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WESTERN AND EASTERN APPROACHES TO LEADERSHIP

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Introduction

Although the research in the field of leadership has a long history in literature, scientific research in this area was only begun in the 20th century. Leadership involves establishing a clear vision, sharing that vision with others so that they will follow willingly, providing the information, knowledge and methods to realize that vision (Wangmo and Samul, 2019). Leadership plays a crucial role in organizational success (Kumar and Kaptan, 2007; Mastrangelo, Eddy and Lorenzet, 2014), leads to sustaining profitability, productivity, and a competitive advantage (Lussier and Achua, 2007) and influences team effectiveness and organizational performance (Samul, 2016; Wipulanusat, Panuwatwanich and Stewart, 2017) by stimulating employees' behaviour (Szczepańska-Woszczyna and Kurowska-Pysz, 2016).

Multiple literature discloses the leadership styles, traits, philosophical approaches and perspectives in different parts of the world, but still there are some gaps between western and eastern philosophical approaches to leadership (Allio, 2013; Witt and Redding, 2012). Thus, it is important to determine the similarities and differences between Western and Eastern approaches to leadership and the grounds of these approaches.

Literature review

The authors were motivated to conduct this particular study since there is a common view that a gap exists between Eastern and Western philosophy and a Western bias still is that Western theories are better than others, and that the East can learn from the West. The study revealed that there are some differences in the organizational structures of the leadership. For instance, 'Western organizations normally have flatter structures, which indicates a less prescriptive mode of leader-

ship. Leaders are generally of the mindset where they tell employees the end goal, and trust them to find the right way to get there' (Simmonds, 2016). On the other hand, Asians are more inclined to be directive, which provides fewer opportunities for employees to find their own ways.

The study highlighted that the modern approaches to leadership have their origins in the West. Western approach to leadership differs to some degree across European cultures according to some literature reviews. According to Kotter (1988) the leaders in the West have a visible role, meaning leading from the front, that indicates the intention of performing everything for the employees benefit. The Western leaders' job is stimulating the organizations' desirable attitudes, values and beliefs and building trust, openness, and acceptance as well as take care about productivity, efficiency and quality as the requirement of supervision and control. A leader should display ethical behavior (Caldwell and Canuto-Carranco, 2010) and integrity (Odrakiewicz, 2010). Integrity, honesty and sincerity are important features of leadership that provide the authenticity of a leader (Moczydłowska, 2015).

On the other hand, eastern philosophy of leadership theory is quite new for a research topic which emerged around thirty years ago (Wu, 2009; Yang, 2009). Current studies, however, suggests that Eastern business practices continue to follow traditional Asian approaches that are firmly entrenched in traditional Chinese leadership. Within this philosophical framework, leadership has focused on being humanistic and improving followers through personal development (Chen and Lee, 2008; Wang, 2006). Collectivist culture and power distance orientation are two of the most prominent contextual factors of leadership in Asia (Park and Koo, 2018).

Research methods

The current study was purely conducted based on the most relevant literature reviews. Hence, it was evident enough that the study was appropriate and this approach resulted in solving the research issues respectively.

Research results

In general, Western philosophy is derived from the Greek school of thoughts. To the contrary, Eastern philosophy is based mainly in Asian and Chinese philosophy from Confucianism, Mahayana Buddhism, and Taoism. Thus, European and Asian philosophy have generated very different assumptions about society, busi-

ness and government. The results of differences of both philosophy are displayed in table form based on different issues (Tables 1and 2).

