

Education 4.0 and the need for Competitive Intelligence in University management

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Summary: *Unprecedented challenges determined by globalization and the booming development brought by Industrial Revolution 4.0 determine changes that impose a redrafting of skills and abilities requirements necessary on the job market. "Education 4.0" will have the role to provide a new set of such capabilities, but also train adequate attitudes in a super technological and interconnected environment in which new technologies focus on innovation, on identifying and promoting talents, on the capacity to understand and interconnect information from various fields in order to find innovative solutions, on the capacity to adapt to different cultural environments or to work remotely in virtual teams, and the higher education is the most important supplier of highly qualified personnel who is fit to integrate quickly in the Industrial Revolution. In order to do this, we need to reset the academic and administrative management of the educational institutions. They have to understand that their role in the context created by Industry 4.0 is similar to that of a "company with innovative technology" regardless of the area it forms and develops skills. A competitive intelligence type of approach in education and university management would respond to the challenges and would offer instruments for collecting, processing and capitalization of useful information in their ascent in the top of international elite universities but, most importantly, would connect and function in tandem with the new technological generation and society.*

Key words: *Globalization, Industry 4.0, skills, Education 4.0, Competition, Competitive intelligence*

INDUSTRY 4.0 AND THE NEED FOR NEW QUALIFICATIONS AND ABILITIES

We live in a society that is going through major changes, that has to quickly identify and face unprecedented challenges determined by globalization and the booming development brought by Industrial Revolution 4.0 that influences all the economy branches, the geopolitical relationships, the social relationships as well as the other day to day issues.

These two aspects are in a tight interdependency as in both situations comes in the interconnectivity, a quick access to information as well as a common language in decoding, interpreting, correlation and transmission of information. Interconnectivity of certain data and information from different areas, the use of artificial intelligence, of digitalization and automation in the most diverse array of activities allow for the links between organizations, economies or countries to become more and more complex and extended.² The diversity of thus formed links forces the governments, companies and other forms of organization to be capable to possess the necessary knowledge and qualifications set that will allow their integration in different areas, to quickly

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² Costea, Simion; Michel Labori, *Le Management des Politiques de l'Union Européenne/ The Management of EU Policies*, PARIS, Ed Prodifmultimedia, 2011; Costea, Simion, *Ideea europeană și interesele statelor/ The European Issue and the States' Interests*, Cluj-Napoca, Napoca Star, 2005; Costea, Simion, *România și Proiectul Briand de Uniune Europeană, /Romania and the Briand Project of European Union*, Targu-Mureș, Petru Maior University Press, 2004; Costea, Simion (coord.), *Culture, Elites and European Integration, Volume IV – International Relations and European Union Interdisciplinary Studies*, PARIS, Editions Prodifmultimedia, 2011; Costea, Simion; Costea, Maria (coord.), *Integrarea României în UE: provocări și perspective/ Romania's Accession to the EU: Challenges and Perspectives*, Iași, European Institute, 2007; Costea, Simion (coord.), *For a Stronger and Wider European Union*, Cluj-Napoca, Napoca Star, 2005; Costea, Maria (ed.), *Diplomatia României și geopolitica europeană / Romania's Diplomacy and the European Geopolitics*, Iasi, Institutul European, 2019; Costea, Maria; Costea, Simion (eds.), *Diplomație și actori geopolitici în epoca interdependenței complexe / Diplomacy and geopolitical actors in the age of complex interdependence*, Cluj-Napoca, Ed. Napoca Star, 2021;

assimilate new working and communication techniques and methods, to understand and be able to satisfy the necessities and requirements of collaborators, clients or community in general. These changes require a redrafting of necessary skills and abilities requirements that can be provided to a small extent in companies by adopting a new coaching strategy for employees but which on the whole have to be quickly drafted, provided and developed by educational institutions by an adequate and methodical training of the generations that prepare to enter the work force or other society sectors.

