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IMPACT OF THE FOURTH INDUSTRIAL REVOLUTION IN BUSINESS MANAGEMENT AND WORK-PLACES SHAPING

UTICAJ ČETVIRTE INDUSTRIJSKE REVOLUCIJE NA POSLOVNO UPRAVLJANJE I OBLIKOVANJE RADNIH MJESTA

Summary

The aim of the research is to recognize and modelling impact of The Fourth Industrial Revolution in future business management operations changes and shaping work-places and creating new jobs in sense of using artificial intelligence and information technology through digital competences development. The Fourth Industrial Revolution is related to almost every aspect of human life, not only professional but individual private and family life. The Fourth Industrial Revolution is basically connected to reindustrialization and new economy development, but its impact is very intensive to the all organisations nevertheless if they are private business, educational organisations, sport organisations or some state public institutions. There are very important questions that society and businesses have to answer in sense of human resources strategies, operations, value creating and delivering systems, clients or citizens' satisfaction and triple bottom line threshold and sustainable development goals achieving. Aim of this paper is to give an overview of the possibility and risks and offer conceptual model that Bosnia and Herzegovina can use regarding The Fourth Industrial Revolution in sense of contributions in order to obtain better development proposition on macro and micro level through work-places reshaping according to the digital competences and developing and modelling new business anatomy according to the modern operations management approach and contemporary smart companies.

Key words: *The Fourth Industrial Revolution, Organisational Operations, Emotional Intelligence, Work-places reshaping,*

Sažetak

Cilj istraživanja je prepoznati i modelirati uticaj četvrte industrijske revolucije u budućim promjenama operativnog upravljanja poslovanjem i oblikovanju radnih mjesta i stvaranju novih radnih mjesta u smislu korištenja umjetne inteligencije i informacijske tehnologije kroz razvoj digitalnih kompetencija. Četvrta industrijska revolucija je povezana sa gotovo svim aspektima ljudskog života, ne samo profesionalnim već i privatnim i obiteljskim. Četvrta industrijska revolucija je u osnovi povezana sa reindustrijalizacijom i razvojem nove ekonomije, ali je njen uticaj vrlo intenzivan na sve organizacije, bez obzira na to da li je riječ o firmama, obrazovnim organizacijama, sportskim organizacijama ili državnim javnim institucijama. Postoje vrlo važna pitanja na koja društvo i firme moraju odgovoriti u smislu strategije ljudskih resursa, operacija, sistema stvaranja i isporuke vrijednosti, zadovoljstva klijenata ili građana i trostrukog donjeg praga i postizanja ciljeva održivog razvoja. Cilj ovog rada je dati pregled mogućnosti i rizika i ponuditi konceptualni model koji Bosna i Hercegovina može koristiti u vezi s četvrtom industrijskom revolucijom u smislu doprinosa, kako bi se dobio bolji prijedlog razvoja na makro i mikronivou kroz preoblikovanje radnih mjesta prema digitalnim kompetencijama i razvoj i modeliranje nove poslovne anatomije prema savremenom pristupu upravljanju operacijama i savremenim pametnim firmama.

Ključne riječi: četvrta industrijska revolucija, organizacijsko poslovanje, emocionalna inteligencija, preoblikovanje radnih mjesta

Introduction

Today we live in a very challenging time marked by strong daily changes that create permanent pressure on individuals, families, companies and entire societies in the context of how to organize business activities and individual behaviour. These pressures are becoming more and more intense and dynamic, which requires the acceleration of the use of knowledge management postulates in the business organizations, a change of individual workers doing their everyday jobs and a change in the learning system of all individuals. Organizations and individuals who are not ready to redefine their business operations strategies and individual ways of thinking and behaviour in short time will find themselves in a position to lose their competitive advantages, while their knowledge will become obsolete. Regardless of the type of industry and business, companies are strongly affected by these changes, while public administration organizations that create preconditions for the competitiveness of the national economy must modify their way of working and transform their systems from bureaucratic and administrative to process and service-oriented organizations to achieve higher levels of satisfaction of citizens and companies. In the same time this kind of

environment create new market potential and new business opportunities that could be used to upgrade economic development through companies' operations redesigning and work-places reshaping in sense of human resource management activities. What kind of approach to these environmental pressures will be chosen by some states, businesses and individuals will shape the future development of them so it is very important to recognize these environmental changes as an opportunity but not exclusively as some restriction, nevertheless obligatory taking in consideration some risks that are immanent to these processes.

The essence of the business of today's organizations must be focused on innovation, and they must be able to apply new improvements, content delivering and innovations every day in a very flexible way in order to survive within hypercompetitive environment.¹ Modern organizations in the world and in Bosnia and Herzegovina also, must continuously collect new knowledge from the external and internal environment, create new authentic and original ways of doing business, share this knowledge through the organization by applying the principles of the learning organization, encode this knowledge for future generations and of course apply this knowledge through new practices every day without exception. Today, new occupations are appearing on the scene, while occupations that already exist have an obligation to change radically with the aim of their sustainable survival. Organizations need to understand that today it is not enough to ensure that customers are satisfied but they just need to know that they should be delighted to be motivated to consume some service or product of some companies. The state administration must, similarly such as private businesses do, create delighted citizens and companies every day by introducing new segments of added public value they deliver them as state clients. It is very sophisticated concept because public sector leaders must take in consideration some very subtle relations with the citizens and their different interests.² The pressures on state institutions is growing every day because the citizens, which are private companies sector clients in the same time, have become very refined and their requirements and expectations are very complex which push state administration to be more flexible, responsive and ready to accept new models of organizing operational activities and to apply innovations in public sector. This process will accelerate and intense in

¹ Elvir Čizmić, Senad Softić*, Armin Talić, (2018), Impact of Event Management Outcome in a Students Employability Perception, Universal Journal of Management 6(10), DOI: 10.13189/ujm.2018.061004, pg. 407.

² Moore, Mark, H., (1995), Creating Public Value Strategic Management in Government, Copyright by the President and Fellows of Harvard College, pg. 52-55.

the near future and the leaders of all organizations must be very well aware of that facts and evidences.