Table 1. Comparison eastern and western philosophy

Issues	Eastern philosophy	Western philosophy
Main Principles	– cosmological unity; – life is a journey towards eternal realities that are beyond the realities that surround us; – circular view of the universe, based on the perception of eternal recurrence	– life is a service (to God, money, business, etc.); – linear view of universe and life, based on the Christian philosophy where everything has its beginning and end
Relationship with religion	– integration	– oppositon
Values and Beliefs	– the true key is inside; – the inner world of a human being and his or her ability to control and develop it is of the highest value	– the main values are success and achievement; – the majority of success and achievement criteria have an external nature (money, faith, popularity, etc.)
Individualism/ Collectivism	– a human being is an integral part of the universe and society; – people are fundamentally connected	– a human being has an individualistic nature and is an independent part of the universe and the society
Goals and key to success	– spiritual; – "Virtuous life and adherence to performing your duties." (Confucianism)	– materialistic; – the secret of success in life, and subsequently of making money, is to enjoy your work
Living Principles	– virtue; – be satisfied with whatever you have, and enjoy the same	– ethic; – refrain from doing ill; for one all powerful reason, lest our children should copy our misdeeds
Leadership	– spiritual; – walking behind people; – silence is golden	– hands-on; – walking ahead of people; – speech is golden

Source: based on (*East vs. West…*, 2018).

Table 2. Western and eastern appproaches to leadership

Western approache	Eastern approache
– flexible leadership styles; – high levels of trust and openness; – a willingness to confront personal conflict; – acceptance the difference of opinion; – high tolerance of ambiguity and uncertainty; – relative equality of power and status between leaders and followers; – strong beliefs in teamworking; – playing central role in building organizational culture implies the necessity to cultivate employee commitment, involvement and morale	– to establish direction to the company and then; – the most important is to manage people and organization as a whole; – one should also know that to be a leader is to learn and improve one's own abilities to overcome the challenges; – Thus, Asian cultures leaders encourage personal and professional collaboration, with people learning to work and support each other both at work and outside to accomplish targeted goal as a whole

Source: author's compilation.

Conclusions

Based upon intensive literature analysis, the study concluded that there is no one answer which approach is better for organizational success, professional life and societal life. It depends on culture, traditions, habits, values of both subordinates and leaders, it depends on environmental conditions.

In one case Western style can be useful, and in the other Asian style. Chinese leadership seems to be an art and emphasizes interdependent, humanistic and situational aspects, while Western leadership focuses on organizational objective results and impersonal processes supported by logic and analysis.

Thus, the most significance issue is that one can learn from another. Leaders from the West should look for opportunities to follow their Eastern counterparts in increasing employees' discipline, responsibility and ownership and not only focus on "getting things done" and leaders from the East should try to be more open in relationships and notice the individuality of employees.

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STARTUP MANAGEMENT AS A DAILY DESTINATION FOR ENTREPRENEURS

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Introduction

Nowadays, it is not difficult to imagine a real emergence of entrepreneurial spirit around the business world. Startup activities are committed more than ever before. More and more people are searching for ideas and willing to start their own unique and independent businesses rather than working to satisfy someone's desires and needs. The number of projects created from scratch is growing rapidly every day. A huge number of companies have the same intentions to invest in worthy startup projects provided they are backed with a competent business plan. Companies are declaring their support for innovative projects and are ready to invest in interesting startups. The aim of this work is to show Startup Management as a daily destination or target for entrepreneurs. The research question of the paper is connected with managing startups. The Paper tries to answer the following questions: What is Important in managing, growing, controlling, coordinating and scaling the startups? What are the essential components of a successful startup project? Is startup management seen as a daily destination for entrepreneurs? The paper is structured to make the focus on management, strategy, marketing and organizational topics. The main purpose is the fact that the paper emphasizes the importance of Startup Management as an approach for the successful development of startups.

Literature review

An interesting fact is that the term Startup appeared recently. Przem (2016) in his work *What is Startup* says that origin of the term "startup" has a close relation with what is called "the dot-com bubble". The dot-com bubble was the speculative and attractive bubble that appeared during the late 90s and the beginning of 2000s. The reason for this situation is the fact that the period was famous for investments in a large number of new Internet-based organizations, often referred to as "dot-coms", resulting in the subsequent – and fast rise of their stock exchange value. During that time a lot of now-successful startups were started and worked. New enterprising companies took risks and developed.

During this period the term "startup" became so widespread that it has gained its current meaning. According to the Oxford Dictionaries the idea of a "startup" is the company which was established recently or is in the process of becoming. Usually company has a limited amount of resources, including temporary ones, due to the youth of the company.

Thirdly, Ries (2011) says that startup is "new": new product, new company, new vision of business, while Graham (2014) believes that startups should be "open to the world".