According to some studies, the work force faces an excess of workers but a deficit of talents and this is caused by technological changes that generated changes in manufacturing and operations and lead to the low skill workers not being needed anymore; the imbalance between geographical areas - in some of them new workplaces are being generated but it's difficult to cover them (USA and Western Europe), and others do not have any new work places opportunities and have the highest unemployment rate (Africa, Asia); the job offer for high skill workers which is still low on a global scale.³

Along with the unprecedented technological development brought by Industry 4.0 a new set of abilities of the future have been identified that will also be required by any organization when selecting future employees. To identify the necessary qualifications in the current context of challenges faced by the society, *The Institute for the Future*⁴ established a set of six drivers of change which come with their own skills. The six main drivers of change aim at:

- *Increase lifespan*, but which interferes with the decrease of birth rate, especially in developed countries. Thus, the job market will require a new approach where the employees will stay active longer than the age of 65 years old which will need a proactive approach to lifelong learning and to change in the field of activity.⁵

- *Rise of smart machines, equipment and systems* which will overtake a big part of repetitive and routine human tasks which will have to develop useful skills in order for the human-man relationship to function.

- *Working in a computational word of data* that will be processed, stored and rendered by “machines” which will demand the development of relevant data selection abilities, abilities to interact with data, make data-based decisions and use data to design for desired outcomes.

- *New media ecology*, a concept that transforms the way we communicate through video production, digital animation, augmented reality, sophisticated media editing etc. This new “ecosystem” with access to millions of devices can exert an enormous influence on culture.

- *Superstructured organizations* – the large scale access to social networks leads to a reorganization of collaboration and added value in organizations. The use of collective intelligence, possibility of communicating and connecting outside of traditional organizational boundaries contributes decisively to working, innovating and leading organizations.

³ RAȘCĂ Lavinia, *The positive employees experience - Solution for reducing the talent deficit in Industry 4.0 (Experiența pozitivă a angajaților – soluție pentru reducerea deficitului de talente, în cea de a patra revoluție industrială)*, Quality-Access to Success, Vol. 19, S3, October 2018

⁴ IFTF is an important foresight global organization. For more than 50 years the enterprises, governments and social impact foundations have been considering the IFTF global foresight, including personalized research and perspective training regarding complex changes in order to develop strategies with a global impact. The IFTF methodologies and sets of instruments offer correct opinions on transforming possibilities in all the branches that work together towards a sustainable future.

⁵ According to the last international studies, a new approach is necessary in order to keep the talents in companies for a longer period of time because motivation and satisfaction will no longer suffice. In order to attract and keep the valuable employees in their company, Deloitte created and promoted the concept of “Positive employee experience” that includes the well-being in all the areas of their life and connecting with the company, superiors and colleagues’ values. - from RAȘCĂ Lavinia, *op.cit.*

- *Globally connected world* - The globalization can have a long term influence, reestablishing a new balance on the monopoly held by the European developed countries and United States on influencing the workforce market, innovation, political and economic power, but determines changes as well in the large companies' strategy that wish to remain competitive. The poorly developed countries will have a bigger role, not just as talent providers, but also as an outlet which will develop the need to form a global team and develop abilities to cultural sensitivity and intercultural communication.⁶

Using these drivers of change, *The Institute for the Future has defined the skills that will be critical for success in the workforce:*

1. **Sense-making** – the ability to determine the deeper meaning of what is being expressed and other complex aspects in order to be expressed in computer programming or data processing which cannot be codified or processed by a computer.
2. **Social intelligence** – the ability to network, to connect to others in a deep and direct way.
3. **Novel & adaptive thinking** – the proficiency to adapt to various situations and come up with innovative solutions.
4. **Cross-cultural competency** – the ability to operate in different cultural settings.
5. **Computational thinking** – the ability to translate data and information into abstract concepts and understand data-based reasoning.
6. **New media literacy** – the ability to critically assess important aspects of communication and translate it into new media content in order to leverage these media for persuasive communication with collaborators.
7. **Transdisciplinarity** – literacy in and ability to understand concepts across multiple disciplines and adapting them to specific situations.
8. **Design mindset** – the ability to understand and quickly adapt to work processes necessary for carry out processes for desired outcomes.
9. **Cognitive load management** – the ability to filter relevant information and attach to them cognitive functioning necessary for desired outcomes.
10. **Virtual collaboration** – the ability to adapt, drive engagement and work productively as a member of a virtual team.⁷

Education 4.0

These skills will have to be learned by those already active on the job market by using lifelong learning and for the young still in training it's very important for these skills to be delivered by the educational system specifically, on time and continuously adapted to change which thus becomes and important partner in transforming the members of society. But, in turn, educational institutions must adapt to the new requirement of external environment, to study its “behavior”, to know its expectations, to transfer to those who study the knowledge and skills required by the community.