At a time when new generations of young people are emerging and they need to be educated and who are introducing to work, managers and employers but professors and teachers in the education system, also need to be aware of the profile of young people involved in these processes. Today and in the future when students are required to have disciplined creativity competence, which is becoming a key prerequisite for sustainable employment in various types of organizations, people who manage processes must be aware that it is increasingly difficult to buy the attention of young people. In the educational process, teachers are required to continuously seek new ways to transfer knowledge and ensure a high level of attention of pupils and students taking in consideration LAYS³ concept, while employers must find new methods to attract different types of talent to the organizations. These phenomenon is some contradiction that redefines current jobs of people who are currently employed, while on the other hand the environment in which young people live and develop today creates a profile of pupils and potential workers that is not complementary to the requirements of the new self-determined and personalized education systema and the new quality of working system, thus parents of the young persons must play crucial role in directing their children what to do an how to behave within new environment. The fourth technological revolution on the one hand puts young people more choices and profiles them in such a way that they can hardly focus on one important thing because their attention is often scattered on several contents at the same time which puts them in a position to have attention and concentration deficit which is very important problem for young people today and educational system and employers, too. In general, human resources observations in context of fourth industrial revolution, as a main intellectual capital of all contemporary organisations, must take in consideration people commitment, creativity, communication, control, comprehensiveness, credibility, congruency, cost-effectiveness, change and competence as main categories to measure human effectiveness in organisation.⁴ For this reason, the education system and employers must be sensitive to this fact and anticipate and develop new educational contents and activities and change the way they are delivered while employers must reshape work-places content and shape in such a way as to keep the attention of students on the one hand and to ensure

³ Deon, Filmer, Halsey, Rogers, Noam, Angrist, Shwetlena, Sabarwa, (2018), I Learning-Adjusted Years of Schooling (LAYS) Defining a New Macro Measure of Education, World Bank Group, Education Global Practice, Policy Research Working Paper, pg. 6.

⁴ Price, Alan, (2007), Human Resource Management-in a business context, Cengage Learning EMEA, pg. 74.

the high level of commitment and high level of performances of talented employees on the other.

System of teaching has rapidly changed, system of learning has drastically redesigned, and system of researching has dramatically hastened so we can expect some practice continuing after current pandemic time using more and more some new education models and techniques that could be call self-determined learning system and self-exploration education system, including new heutagogical technique and semi-automatic learning processes, through accelerated digitalisation.⁵ Additionally, when new pandemic tendencies were emerged, the process of change was further accelerate and the fourth technological revolution through the process of intensive digitalization and use of all components of the concept of the Internet of Things was built into the daily impact explosion and changes in behaviour of all people categories. The learning process has changed significantly and the basic context on the basis of which it will be possible to build scientific work in the future will be related primarily to the intensity of competencies related to emotional intelligence. The reason for this situation is that knowledge has become fully transparent and globally available through various types of created structured knowledge content related to explicit knowledge in the form of books, articles, concepts, diagrams, models, video explanations and others content that are often offered for free. Hundreds of different books, on the other hand, can be found at the "books should be free" portal along with a number of other free sources that can serve as inspiration for screenplays and blueprints for new films and the development of art academies. What is necessary for today's students and employees in general from the category of knowledge management is a higher intensity of competencies in the domain of emotional intelligence related to self-control and self-awareness that are necessary for a person to find time for reading, learning, studying and applying this knowledge in practice. This means that it is no longer enough for people formally belong to the category of knowledge workers or to category Y people according to the McGregor concept, but it is necessary for these people to have an extremely high level of emotional intelligence and commitment if they want to achieve extraordinary results in their careers.

⁵ Muhamad Fazil Ahmada, Wan Rohila Ganti, Wan Abdul Ghapar, (2019), The Era of Artificial Intelligence in Malaysian Higher Education: Impact and Challenges in Tangible Mixed-Reality Learning System toward Self Exploration Education, 16th International Learning & Technology Conference, pg. 4.

The 4IR Development Effects and Impacts

If we take in consideration some simplified impact of the fourth industrial revolution (4IR) on the daily life of an individual person, it is related to the use of certain consumer electronics devices through the Internet of Things and of course the use of devices such as desktops, laptops, tablets, mobile phones, wrist-watches and interactive televisions. When we look at the impact of these devices that serve as tools for participation in virtual space through various communication applications ranging from educational Internet domains, to various personalized and group communication applications such as viber, twitter, skype, messenger, whatsapp applications and many others, it is clear that they have become commonplace for all people regardless of age group. On the one hand, adults use the aforementioned applications, while on the other hand, children and teenagers have a number of other applications for exchanging ideas, conversations, agreements, communication, games and entertainment through various gaming platforms and applications for sharing sketches of drawings, poems, tasks such as tick talk platform, but also that kind of platforms can abound in certain risks. Some educational platforms such as BigBlueButton, Teams, Zoom, Google classroom and others provide an acceptable interface for conducting different segments of the education process with different advancements very frequently.

When it comes to adults who should have a higher degree of maturity, it is necessary to find a balance in the use of modern technologies in a way that uses the postulates of effective and efficient use of time management principles or more precisely management of themselves within the time. There are a number of advantages related to new technologies where people can participate in working on different projects globally in a way that project teams working within different time zones through the realization of different project tasks and activities with the aim of delivering value defined by the project goal. Companies can operate through smart options in a way that product design is done on one continent, production on another, while the placement of goods is realized globally. Similarly, Different types of service-oriented organizations can use the resources of the old and new economy in combined manner with the goal to delivering better treatment, education, banking service and the like to their clients, globally, because some new category of the young people accepted new philosophy of living such as high-tech nomads.

On the other hand, the different aspects of new technologies brought about by the 4IR can often lead to stressful situations for different people who do not have the skills to use them in a balanced way. In the case of certain important

meetings, it may happen that certain devices such as computers and mobile phones may appear as distractors due to the constant interruption by distractions and the like, so that it can prolong the activities that should be implemented more efficiently. In addition to the above, constant reliance on devices during operation can also lead to discontinuity, which means that relying on digital technologies and digital memory can disrupt the capacity of systemic organic people memory necessary for better processing and decision making. In such a complex micro and macro environment, it is necessary to use various new techniques and skills based on time management, stress management and the use of advanced techniques of creative thinking with a high degree of emotional intelligence. Repercussions of misconduct in the context of the fourth technological revolution can lead to emotionally unstable conditions and chronic stress that can harm different people on various grounds, which burdens employers on the one hand due to mistakes and absences at work and the health insurance system to medical treatment such conditions, on the other.

Simultaneously, we must deal with a range of global issues, such as environmental protection, health improvement, and fight against poverty. Stakeholders demand that companies adopt more transparent and responsible approaches, aiming at the holistic achievement of economic growth, social progress, equity, respect, and awareness of the environment.⁶ If we see the next table, we will understand the main advantage and area of using new technology based on 4IR and digitalization and some disadvantage and some risks of using them.