According to Fisher (2008) startups have to "shoot" in order to be called successful. The development of the project is possible if customers will value the output of startups. Mostly startup projects are based on improving people's condition of life or solving problems. Success, promotion and profitability of a startup, requires a clear execution at the highest level, promotion through marketing communications and certain financial investments.

Research methods

The chapter indicates and describes the research methods applied to solve the research problem.

The online research method was used in this paper. This entailed using the internet and mobile tools to collect research data. The writer visited the library to read books, articles, and other information from the internet regarding the essential composition of startup projects and management skills to deal with them.

Research results

As a result, the author has determined seven vital components for managing a successful startup project. Following the startup coordinating actions through the prism of the seven main functions results with a success of startups.

It is very important for any entrepreneur of the business project to have a business plan. The model is needed in order to identify aims, prioritize the tasks, choose strategy and achieve goals. Every business plan should include an executive summary, market assessment, description of product or service details, sales and marketing details, competitive analysis, operations or manufacturing details, corporate organization and human resources, finance, capital and projections, summary of risks, investment and relevant sources of information and research. Entrepreneurs should create complete and clear business plans.

Also, it is important to make a model which is comprehensive and addresses all the important angles of your business. In addition, entrepreneurs should give attention to conducting market research and evaluating the market. It is essential to know what the market needs are and how these needs might be satisfied today. Which products and services are needed? What are the prices for the products and services today? What are the influences on prices? Who are the main actors in the market? In startup management, knowing the situation and conditions of the market are vital for development of the project.

Creating the budget takes place while building the business model of the company and conducting the market research. The budget helps the founders to calculate the profit potential of the startup and take the decision to start the business.

Another important part of any startup project are customers. Only an exciting business plan and market evaluation can attract new business. Marketing research can be the appropriate way to find appropriate market segments. Whereas operating companies have many possibilities on how to reach new customers and get feedback, a startup's resources are somewhat limited. In most cases, the best way to contact possible customers is prototyping. The goal is to show startup potential not only to future customers but also to future investors or partners, but with minimal possible cost in mind. Startups must be able to offer customers something truly needed.

The team plays an essential role in managing the startup project. Surround the startup with the right people by selecting team members. The team will include partners, employees, advisors. Results are usually achieved through members of the team. How good the team is and how the team is led and manages are key points to the success of the new business. It is necessary to focus on people with

different experience and focus. Each startup project should consist of several types of characters in order to find extraordinary solutions.

While executing any project, time influences different parts of the startup. Whatever is being developed or invented, appropriate timing has to be considered, meaning the right time when the standards and market ecosystem is ready enough for the product. In other words: „The timing of when the market needs a solution and the development time of the solution must generally align".

The legal issues of the startup business should not be forgotten as it is also important to protect the business name, follow local regulations, conclude appropriate shareholder agreement and to patent and copyright. It is also includes selecting a lawyer, an accountant and a business consultant to help the entrepreneur with running the startup business.

Conclusions

In conclusion, it is very important for any entrepreneur of the business project to have a business plan. The model is needed in order to identify aims, prioritize the tasks, choose strategy and achieve goals. In addition, entrepreneurs should be aware of doing market research and evaluating the market. It is essential to know what are the market needs and how these needs are might be satisfied today. Creating the budget is also one of the vital parts of the good startup project. The budget helps the founders to calculate the profit potential of the startup and take the decision to start the business. Another important part of any startup project is customers. As well, the team plays an essential role in managing the startup project and finally, time influences different parts of startup. Whatever is being developed or invented, appropriate timing has to be considered, meaning that the right time when the standards and market ecosystem is ready for the product. It is also important to be proficient in Startup management as it is one of the essential parts to succeed in a newly arising project. It must be the managers' daily destination for every day.

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CITY LOGISTICS

THE CONCEPT OF SMART MOBILITY IN BIALYSTOK

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Introduction

In the age of modern technologies, digital solutions affect almost every field of life. Implementation of new technologies is a very important aspect in cities nowadays. Cities are still developing and investing in intelligent solutions. Today's cities trend to obtain smart city status with high-speed communication, based on information and communication technologies, innovation, creativity of residents and the effective management of city.