The approach that must be promoted by the educational institutions shows a new concept, an “Education 4.0” which will have the role to provide a new set of skills and abilities, but also train adequate attitudes for a super technological and interconnected environment in which new technologies focus on innovation, on identifying and promoting talents, on the capacity to understand and interconnect information from various fields in order to find innovative solutions, on the capacity to adapt to different cultural environments or to work remotely in virtual teams, and through its institutions, the higher education is the most important supplier of highly qualified personnel who is

⁶ http://www.iff.org/uploads/media/SR-1382A_UPRI_future_work_skills_sm.pdf

⁷ Ibidem

fit to integrate quickly in the Industrial Revolution. The responsibility of universities as a skills supplier specifically adapted to the requirements of the technological revolution accentuates their importance in the economy and community, but at the same time gives them the status of organizations that are in competition with each other in order to meet the requirements of the job market and the rate of development in technology, innovation and society in general. Despite the fact that apparently the technological development influences only or first of all the technical specializations in education, actually its powerful influence in society asks for a new approach from a sociological, psychological, cultural, health, environmental knowledge and protection point of view, basically covering all the learning areas provided by universities and other educational providers.

A study performed by the company Deloitte together with Global Business Coalition for Education shows in a report on “Preparing tomorrow’s workforce for the Fourth Industrial Revolution” that almost two billion youth worldwide stand to be left behind in the work force in the Fourth Industrial Revolution.⁸

According to these new approaches, it would be necessary for all the higher educational institutions to self-assess its capacity to deliver new necessary knowledge and skills and reform those methods of teaching, researching, developing and innovating that do not meet the requirements in economical or technological environments or society as a whole anymore. The quicker this action will come to fruition, the more competitive universities will become, growing into a serious and credible partner, integrated into the technological revolution process and benefiting from the necessary head start to establish its position on the international educational market. A real challenge for the universities as well as a sincerity and integrity test towards themselves and the society will be identifying and recognizing their own shortcomings - teaching and researching staff - according to the industrial revolution and quickly adapting to change. Thus, the competition between the educational institutions starts to resemble more and more the one in the economic world, requiring a good knowledge of necessities and expectations of the most important actors in areas directly involved in or affected by the Industry 4.0.

EXCELLENCY IN EDUCATION

On a different note, the exponential growth of the degree of interconnectivity between fields, regions or continents increases the level of globalization and diversity, practically contributing to the disappearance of physical or virtual borders, job market included. The free movement of workers, the use of virtual means for remote work increases the need to cover the necessary skills on international market but also a harmonization of educational and training systems that would provide these skills. This tendency towards internationalization requires referring to some reference systems known at European or international level, with general or specific to the area of education quality criteria or standards amongst them. Thus, the skills, specializations or trainings acquired in different educational institutions should have a common base resulting from the increase of interinstitutional collaboration, student mobility, diploma recognition, resulting from the main lines of action of the concept of quality assurance in higher education, regulated since 1999 by the Bologna Declaration, later developed through Salamanca Convention of 2001, respectively through reunions in Berlin in 2001 and Bergen in 2005.

⁸Deloitte, « Studiu Deloitte: Două miliarde de tineri riscă să devină inadaptați la piața muncii în cea de-a patra revoluție industrială », 29 noiembrie 2018
<https://www2.deloitte.com/ro/ro/pages/about-deloitte/articles/studiu-deloitte-doua-miliarde-de-tineri-risca-sa-devina-inadaptati-la-piata-muncii-in-cea-de-a-patra-revolutie-industriala.html>

Based on this idea at European level, the European Council for Education reunited on May 22nd 2018 proposed the idea of “European universities”, a concept that must be implemented until 2025 in order to “significantly enhance mobility and foster high quality and excellence in education and research, by strengthening the link between teaching, research and innovation and knowledge transfer, by demonstrating the benefits of multilingual learning, the recognition of qualifications and by developing joint education and research programs and projects”. In European Commission’s opinion, this initiative represents a “major step in cooperation between all types of high education institutions in all European regions and on all organizational levels in all areas of activity, from teaching and learning to research and innovation.”⁹