Table 1: Advantages and disadvantages of the Fourth Industrial Revolution

Some of the main advantages and areas of using 4IR achievements in business, science and society
<ul style="list-style-type: none"> -Better forecasting and volume optimization (less bottlenecks and dissipations) -Increasing of production flexibility using flexible production cells and CAD, CAM and CIM systems -Shortened “time to market” and increase customization and visualization possibilities -Increasing possibilities for enriching products and services in advantage of customers -Improving in different areas of science and increasing researching potential -Improving system of education, training, and learning through webinars and precast contents -Improving the traffic safety and transport optimization using self-driving cars and GPS transport control -Making work more interesting by overtaking simple repetitive aspects of jobs using

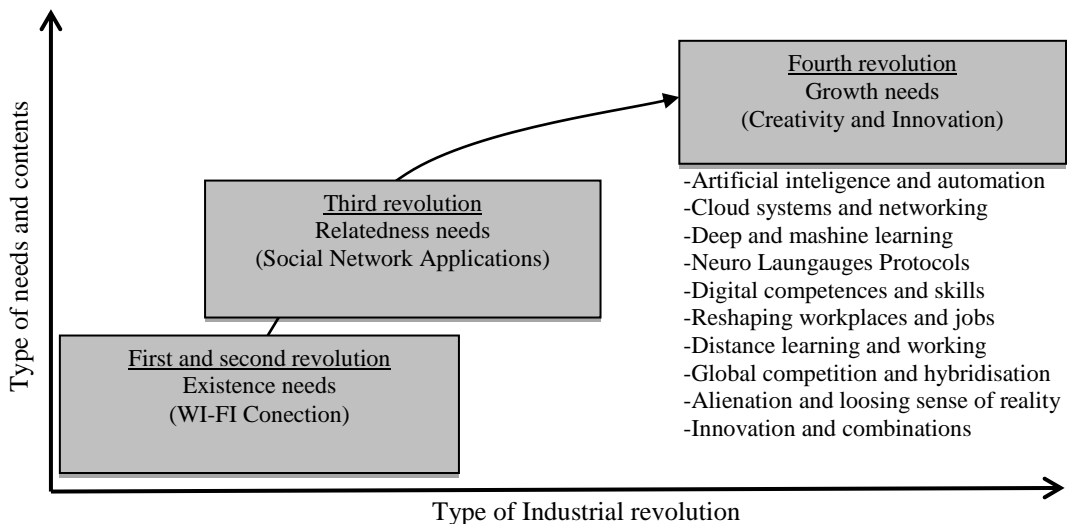
⁶ Luis, Miguel, FONSECA, (2018), Industry 4.0 and the digital society: concepts, dimensions and envisioned benefits, De Gruyter Open, DOI: 10.2478/picbe-2018-0034, pg. 387.

<p>automation</p> <ul style="list-style-type: none"> -Global exchanging of ideas, knowledge and professional standards and accreditations -Better medicine equipment and health diagnostic and services for upgrading workers availability -More transparency in any kind of social and business activities and labour market -Poverty reduction by using new technology in food production and people instructions to produce themselves -Better system of time management using different application for planning, notes and alerts -Better layout systems for capacity, business processes and total quality optimisation -Democratisation styles of leadership and better organisational information exchanging -...
<p>Some of the main disadvantages and risks of using 4IR achievements in business, science and society</p> <ul style="list-style-type: none"> -Artificial intelligence, robotics and bioengineering could be used for creating new weapons -Social media can spread out hate speech, wrong information and some types of harassment -Increasing alienation and bad patterns of behaviour and habits of different category of people -Increasing of cyber-crime possibilities by money laundering and identity stealing -Accelerating polarization between workers categories in knowledge and standard in global context -Privacy protection problems with special additional ways of privacy harassment -Attention deficit disorder for younger people which is becoming some very serious problem -Internet and mobile phone addiction options arising for different category of people -Distraction of different appliances and reducing systematic organic memory and people operations capacity -Cyber mobbing and bullying and other peer violence that could be worse for children than in reality -Unnecessary supervision over different categories of people and different forms of discrimination -Children harassment using internet as media for accessing children by different bad persons -Organising of protests and revolutions and supporting making disorder in some countries -Organising terroristic networks for planning and execution of terroristic attacks -Interfering in the electoral process through hacker attacks and fabricating false information -...

From the table 1, one can see that there are a lot of advantages of 4IR in sense of business, science and social context, but one can recognize some negative aspects of 4IR connected with behaviour and habits of the individual people of different age. It means that national and international institutions, organisations and business must manage these phenomena in sense of using and accelerating benefits and prevent some abusing or misusing of new technological and scientific effects and impacts. It would be good to define some state body that will take care about these new technology applications and developing new technology transfer capacity of one social and economic system because the effects and impacts of these new trends are requiring

developing of new competences called digital competences, but digital competences cannot be observed isolated, because digitalisation is only one new tool for better doing job, if it is used correctly. This new reality will reshape any work-place from operational repetitive jobs that could be programmed till very sophisticated strategic jobs that will occur within higher level of complexity. All work-places will become more and more complex and that will require new skills and competences from employees and management bodies within business companies and within state public bodies. From the individual level digital competences take in consideration information and data literacy, communication and collaboration, digital content creation, cyber security, problem solving and improving learning techniques. All those aspects will influence on leadership systems, motivation, communication, decision making, customer identification, recruitment systems, financial transactions systems, trading systems with increasing of disintermediation, meeting organizing, event management systems and all businesses, scientific and social operations, contents and activities. Next figure (Figure 1.) explains possibility of using Alderfer ERG motivation theory in context of 4IR and its application to new category of young workers called millennials.

Figure 1: Correlation between type of needs and industrial revolutions



At the figure 1, one can see that human needs can be correlated with industrial revolutions from history where first and second industrial revolutions are related to automatization of production that presented one of the basic human needs which enabled security of existence and replacing

difficult physical human work with machine operations.⁷ A third industrial revolution is based on information technology development and automatization of production where the human needs are reflected on social affiliation through social media but in contrary there is a problem of alienation in the same time. After three industrial revolutions society, individuals reached the state of needs for independence, personal development, and maximization of their own potentials. In this sense it could be take in consideration some application of Alderfer ERG motivation concept in context of 4IR.⁸ It is important to apply traditional theory and framework on new situation and new young people developed behind processes that are generated by the fourth industrial revolution. When we speak with the new generation vocabulary it is easy to understand that their phundamental existence needs are not connected with traditional explanation but they are focused on WI-FI connection availability. When they think about relatedness needs, they are taking in consideration electronic and social networking and fun, and in the end when they think about growth needs, they think about using all advanced contribution of the fourth industrial revolution for developing and sharing some new ideas and information using some communication platforms for self-actualisation and self-promotion.

