises that are increasingly operating in a borderless manner are facing a multitude of challenges as regards their competitiveness. The main managerial task faced by state leaders and corporate management boards alike has to do with the imperative that progress and growth in a highly competitive environment must be backed up by consistent innovation. Innovation that enables long-term competitiveness. A parallel task on the agenda is the protection of that competitiveness. Based on historical retrospection and identification of significant

present-day challenges, and as a result of expert forecasts, some recommendations for managing competitiveness include the following: encouragement of a culture of critical thinking and creativity at all levels; adaptation of regulations in a way that promotes innovation and entrepreneurship; synergy of scientific, educational and business priorities; flexibility and proactive problem-solving when it comes to security. Due to fierce competition in all markets, a long-term specialization (of nations and companies) is by now imperative in specific sectors (industries) where the limited national resources of science, education and business initiatives should be focused. The identification of specialization sectors should take into account a number of unavoidable factors in the long term, among them: geographical, demographic, technical, technological, etc., and it should opt for a synergy approach to innovation management, which ensures long-term coordinated management of science and education in fields corresponding to the R&D priorities in the industry. This science-education-industry synergy has become essential in ensuring and preserving competitiveness levels. Last but not least, the management focus also involves deployment of a system of security measures, which is called upon to ensure long-term market development of nations, companies and economies on the basis of timely recognition, containment or direct neutralization of the development of all external and internal threats to competitiveness as a condition of economic progress.

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