By bringing together as many European universities as possible a long-term education strategy wants to be achieved that will facilitate the connection with research and innovation and society as a whole. The idea of interconnection will be possible in various forms, allowing direct or virtual student and post-graduate collaboration, as well as teaching or auxiliary staff in order to “study, train, teach, do research, work, or share services in any of the partner institutions”. And to keep up with the ongoing technological development new **interdisciplinary/multidisciplinary and cross-sectoral** approaches together with new innovative teaching methods will be implemented that will be integrated in the newest digital technologies.¹⁰

This community of “European Universities” should play an important role in the European Educational Space in order to promote excellency, the continuous growth of European higher education quality and competitiveness and to promote it internationally. It is worth mentioning that in order to obtain grants from the European Union in order to form university alliances, quality assurance must be an “embedded component to ensure that European Universities successfully deliver the expected results and achieve an impact going far beyond the impact an individual partner organization could achieve.”¹¹

In the context of globalization, World Trade Organization (WTO) introduced certain policies regarding trade services, consequently each member nation according to educational services requirement must “permit foreign institutions to grant degrees and diplomas, recognize degrees and diplomas granted by other member nations, advocate studying abroad, support the international flow of professionals, reduce restrictions on immigrants and decrease financial subsidies to its own educational institutions.” These policies are intended to build a unified and open educational market so that educational institutions can compete with one another equally both at home and abroad.¹²

According to this context, the universities face multiple challenges:

- reforming the internal background by overcoming certain traditional customs especially in “historical” universities where rites, rituals and myths can hardly integrate a modern concept of approaching the educational and research act;
- accepting the idea that the educational act is actually a service provided for the education “consumers” in the conditions of a market economy . This service must of course preserve its training character and quality standard of the transferred information but at the same time it must assimilate the management rules and especially marketing in order to promote education institutions on at least two levels: in competition between universities, as well as in business, politics, social world, offering exactly what it is required in economic and technological areas as well as community in general;

⁹ EC, Erasmus +, Brussels, https://ec.europa.eu/programmes/erasmus-plus/book/export/html/2290_ro

¹⁰ Ibidem. https://ec.europa.eu/programmes/erasmus-plus/book/export/html/2290_ro

¹¹ Ibidem, https://ec.europa.eu/programmes/erasmus-plus/book/export/html/2290_ro

¹² **Chunmao Liu, Charles Oppenheim** , Competitive Intelligence and the Development Strategy of Higher Education in Tianjin, China, March 2006 Information Development 22(1):58-63, DOI:10.1177/026666906060091 https://www.researchgate.net/publication/240713962_Competitive_Intelligence_and_the_Development_Strategy_of_Higher_Education_in_Tianjin_China

- continuous adjustment of study programs and research themes on a technological level that are advancing at a staggering speed and which lead as well to an evolution of new skills suitable for the new technologies.

It's worth knowing that in all university ranking systems that assess universities' performance in terms of educational and research act, in order to rank them, the criteria are focused on the approaches and resources provided by the university for the student. The criteria and assessment indicators for quality assurance in education that underpin the receiving of the national or international accreditation are similarly devised by the universities. There are indeed also criteria which concern employability and the continuous postgraduate education of graduates, but according to the external environment demands it seems that they are not enough.

It seems though that universities began to understand that in addition to the regulated framework imposed for a national or international accreditation educational system it is extremely important for everyone to navigate and ensure a personal development environment in order to grow the level of internationalization or globalization and to increase the share of activities dedicated to research in relation to the theoretical training of the students. This approach also results from "critical points" identified by studying the answers the students usually give when attempting an international classification of universities. For example, in a study carried out by Times Higher Education for students in Japan, they gave out pretty low scores (between 4.79 and 6.9) to questions regarding their belief that the University allows them to apply what they have learned in school in the "real" world, that they are challenged to find solutions to "critical" situations, that they are making connections with other areas, etc.¹³