The 4IR Development and Organisational Operations

Throughout history, the works of Frederick W. Taylor have become widely recognizable through the development of management techniques that have focused on production efficiency, so that production management has become an acceptable and recognizable term used as early as the 1930s and 1950s. The work and behaviour of workers are studied and analysed to the smallest detail in order to eliminate unnecessary efforts and achieve a high level of efficiency. At the same time, psychologists, sociologists, and other social scientists began to study human behaviour in the work environment. In addition, economists, mathematicians, and other experts have generated new, much more sophisticated analytical approaches. Since 1970, significant changes have been taking place in this area, primarily through the adoption of a new name for the area, which received a new terminological content form in the term of operational management that includes all organizational

⁷ Adapted: Kyró, Paula; Mattila, Johanna; (2010): Towards future University by Intergrating Entrepreneurial and the Third Generation University Concepts; pg. 6.

⁸ Jane R. Caulton, (2012), The Development and Use of the Theory of ERG: A Literature Review, Emerging Leadership Journeys, Vol. 5 Issue. 1, pg. 3.

subsystems, and takes into account the production and service sector.⁹ Due to the fact that the service sector is becoming much more prominent, the change from production to operation extends the scope of research and application of this scientific research and practical (applied) field to service organizations.

Another important context of change is the introduction and emphasis on synthesis, not just analysis, as a methodological and research toolkit in the study of management practice in general, and operational management in particular. In modern business conditions with the fourth industrial revolution contours, when service jobs have significantly outpaced production jobs both in terms of their financial value and the number of employees, organizational knowledge and scientists, as the basic bearers of intellectual capital, represent the most valuable resource on which most of the added value of any organization is generated through its operational processes, so that the principles of operational management should inevitably be included in this segment with the aim of raising the efficiency of scientific work to a higher level. The term operational management is universally used to denote all activities of production of goods and services in any organization, product or service organisations, for-profit or non-for-profit organisations, small or large organisations, public or private organisations, to the individual level of each individual through self-management. The key goals to be achieved by quality operational management are, above all, customer satisfaction and competitiveness of the organization, which certainly touches on issues of strategic importance to the organization in sense of its surviving, growing and developing.¹⁰ The ultimate goal of operational management is to improve the quality and productivity of the organization, or its employees, processes, products and services. New technologies are fundamentally changing the business environment and the nature of doing business. For example, nowadays different service and production businesses use web tools for business development instead of opening new branches, while a good part of routine jobs in different businesses are performed by robots instead of workers, whether they are robots that automatically sort, cut or paint assembly parts in automobile industry for instance. For example, ATM (interestingly, the Republic of Ireland highlights the ATM as an authentic domestic innovation) or expressway ramps that replace much of the

⁹ Smith, A., (2005), *The Wealth of Nations*, Book I-Of the Causes of Improvement in the Productive Powers of Labour and of the Order According to Which its Produce is Naturally Distributed Among the Different Ranks of the People, The Pennsylvania State University, pg. 5-6.

¹⁰ Roy, N. R. (2005) *A Modern Approach to Operations Management*, New Age International, pg. 6-7.

operational activities previously done by banking or other administrative and counter clerks in banks.

It should be emphasized that regardless of the automation and robotization of certain processes, activities and operations in various business organizations, the role of people remains irreplaceable, but certainly the jobs performed by people change, become more complex and meaningful, which requires workers of post-industrial society context that requires a different kind of skills, knowledge, competencies and abilities based on the simultaneous application of discipline and creativity with continuous development and learning. In this context, the characteristics of the new employee are based on the diversity of content and job requirements, diversity of skills, knowledge and competencies of employees, and a high degree of flexibility and mobility, which means teamwork, continuous education and training, and self-guided careers and lifelong focus and potential.¹¹ In sense of above qualitative aspects of the fourth industrial revolution and digitalization it is possible to present main features of four revolutions in sense of new organisational framework in a systematic way within a table as follows (Table 2.).

Table 2: Comparison of Four Industrial Revolutions and Organisational Framework

Comparison elements	1IR	2IR	3IR	4IR
Goals	Physiological	Rational	Behavioural	Emotional
Roles	Individual	Groups	Teams	Networks
Methods	Physical metrics	Quantitative	Qualitative	Mixed data analysis
Capital	Physical capital	Financial capital	Structural capital	Intellectual capital
Orientation	Force	Invention	Creativity	Innovation
Motivation	Money	Money and position	Participation	QWL and climate
Paying system	Angst	Fringe benefits	Performance paying	Behaviour paying
Language	Latin	National	English	Experts
Organisation	Hierarchy	Mono-dimensional	Two-dimensional	Multi-dimensional
Leadership	Autocratic	Benevolent	Democratic	Participative
Management	Individual	Managers teams	Multi owners	Stakeholders

No matter what the basic type of organization is, it is clear that in the context of value-added delivery to customers, certain changes must always be made

¹¹ Lisbeth, Claus, (2019), HR disruption-Time already to reinvent talent management, COUNTER-INTUITIVE PERSPECTIVES, Business Research Quarterly, doi.org/10.1016/j.brq.2019.04.002, pg. 209.

to the operating core serviced by other basic parts of the organization (which also require certain changes). The operational core, by its very name and content, implies its setting as a key segment of operational management for the reason that it adds a key part of the added value of the configuration that is delivered to customers. When we say configurations, it means the total package of services and products consumed by customers, whether it is B2B arrangements or arrangements for the end user. If we take as an example a higher education institution or any other institution of the education system, as glaring examples of a professional organization, it is clear that the configuration delivered to the client includes elements including lectures, exercises, books, articles, case studies, project-oriented workshops, databases, websites, information, mentoring, additional services (library), etc. As can be seen in the education sector, the delivery of value to the client is a very complex and sophisticated process, while the delivered value is complicated daily due to various influencing factors including higher the level of sophistication of clients whose expectations are continuously growing. A similar phenomenon occurs in all types of businesses and industries, so the seller of a washing machine today must be very prepared and able to answer the customer a number of questions that include technical information (speed, elasticity consumption, additional functions for easier management, etc.), but also information related to environmental protection (whether green standards are respected according to EU directives, such as wastewater, which detergent is used in terms of degradability), to certain social issues and the relationship of the manufacturer of a particular brand of machine to the community. This context of complexity can be expected in the placement of an increasing number of products, services or a combination thereof. For this reason, all businesses and all other organizations of any type must change continuously because customer expectations are changing, so these processes will not bypass the organizations traditionally set as highly formalized and bureaucratic, where the client will be the most common parties to the dispute (if it is about the court), to ask the mentioned institutions to perform their work professionally and efficiently, without hesitating to criticize them or procedurally encourage them to increase their efficiency. This means that operational management as the basic vehicle of innovative efficiency will be an integral part not only of market-oriented organizations and business systems but also an integral part of every organization and every institution, be it public administration, healthcare or education.