Literature review

The smart city idea is an approach to city management in an ecological, modern, economical but effective manner. Smart cities are innovative areas supported by digital solutions. They are sustainable, digital or connected cities providing high a quality of life through use of intelligent transport systems (ITS), green buildings and industrial control systems (ICS) (Szmelter, 2017).

Essential elements of these cities are information sharing systems and use of new generation vehicles to improve mobility of inhabitants and guests with the use of the Internet of Things, increasingly referred to as smart mobility. The need for smart mobility resulted from increased traffic and related side effects, including pollution, deaths and wasted time (Vinod Kumar, 2017).

There is no doubt that Bialystok is becoming an intelligent city. The city belongs to a group of several Polish cities, which have been recognized in the ranking of European Smart Cities 2014, prepared by the Vienna University of Technology and recognized as smart (*Smart Cities*…).

The smart city concept is based on smart mobility and five different characteristic dimensions (Meijer and Bolivar, 2015):

- smart economy,
- smart people,
- smart living,
- smart governance,
- smart environment.

The Smart economy is based on the knowledge and creativity of people, where technological solutions and innovations are the most important force of the city. It is characterized by the skillful use of capital by people and the ability to transform ideas into valuable products, processes and services. It also focuses on creating a "green" economy that aims to reduce air pollution and promote renewable energy sources (Cambell, 2012).

Most important in the smart people dimension is the learning society, which initiates changes towards reducing excessive energy consumption, minimizing environmental pollution and generally improving the quality of life of people in the city using the appropriate technical and technological support. It's human capital, citizens' education, creativity and participation in public life are the basis for creating other areas of smart city initiatives. It is also the residents who learn their whole life, educate and then undertake activities related to technological changes and introduce innovations (Stawasz and Sikora-Fernandez, 2015).

Smart living allows residents of city to use public services of a sufficiently high level of quality, with a developed technical and social infrastructure and a varied cultural and leisure offer. Residents have access to education, health care, green areas, healthy environment. In addition, they are safe and can feel safe in their city (Szelągowska, 2017).

The purpose of smart governance is the principle of open government, free and comprehensive access to public information, and striving for order and compromise between available technological solutions, environmental requirements and social pressure on development and improving the quality of life (Noworól, 2012).

The smart environmental dimension consists of all activities related to the protection of the natural environment, its constant monitoring and controlling the state of pollution. The aspects of functioning of the energy economy with distinction of renewable energy sources are important factors. The intelligent environment uses modern solutions in building, effective street lighting control systems and waste management (Stawasz and Sikorska-Fernandez, 2016).

Research methods

The first method used in the work is the oldest working method of scientific work as well as indirect observation method were also used. The authors used it to identify problems related to smart mobility in Bialystok. In addition, a popular heuristic technique was used – SWOT (Analysis of a smart parking in Bialystok).

Then we used the method of literature analysis and document research, which consists in the collection, selection, description and scientific interpretation of the data contained in ITS, Smart City and Smart Mobility. The knowledge gained while writing the engineering work of the authors turned out to be valuable and supported the proposal of smart solutions for Smart Mobility in Bialystok.

Research results

The following problems have been observed regarding:

- very high frequency of using parking lots in the center of Bialystok by residents;
- average condition of infrastructure of city car parks in Bialystok;
- a long searching time devoted by locals to find a free parking space in the center;
- large operating costs of using own cars;
- traffic jams and congestions.

In order to solve problems, we suggest the following solutions: smart parking, Smart bus stop, Smart car-sharing.

The smart parking solutions and innovations of the future are going to define how major cities around the world develop from sensor-based technologies to new generation intelligent town planning. The IoT (Internet of Things) is facilitating this Smart City (*Park IT Solutions*…). A Smart parking system uses wireless sensor-based technology, which could connect more than 10000 devices that are currently installed worldwide. This revolution in parking includes the provision of real-time parking data to citizens, as well as the instant regulation of parking areas.