These low scores can be found at other universities as well and present an opportunity as well as a challenge because the young finally begin to understand that they need abilities and skills that would allow them a quick adjustment to competitive environment requirements of the work force, that practice should prevail comparatively to the volume of theoretical concepts, that parallel with the basic skills they also need to develop performing digital skills as well as entrepreneurship skills and that there is a need to reset the academic and administrative management of all educational institutions. Educational institutions have to understand that their role in the context created by Industry 4.0 is similar to that of a "company with innovative technology" regardless of the area it forms and develops skills. And extrapolating, understanding that education and research are contributing significantly to the competitiveness of a country, they have to occupy a fundamental role in a country project that would ensure the internal and international competitiveness.

COMPETITIVE INTELLIGENCE AND STRATEGIES IN THE EDUCATIONAL ACT

In this context, a competitive intelligence (CI) type of approach in education and university management would respond to the challenges and would offer instruments for collecting, processing and capitalization of useful information in their ascent in the international elite universities top but, most importantly, would connect and function in tandem with the new technological generation and society. The use of the competitive intelligence can benefit reaching the development goals of higher educational institutions and the theory and CI methods offer a shortcut for the optimization of this strategy.

The biggest challenge the educational institutions have to face in order to successfully register is to combine the traditional principles which are guiding most of them with the market principles, to learn to build a personal strategic direction that will face the external competitive pressure, but will also bring the expected benefits. In order to do this, the educational institutions must also learn

¹³Bothwell, Ellie, "Japanese universities 'improving on internationalisation'", March 27, 2019
<https://www.timeshighereducation.com/Japanese-universities-improving-on-internationalisation>

or turn to those that already have the necessary skills to permanently monitor the internal and external environment, as well as the competition's behavior in order to identify the opportunities as well as risks in regard to the established strategic objectives.

An example of good practices when it comes to competitive intelligence in order to develop the strategy for a higher education connected to the current requirements is the one applied to the 18 universities and colleges in Tianjin, China. In this case the need to adapt the strategy in educational institutions appeared as a result of China entering WTO and the fact that it has to meet the requirements of educational services in the context of the trade the country became part of.¹⁴

A University's competitive strategy document should comprise six parts:

1. the background;
2. the formation of aims and objectives;
3. the choice of actions;
4. criteria of success;
5. statements of how the strategy will be developed and communicated; and
6. the required functions of the organization.¹⁵

The reference analysis to draft a competitive strategy for universities, tied to the specific competitive environment as well as the requests of technological, political, social and cultural environments must take into account the following aspects:

- knowing the personal internal circumstances as well as external;
- knowing the reference content in order to base the collected data and information on it;
- choosing the reference object that will lead to drafting of the strategic objectives in order to increase competitiveness and ensure its appropriateness to the competitive environment;
- gathering and analyzing data;
- determining the type of actions;
- drafting a plan and an appropriate assessment.

A CI type of analysis will approach the higher education institution as a player on the market that will adhere to the rules of competition between service providers. Thus, the analysis data should focus on:

- external environment, in terms of political, economic, social, cultural, technological and environmental factors (PEST analysis) to identify opportunities and threats in relation to the competitive environment;
- internal environment by using the SWOT analysis in order to identify the strengths and weaknesses, educational, scientific and management skills resources and needs for improvement;
- ranking the priorities based on the identified opportunities and threats;
- the strategy of tackling the priorities based on their importance.

CONCLUSION

In conclusion, in the current context of globalization and technological development, the higher education institutions and especially universities and affiliated research institutes should adopt a new approach - as an innovation provider with a suitable market and marketing strategy. In order to deal with competitors as well as associate with universities that have common or complementary interests they need to know very well and keep on updating the competitive and market environment in which they operate. In this context, establishing a competitive intelligence type of structure in each

¹⁴https://www.researchgate.net/publication/240713962_Competitive_Intelligence_and_the_Development_Strategy_of_Higher_Education_in_Tianjin_China

¹⁵ Chris West, „Competitive intelligence”, New York, Palgrave, 2001, p. 33-49

university would benefit information gathering, selection and processing that will ensure a strategic decision making suitable for the current moment and purpose of those institutions.

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