In addition to the physical location and schedules related to real production and services in today's business environment, there is more and more talk about virtual organizations, virtual location and virtual schedules that are

becoming a reality. When it comes to virtual location and virtual scheduling, it is clear that aspects related to the performance of individuals and organizations in post-industrial society and fourth industrial revolution and digitalisation need to be considered. Today we should definitely talk about coworking spaces, cyberspace, working within the cloud system, working remotely and using the network in the design and implementation of various projects. In this sense, organizations develop knowledge repositories that ensure the authenticity of their activities and the construction of one of the components of intellectual capital in the context of structural components and resources, but also the construction of organizational culture based on knowledge and innovation. On the other hand, individuals in post-industrial society need to answer the question of how to manage memory, information, documents, research, projects and stocks of various digital resources on an individual level through the use of tools and media such as drop box, hard drives, external removable disks, and different web domains and the like in the context of availability, security, risk and consistency. The question is how and to what extent to robotize and automate processes with the support of cloud technology and how to manage location, schedules, resources and information in a post-industrial artificial intelligence society that ensures that robots learn from each other through networking and cloud technology. From which place to manage the company, where to locate the company, how to optimize schedules and terminate plants and machines and how to reach an increasingly demanding sophisticated client who knows more and sees better, so that he becomes very picky. On the other hand, the use of social networks Facebook, Twitter, LinkedIn and other digital Internet resources, such as interactive web portals, websites and podcast services, is becoming every day for every person in post-industrial society not only as a marketing channel and channel for receiving certain information, but also as a tool for learning, research and exchange of opinions, support the existence of the need to analyse the virtual location and closeness of the individual and the company according to certain parameters prescribed by digital marketing. However, we have to know that contemporary ages featured by fourth industrial revolution require combination of conventional and modern, for one simple reason that says that there will never be cloud digital shoes, but they will always be made of rubber, leather or some other tangible material with a built-in sensor that will measure meters, temperature and pressure, which nevertheless implies the establishment of a whole range of elements of the value chain in an optimal way. When it comes to services, ask yourself if you would ever allow a robot to cut your hair or for a robot to style your hair even if that possibility exist, not to mention certain types of services that are much more complex, subtle and sophisticated? All of the above indicates that operational management, its principles, and its goals related to process and schedule

optimization will be of strategic importance in every serious company in the coming period, because they can provide an impetus for disciplined creativity and innovation that means competitive advantage and profitable business.

The 4IR Impacts and Organisational Leadership

A modern organisation based on 4IR and digitalisation platform could be called as a virtual organization and it is some temporary partnership of independent companies and/or individuals (suppliers of certain goods and services, customers) that are connected by modern telecommunications systems, or modern platforms, in order to seize opportunities and profit in an extremely changing business context. A virtual organization would literally mean an apparent organization or a substitute for reality. Instead of covering all the activities that the business includes from raw materials to the final product, each company in the network of the virtual organization outsources all activities in which it is not the best, and retains only those in which some company is a leader. An important characteristic is its flexibility, adaptability and modularity, as well as the ability to react quickly to changes. A virtual organization is the complete opposite of a vertically integrated company (it outsources all activities except those in which it is a leader). Within a virtual organization, companies can share costs, skills, knowledge and access to specialized resources, access to regional and global markets, where each partner contributes in the area where it is best. In the case of a virtual organization, partnerships are less permanent, less formal and more based on specific business opportunities and technological opportunities.

The name virtual comes from the fact that there is no single central office (location) or some form of vertical connection of partners in a virtual organization. Communication link Virtual organization provides internet. Teams of experts, professionals, scientists or stakeholders can work simultaneously and together regardless of location. Virtual organization, thanks to information technology, becomes flexible, and connections less formal and stable (permanent) and has some features of strategic alliances. Virtual organization appears as a form of organization that is directly supported and enabled by information technology. Thus, different authors list different essential characteristics of virtual organizations, and some of them are that they exist in the so-called cyberspace, they develop in proportion to the development of information and communication technology, they pass the operationalization of business activities through conventional organizational structures, management aspects of virtual organizations transcend the boundaries of conventional organizational structures,

complementary resources of individual units of the virtual system are used, they are based on knowledge exchange and geographical dislocation and dispersion, business is based on understanding and trust between participants in order for business to take place without many written documents, key competencies are combined in order to achieve greater market influence, refusal to introduce additional centralized management because it entails the existence of unnecessary bureaucracy, organizational intelligence, which means that with the support of information technology through the process of automation, certain intellectual content is embedded in the overall intellectual capital of the organization.

The specifics of a virtual organization are reflected in increasing competitiveness, increasing flexibility and adaptability to the environment, increasing the quality of products and services, improving the quality of business communication, and reducing business costs. Regardless of these trends, real business operationally monitors the market opportunities brought about by the network and virtual connections, so that schedules of operational activities still need to be optimized and similar models can be logically fully or partially applied to new types of virtual organizations and network type. The following explains in more detail the different types of schedules that can ensure business optimization within a particular business context.