Table 1. SWOT analysis of a smart parking in Bialystok

Strengths	**Weaknesses**
– a great convenience for the city's residents; – access for a large number of residents – fuel saving for drivers; – quick finding of a suitable parking space	– a complicated, pluggable and technologically complex process; – necessary internet access; – cost-intensive; – the application requires continuous technological support, needed for continuous and smooth operation
Opportunities	**Threats**
– improvement of city traffic thanks to the reduced time of searching for a free parking space by drivers in the center; – reduction of congestion during peak hours in the center of Bialystok; – improving the quality of the technical condition of the parking infrastructure; – reducing congestion on roads in the center; – lower combustion of carbon dioxide into the atmosphere, preservation of a cleaner natural environment; – the ability to collect data on parking lots and to keep statistics that would allow city authorities to gain valuable access to information on the frequency of parking in specific parking lots; – carrying out an effective and conscious policy of parking lots use; – changing the attitudes of people, overcoming barriers, changing the current way of imagining technologies of people who do not use mobile devices; – prestige for Bialystok on the national arena as a modern city	– modernization of smart car parks would require a lot of time and would cause difficulties in urban traffic; – parking in the center would be limited during modernization; – people who do not use mobile technology would be excluded from the recipients of the application

Smart bus stops include advanced machine learning and sensors that detect environmental conditions and suburban traffic to adapt modes and provide intelligent cooling. The sensors at the bus stop detect the working conditions on the ground for example – temperature, humidity, traffic; and dynamically adjust the modes in

which the air should be cooled. During a period of relative silence, the system switches off to standby mode. Sensors are also used to track data to analyse the average waiting time of people commuting to work at a bus stop, flow of commuters and the number of people at a bus stop at any time. The bus stop has a camera with a built-in vision system and advanced analytics that allows you to detect suspicious activities such as wandering and unattended bags. Today, the data is hosted by ST Engineering for testing purposes (*Opengovasia*…).

The Polish car-sharing market consists of 8 companies - Kraków's Traficar, Panek Car-sharing operating in Warsaw, 4Mobility, GoGet, Omni car, Car-2go, Zipcar and Drive. People using car-sharing services are mainly people who own either their own cars or share vehicles with other family members. Curiosity and entertainment are the original motives for using this type of service (Tkaczyk and Awdziej, 2017). Most of the existing Carsharing business models are mainly based on gasoline and diesel vehicles, but in recent years there has been a significant increase in the number of hybrid electric vehicles (HEV) and the revival of electric vehicles (EVs).

Carsharing offers a middle option between having no vehicle and owning a private vehicle. It is shown in Table 2. It allows consumers to use a combination of modes rather than relying entirely on automobile travel (Litman, 2015).

Table 2. Carsharing is a Middle Option

No vehicle	Carsharing	Private vehicle
– rely primarily on non-automotive modes (walking, cycling, and public transit); – minimal social costs; – mobility disadvantaged in most communities	– rely on a combination of walking, cycling, ridesharing, public transit and driving; – moderate social costs; – moderate mobility, maximum mobility choices	– rely primarily on driving; – maximum external costs; – maximum mobility

Source: author's elaboration based on (Litman, 2015).

Car sharing makes it easier to go car-light or car-free, since they really need to. More than 1 in 5 people to buy car, more than 3 in 10 avoid buying a car altogether. One shared vehicle replaces up to 20 personally owned vehicles.

Conclusions

The Smart city is a wide concept and it refers to both technological and humanistic, natural and social areas. More and more cities, not only in Europe, but also in the world, implement the smart city concept. This idea is a solution to many problems faced by the city. Development in line with the smart city model is becoming more and more popular and effective, as it helps to eliminate many barriers and limitations that affect cities. Smart mobility is one of the most important dimensions of the smart city.

In Bialystok, in recent years, intelligent transport systems have been dynamically introduced and many solutions related to urban transport have been implemented. Synchronization of lights controlling urban traffic was used, i.e. the "green wave". Advanced passenger information systems have also been introduced in Bialystok.

Despite many modern solutions introduced in Bialystok, there are still problems with congestion, traffic jams and length-of-time intended for finding free parking spaces in the center of Bialystok by the residents of the city. We should think about other modern solutions that would solve the problems presented. Smart parking lots, smart bus stops and car sharing would help the city improve these existing inconveniences.