In the modern conditions of post-industrial society and fourth industrial revolution, the most important issue related to the success of managers is reflected in their leadership characteristics. Modern managers need to be able to strike a balance between their formal and actual authority, as well as a balance between rational and emotional intelligence, that is, between managerial and leadership characteristics. According to the traditional concept, leadership quality is associated with certain components such as intelligence, consistency, determination, responsiveness and vision, which is certainly a necessary condition for the success of leaders but not a sufficient condition for quality leadership in recent times. In modern working and business conditions, truly effective leaders are identified by a high level of emotional intelligence, which includes self-awareness, self-control, motivation, empathy and social skills or interpersonal skills of working with people. These characteristics may sound like soft determinants that are not appropriate to the business organizational aspect, but still a direct correlation can be established between a conceptually shaped management system based on emotional intelligence and measurable business results of each individual and organization as a whole. For this reason, looking at the cognitive characteristics of each person as an emotional receptor and reflector, it is clear that the interaction between managers and employees is a key

prerequisite for quality application of leadership systems in the organization in order to better business performances. Although the use of virtual and artificial intelligence seeks to integrate the emotional context into different types of human neuro systems and software systems through combination of robotic and human concepts such as bionic limbs, the intangible components of organizational functioning will remain exclusively human-related while any type of sophisticated technology and technological innovation will be used to establish better relationships between people, which means a specific interface or collaborative interface based on a combination of people and machines and its impact on interactions between people. It means that is acceptable to examine the interaction of leaders and employees in the context of the application of technological innovations based on 4IR and digitalisation as a specially determined and focused relationship between people based on the principles of leadership and emotional intelligence.

Additionally, it is very important to explain communication and interactions in the organization, starts with the elaboration of key elements of the communication process related to senders, message structure, message transfer channels, recipients of messages or information and feedback, and the field of common experience and noise or interference in the communication model. Communication in this case is viewed in the context of leadership styles taking into account all directions of communication both ascending and descending vertical communication as well as horizontal communication and communication of diagonal and circular type in sense of using new technology solutions based on fourth industrial revolution and digitalisation. When it comes to communication in general, it can be said that it is a process of transmitting information from one person to another through different channels and technologies, provided that the meanings sent and received match through the field of shared experience and eliminate semantic distortion. Any non-verbal communication exchange is a field of non-verbal communication that to some extent, not completely, is absent in communication related to the use of technological innovations, but which includes words and movements that carry a broader meaning than that which the words themselves have by definition. This means that the leader and employees in communication still need to take into account body language, eye and gaze speech, facial expression and all other non-verbal types of communication that can be important for managers and motivating for employees. Finally, in this case, communication will be considered any type of transmission of meaning by the sender to the recipient, taking into account various technologies and technological innovations with the aim of more effective communication in the organization. Of course, the interactions between managers and employees in the context of technological innovation

are influenced by other types of technologies in addition to technologies aimed at better communication, but the complete impact can be measured through the process of communication, decision making, goal setting, knowledge management and leadership in sense of impact of technological innovation on the relations and relationships between the leader and the followers. Technological innovations can be related not only to the communication process but also to the production process, but it can ultimately be reduced to programmed and structured communication between the project manager who determines the criteria and algorithms that employees adhere to, which ultimately again comes down to learning issues, communication, participation in decision-making and criteria for achieving the set goals of different types through a dynamic process of leadership, motivation and communication among human resources of different categories. Some of the advantages and disadvantages of fourth industrial revolution and digitalisation on leadership main parts in organisation and emotional intelligence components could be seen in Table 3.

Table 3: Impact of 4IR and digitalisation on leadership and emotional intelligence components

Leadership and EI components:	4IR and digitalisation impact on Leadership and EI components (advantages and disadvantages)
Power	Advantages: It facilitates access to employees and supervision and guidance through the concept of rewards and penalties, by giving clear instructions on what and when to do in order to improve the organization's business and improve customer satisfaction.
	Disadvantages: The line between working hours and free time of the employee is lost, which can lead to a situation where the manager controls a certain part and the private life of the employee and his free time, which can lead to a decrease in employee motivation.
Inspiration	Advantages: Leaders have the ability to ensure a higher degree of interaction with followers in a way that the content of communication is shaped and structured in a professional manner while building a higher degree of trust between leaders and followers.
	Disadvantages: The possibility of abuse of trust in a way that the trust-based relationship is publicly exposed and derogated by the leader or followers, which is why one should be very careful in communication and try to optimize the process without exaggerating the scope and content of communication through digital platforms.
Climate	Advantages: Better assumptions for the development of a climate based on critical thinking, creativity and participatory group attitude in the business decision-making process with the use of positive determinants related to behavioural and communication styles based on company heroes and rituals.
	Disadvantages: The possibility of isolating certain persons in the decision-making process through the absence of invitations to virtual meeting rooms and creating an atmosphere of mistrust, hatred between

	certain groups, which can lead to escalating destructive conflict and declining business performance of the organization.
Self-awareness	Advantages: Faster learning and acceptance of new mental models and better self-management through better writing and notes.
	Disadvantages: Alienation and loss of feeling how your decisions affect others given that communication involves not only the voice but also the facial expression, body language, gaze and the like.
Self-regulation	Advantages: Better self-management in terms of emotions and time through choosing the content that a person consumes on the one hand to using better quality time planning tools while avoiding stressful situations that can cause emotional instability and quarrels with colleagues.
	Disadvantages: Situations that impose the exclusive use of virtual space create additional pressure on managers and employees because in the case of speaking, anyone may be left with a digital record that affects people's feelings and behaviour in the long run and does not provide full leadership capacity.
Motivation	Advantages: Better and more accurate self-tracking and measurement of employee results in real-time format with more precise definition of motivational techniques and content aimed at employees in the context of material components of motivation such as the variable part of salary and different types of bonuses and incentives.
	Disadvantages: The problem are higher standards for self-motivation and it is not always easy to determine the capacity of members of the organization in terms of their competencies for participation in the business decision-making process and the difficulty of creating a universally accepted work climate that serves as intangible vehicles to motivate employees.
Empathy	Advantages: Better understanding of oneself even in a situation with additional limitations related to movement and communication with other people with better and more sensitive treatment of other people based on experience and wisdom.
	Disadvantages: The absence of real situations that puts the manager in a situation where he fully understands the emotional state and the situation of other people in order to manage with a higher degree of empathy by generating respect from team members.
Social skills	Advantages: Faster and easier establishment of social relations through various applications for communication in the virtual space through the creation of groups for communication and the realization of meetings from anywhere and at any time.
	Disadvantages: Lack of complete development of social relations because communication is achieved not only by voice, text and words, and even if we can see each other, there is no sense of intimacy and contact with touch which are a very important segment of full communication and creating social networks based on trust.

It is about technological innovations, innovations and types of innovations in general and their impact on key issues in the business of organizations. Key types of technological and organizational innovations and areas of their use in

the organization in the context of relationships with people, relationships with customers, and relationships with other types of stakeholders are the subject of this chapter. This section will present modern concepts related to innovation and the use of artificial intelligence and its application in the organization in the context of better management, communication, cost reduction, greater satisfaction of employees, customers and other stakeholders in the context of triple threshold and criteria for successful business in the context of social acceptability, environmental acceptability and business sustainability of a particular organization or business. This section will also address the social and ethical aspects in the application of new technologies in the context of privacy protection, elimination of stressful situations, and the issue of improving overall relations between people in modern working conditions. New systems of organization and modern technology will be an additional segment that will be addressed in this chapter through the principles of agile project management and project organization process-oriented to deliver value to customers. Given the relevance and dynamics of changes occurring in this segment, this part of the paper will describe the contours of possible future trends in the use of modern technologies and their impact on the development of organizational, business and social systems in general.

The 4IR Impact on Work-places

How to behave at the time of profiling an employee or client where through artificial intelligence algorithms various information related to a person's profile can be derived. On the one hand, companies that recruit employees can generate a lot of information about potential candidates through social networks and databases, electronic CVs, work on previous projects information, work with certain institutions and positions, which certainly says a lot about potential employee's profiles before testing and interview them. These processes can facilitate the first stages of the recruitment process but also the second stages because the preliminary interview can be done through a virtual platform, and even some testing through interactive tests of intelligence, memorization testing, analytical skills testing and individual psychomotor skills of a potential candidate. These processes are already in place and greatly facilitate recruitment procedures and give potential candidates a chance to be proactive and offer their services in the labour market. Systematic comparison of work-places features through four industrial revolution could be shown with the content of the next table (Table 4.).

Table 4: Comparison of Work-places within Four Industrial Revolutions

Work-places elements	1IR	2IR	3IR	4IR
Worker	Low skilled	Blue collar	White collar	Knowledge workers
Technical system	Conveyor belt	Production layout	Chip	Nanotechnology
Assignment	Precise	Crafting	Expertise	Creativity
Specialization	Total	High	Middle	Low
Standardisation	High	Middle	Low	Situational
Education	Law level	Secondary level	Diploma level	Post diploma level
Environment	Stable	Dynamic	Complex	Hypercomplex
Job	A few activities	Tools based	Multitasking	Multicompetences
Recruitment	Informal	Formal	Complex	Combine
Selection	Informal	Formal	Complex	Combine
Contracting	Informal	Formal	Complex	Psychological contract

The new work-places will be characterised with some features that include specific situational intelligence of the knowledge workers, high level of creativity in performing job activities, high level of formal and informal education, different competences and additional specification connected to the new organisational context. Imagine, on the other hand, a situation in which a person enters a shopping centre and during entering is scanned by a digital camera that automatically sends data to a central system that pairs the customer's face with the database and through face recognition software identifies and connects person to other data in terms of its habits about shopping, a person's height and body shape, and as a person climbs the stairs on the interactive display, display addresses her in a personalized way android system with a suggestion which boutique to visit and suggests what to buy by offering her options with pictures of her clothes stands. The essence is the increasing interactivity of artificial intelligence through hardware and software platforms it works with real people, employees and customers in a way that makes people's lives easier and saves time. The problem is how to balance all these benefits with the protection of privacy and possible misuse of technology and artificial intelligence in order to unnecessarily monitor and control people, restrict their freedoms, discriminate, unjustifiably detain and expel. The fourth industrial revolution should aim to democratize the current existence of civilization and of course the lives of people in the future by creating new standards for managing people and running businesses based exclusively on innovative operational

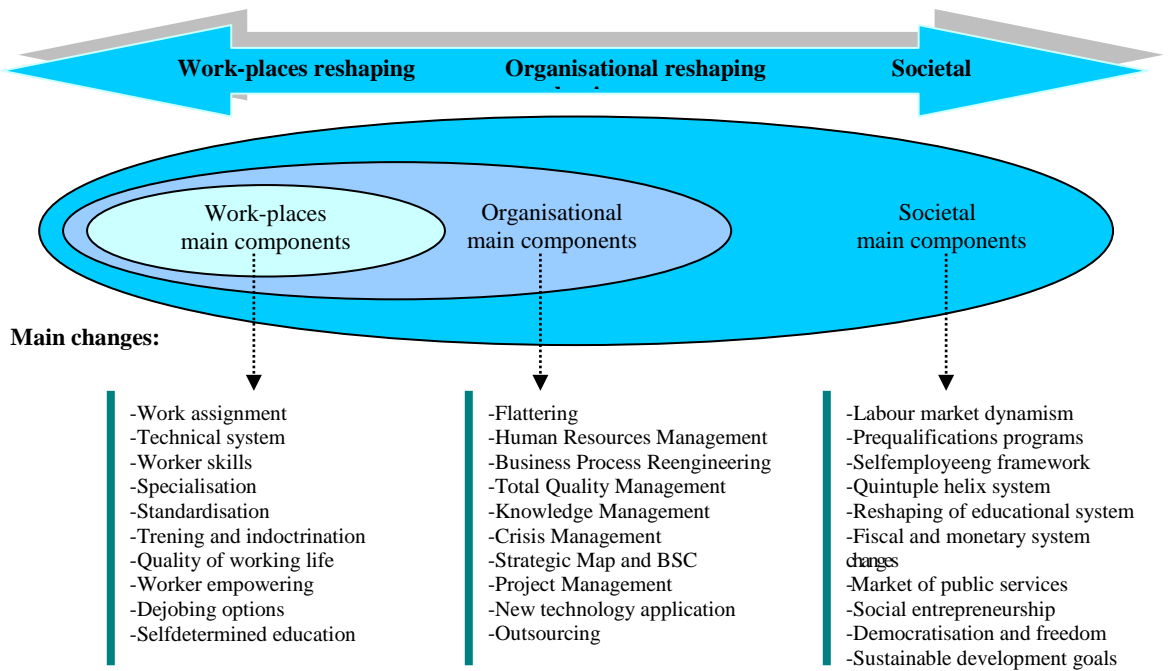
universalism and strict codes of ethics and human rights, while protecting the environment and reducing poverty, by no means through exposing negative phenomena for which it can serve, including child abuse.