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AN INNOVATIVE DESIGN OF A NEW MEANS OF PUBLIC TRANSPORT

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Introduction

In the era of modern technologies, cities are constatly developing and investing in modern solutions. The introduction of the proposed measure can bring real benefits in the movement of people in the urban environment. This issue is important because proper traffic management in the city affects the time and comfort of travel. The introduction of a modern solution in public transport is to encourage people to use it instead of private cars, which will help relieve the city.

Literature review

Unambiguous definition of the term urban logistics is extremely complicated, due to the openness of the city as a system, the lack of opportunity to show its unambiguous boundaries and the impact of processes on particular areas, as well as a number of logistic concepts possible to implement (Rześny-Cieplińska, 2018).

Taking as a starting point a popular definition prepared by Council Logistics Management (CLM), urban logistics can be defined as the process of planning, implementing and controlling flows (Ballou, 2004):

- started outside and targeted to the city,
- started in the city and directed to the outside,
- getting through the city,
- and internal in the city.

City logistics is a key instrument for effective management of the modern city, as well as an element of efficient and reliable functioning of its technical infrastructure and transport system (Rzeczyński, 2004).

The transport subsystem is an element of the city's logistics system, which is extremely important for its efficient functioning. Access to services such as education, health and commerce requires traveling from home to the destination (Nowotyńska, 2017). Using the transport system, it is possible to move people, material goods and information by the appropriate means (Krawczyk, 2001).

Communication solutions used in the city are the result of the organization and preferences of clients. User preferences change with the development of road transport, causing communication problems such as congestion (Tundys, 2008) Urban transport operates not only within the city, but also includes suburban areas. It is designed to meet the needs of the city in terms of urban and suburban transports of residents (Starowicz, 2001).

Reseach methods

The method used in the work is a diagnostic survey method. A survey technique was used, for which the tool was developed in the form of a short research form. The study was conducted on a group of 200 residents of Bialystok, of which 62% were women, the rest were men. The age of the respondents was varied. The results obtained during the study were presented using a descriptive and graphical method.

Research results

City transport in Bialystok is used by people of different ages, with different degrees of fitness and a varied social and professional status. The most numerous group of travelers are definitely students, according to their daily preferences. Not all people from these groups have the opportunity to easily access public transport. Therefore, the city should eliminate barriers to access public transport, modernize infrastructure and provide new innovative means of transport to facilitate free movement around the city (Rzeczyńska-Buława, 2017).

A survey among public transport users was aimed at obtaining an opinion on an innovative transport solution that could be implemented in the city. The question concerned the mode of transport, which according to the respondents would be best supported by the currently functioning public transport in Bialystok. 51% of the respondents indicated an electric vehicle, 33% a tram, only 11% chose a trol-

leybus, 5% of respondents decided on another mode of transport such as a high speed city train or a subway (Figure 1).

Figure 1. Choosing an alternative means of public transport in Bialystok
Source: author's elaboration.

The solution, indicated by half of the respondents, will allow urban transport users a greater freedom of transport and will positively influence the development of public transport as well as the entire city. Electric cars and chargers are an element that builds an intelligent energy system in the city. Electromobility is also gaining importance in the context of combating the problem of smog. Costs that are socially related to smog grow every year. That is why electric transport is gaining popularity.

The prospect of introducing an electric vehicle for public transport in Bialystok is very attractive. The electric vehicle will allow for more efficient communication, without delay and unnecessary crush. The user of this vehicle can be any person who is 14 years old and has a driving license category AM.

Toyota i-Road is a small, three-wheeled vehicle that combines the advantages of a motorcycle and a car. The vehicle has a small footprint and allows you to park in various places inaccessible to the car. It is safer than a scooter and above all weather-resistant. It is a kind of Uber's zero-emission connection with the rental of city bikes. The car has three wheels and two seats for passengers. These are the basic features of a small, typically urban Toyota vehicle that has been implemented so far in traffic in Tokyo and in Grenoble, France. Toyota i-Road measures 2345 mm in length, 870 mm in width and 1455 mm in height and weighs less than 300 kg (Figure 2).