The 4IR and Conceptual Framework of the Future

If we look at the key determinants of organizations in operational terms, 4IR provides a platform for better decision-making related to optimizing the capacity/volume of the organizations and make easier to define dynamics of its operations. Furthermore, it contributes to better understanding the nature of the business environment, quickly adapting to new challenges through their anticipation, and creates a better base for organisational and individual visibility with the constant enrichment of products and services with new components of value through the use of options related to the internet of things.¹² When observing activities focused on processes and activities of building added value in the organization through the use of the achievements of the 4IR revolution, it is possible to ensure transformation processes with fewer bottlenecks and dissipation, higher level of dynamics and optimization of storage processes, whether physical goods or digital data through the use of linear programming in the decision-making process for optimization of logistics and transport and better control and creation of better preconditions for the development and application of various innovations. It should be understood that digitization alone does not mean much if the use of optimization methods of these processes through the use of modern business decision-making techniques based on mathematical methods and operational research in management that include iterative optimization procedures, cost-effectiveness matrices, linear programming, Euclidean lessons in optimization processes and modern methods of project management. It means that digitalisation could not be a strategy for all organisations, but it could be very good tool for strategic goals implementation in an effective way through using 4IR contribution and digitalisation. The conceptual framework of future impact of 4IR on individuals, organisations and society could be explain using next figure (Figure 2.).

¹² Slack, N., Chambers, S., Johnston, R. (2010), Operations Management, Fifth Edition, Financial Time/Prentice Hall, pg. 17.

Figure 2: 4IR and conceptual framework of the future



Furthermore, all these components with the proper use of 4IR contributions can be better achieved by strengthening the credibility of management through the postulates of the learning organization, easier communication and control, cost optimization, clearer understanding of general trends through causal analysis and decision-making platform, rapid adoption of new competencies and obtain a higher level of commitment, but taking into account that human is the instance that controls the devices and not the opposite even if you live within smart flat where interactive virtual system recognize human mood and autonomously redefining apartment environment in sense of changing music, illumination intensity or television programs. Opposite process and wrong using can lead to counterproductive effects of 4IR through disruption of human capacity causing permanent stressful situations that can endanger mental and physiological health of people. The framework concept of 4IR's impact on the modern social system can be observed through the optics of its impact on the individual who must be in a position to constantly push its boundaries in terms of competencies through lifelong learning responding to the challenges of new jobs, responsibilities, a systematic approach to doing the job, and continuously finding better concepts for doing the job. The second segment of influence can be observed through different types of organizations that have to go through a constant

process of business reengineering, restructuring, organizational structures flattening, process orientation, understanding of hierarchical management systems and other changes that strengthen the predisposition for survival, growth and development of the organization.¹³ The third segment of the impact is the impact of 4IR on social systems, understanding the existence of certain spill over effects in the global context, which means respecting international standards, democratization of systems, optimization of public policies and multiperspectivity of various social phenomena respecting triple bottom line base for goals setting. Some possible benefits could be recognised in this new environmental system in all industries and areas of societal and business activities that could be seen in next table (Table 5).

Table 5: Industrial strategic goals and benefits in context of 4IR

Industry	Strategy	Processes and operations	Benefits
Banking	Digital products	Money transfer and payment	Electronic payment
Education	Digital contents and interactive materials production	Online classroom application	Better teaching and learning processes
Health care	Digital diagnostic and archive	Remote consultancy	Availability of remedies
State	Smart e-government	Archives and data base	Elimination of evasion
Sport	Surveillance and security system	Video Assistant Referee	More correct decisions
Traffic	Satellites	Antennas and connection	Long flight comfortability
Pharmacy	Simulations	Statistics	Less contraindications
Army	Satellites	Drones	Peace and stability
Hospitality	Delivery on the door	Ordering application	Client satisfaction
Police	Layout strategy	Layout application	Crime prevention
Agriculture	Resources optimization	Digital farms and gardens	Zero hunger

Based on the table above, the impact of 4IR and digitalization on different industries and sectors of the economy and society in general can be seen, with an indication of key contributions and benefits for different categories of

¹³ M Šestić, E Čizmić, MB Ćar, D Hodžić (2020), Techno-Entrepreneurship: Interdisciplinary Curricula Challenges for 4IR in Bosnia and Herzegovina, International Conference "New Technologies, DOI: 10.1007/978-3-030-46817-0_101, pg. 103.

clients or citizens in general. Regardless of the stated benefits, it is always necessary to think about the negative phenomena brought by 4IR and digitalization in a way to use practices and techniques that minimize the negative effects and consequences and appeals to people and organizations to use them exclusively for positive and legitimate purposes.

Conclusion

At a time when the most technologically advanced countries are testing the way the artificial sun or ion fusion works, Bosnia and Herzegovina should use social phenomena and social innovations that can move society forward. These aspects are important for both business and technology because only through orderly and stable social systems can quality results in education, business, and technology transfer be rejected in a systematic way, otherwise these results will be only on the verge of chance and individual enthusiasm. Furthermore, individual enthusiasm must also exist in a system that is stable in order to move things forward and think outside the black box and established standards but in stable societies individual enthusiasm is managed through the principles of talent management.

Bosnia and Herzegovina as a society needs to adopt to promote and implement a clearly defined framework that will take into account both macro and micro activities and effects related to exploiting the content of the fourth technological revolution on the development of society, economy and business in a national economy. The development of this framework and its implementation is important for several reasons, including the capacity of society, economy and business to join international associations as credible members and to ensure competent participation of Bosnia and Herzegovina, its companies and citizens in the international distribution of labor, knowledge and resources and effects, through a qualitatively different way of participating in value creation within local and global value chains.

This means that Bosnia and Herzegovina as a society should develop the capacity and standard for the introduction of new standards of work and development, faster technology transfer, and establishing better connections with high-tech companies that already exist and operate in Bosnia and Herzegovina by providing them with better quality working and development conditions. This means that Bosnia and Herzegovina must operate on the principles of the quadruple helix model within all administrative levels up to the level of local self-government units. This will provide a stronger incentive to exploit the potential of the fourth technological revolution, which

can through the combination of knowledge and energy of local people with quality transfer and development of new technologies and imitative business systems from demographically small countries make economically large countries interesting for investment and further development.

At a time of acceleration of technological solutions and the possibility of accepting knowledge in a faster way through a regulated system can ensure that Bosnia and Herzegovina becomes an interesting area for high-tech companies that can employ young people in Bosnia and Herzegovina and attract innovative and creative technological individual nomads to realize their jobs around the world from Bosnia and Herzegovina. In this sense, it is necessary to perform certain analyzes, establish certain cause-and-effect relations, and make and promote certain decisions and legal solutions that will trigger a revolution in investing in Bosnia and Herzegovina, which must break the trap of self-pity and submissive mentality to move forward. Finally, a change in the mental structure of people who must begin to value themselves, to value the people around them, to value their cultural heritage, to value their traditions, to value their indigenous products and specific way of working, improving them every day, can lead to changes micro as well as at the macro level.

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