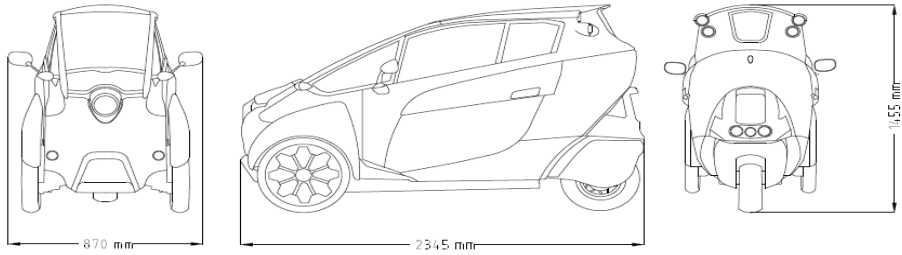

Figure 2. Technical drawing of the Toyata i-Road
Source: author's elaboration.

The vehicle is powered by two 2kW (2.7 KM) electric motors, which, thanks to the energy stored in lithium-ion batteries, provide a range of 50 km, at speeds of 30km/h. Loading a three-wheeler takes place in special stations, where the vehicle will be rented. Guaranteed lifetime of batteries of this type in electric cars is from 8 to 10 years. There is a multi-stage battery notification system in the Toyota i-Road. In the first stage, the maximum speed is limited, in the second stage, all electrical equipment is switched off (air conditioning, radio), and the vehicle speed is ultimately reduced to 5 km/h. This solution is to provide a few kilometers of range for parking the vehicle in a safe place.

Toyota i-Road vehicles could be made available to the residents of Bialystok on a car-sharing basis. The main idea is to create a comprehensive system in which electric vehicles will play an equal role to buses. To start using the rental, you need to download the Toyota i-Road-Sharing application and register on the Energa website which is the operator of this service. Then enter your personal details and attach a photo of your driving license and provide your credit card details. Then a login link will be sent from the operator to activate the rental account. In order to use the car for minutes, you must enable the geolocation service on your smartphone and start the application. On the screen will show the closest parked vehicles possible to rent. It is possible to pre-book the car using the application or a direct rental of the vehicle on the spot. The loan is to scan the QR code, which is placed on the car with your smartphone. This will open the door and start the rental timer. No keys are provided - igniton is with the button on the dashboard. After the rental has been completed, the app will calculate the travel costs and allow you to pay the bill. The car usage can be settled in two ways. The first one is a virtual purse - the payment will be settled with previously paid into the user's account, and the second is all the payment methods offered by PayU. The user will have to

maintain a limit of 20 PLN. If your account balance falls below this level, you will have to pay the difference to rent the vehicle again. No top-up values will be set, the user will be able to pay any amounts to the account.

Renting a Toyota i-Road car will cost PLN 5 for the first 10 minutes, PLN 4 for the next quarter and then another PLN 3 for every 15 minutes. For people holding tickets for public transport, prices will be lower and amount to PLN 4 for the first 10 minutes and PLN 3 for each next quarter of an hour. The rental price would include all fees, the price includes not only the costs of operation and charging, but also the OC / AC insurance and vehicle service during an emergency stop on the road. Electric cars will be available within the city and up to 10 kilometers outside of city boundaries.

In Bialystok, there is currently one charging station for electric vehicles. The charging point is located at a public car park next to the Decathlon store. It allows simultaneous charging of two vehicles: one DC (DC) and one AC (AC). In addition to the existing station, according to the author's project, another six are planned. The stations would be supplied with alternating current from 11 to 22 kW. They will allow you to charge Toyota i-Road from 0 to 100%, with an average charging capacity of 16 kW in about 15 minutes (https://ddb24.pl/). Electric vehicle charging stations should be visible and easily accessible (Figure 4). Stations according to plans would be located a short distance from bicycle stations, bus stops and Bialystok galleries or public facilities. The points are therefore planned in the following places (Figure 3):

- of the centre transfer by the Gallery of Jurowiecka,
- bus station,
- around the University Clinical Hospital,
- around the Bialystok University of Technology,
- around the Antoniuk gallery.

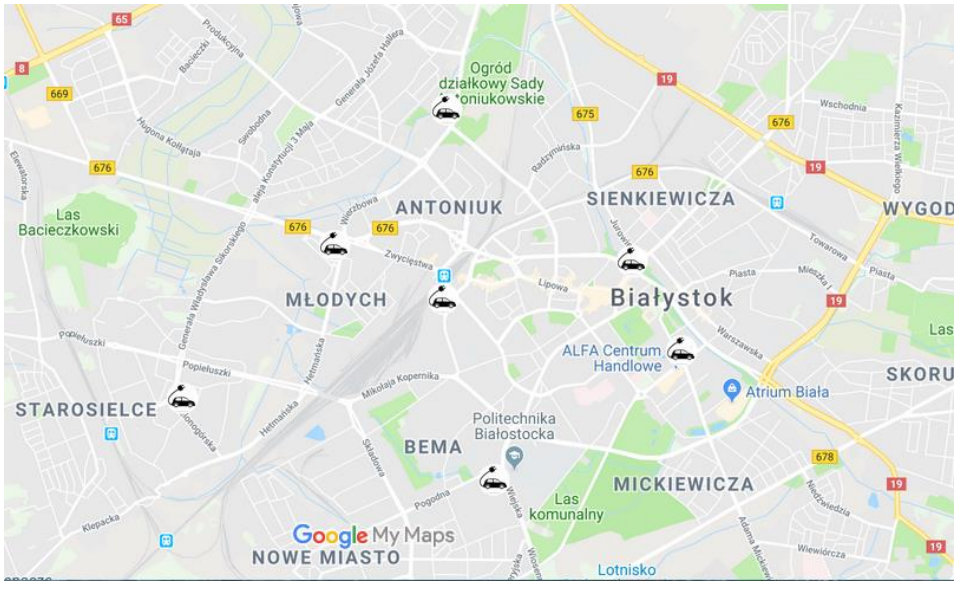

Figure 3. Planned location of charging station for electric vehicles in Bialystok
Source: author's elaboration.

Figure 4. Technical drawing and visualization of charging stations for electric vehicles
Source: author's elaboration.

It is important that the public charging network for electric vehicles provides convenience in terms of location and use. Construction plan for subsequent charging stations in the center, in the vicinity of shopping malls, hospitals and the most important public buildings, it is to encourage the largest possible number of inhabitants to use ecological vehicles. The places where the station is planned to be built every day are visited by a large group of people.

Conclusions

The research problem was solved by the author's development of a conceptual and technical design of a new means of transport. The presented project is a vehicle and the infrastructure planned for its implementation, which enables minimizing problems related to the use of public transport in Bialystok. An electric vehicle that will operate on principles similar to Biker would be a good complement to the currently functioning public transport in the city. The eco-friendly vehicle will enable users to communicate freely and faster in the city, while transport organizers will help fight the growing problem of environmental pollution.

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GREEN MANAGEMENT

GREEN MANAGEMENT AS A COMPETITIVE ADVANTAGE ON SMES IN LATIN AMERICAN COUNTRIES

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Introduction

Small and medium-sized enterprises in Latin America struggle to have a comfortable position on international markets. It is certain that the context of the developing region does not yet provide the conditions to enhance the internationalization of local enterprises. Green management materializes as a possibility for SMEs to develop a solid position globally. As environmental consciousness grows unstoppably on a global scale and markets trend to a greener way of consumption, it brings a wide range of opportunities to developing countries (Altenburg and Eckhardt, 2006). A prime example of this is the EU-eco-regulation and Fair-Trade arrangement. As the BIO trend grows, Latin American SMEs must move in the right direction.

Literature review

According to the ISO Survey, 10301 enterprises from Central and South America have adopted ISO 14001 standard, an astonishingly small number if we compare it to 109133 enterprises that have it in Europe. Nevertheless, a comparison of the development of the standard on both regions in the last 18 years gives us a 179.64% annual growth rate in Central and South America compared to 78.03% in Europe (ISO, 2018; CEPAL, 2012; 2018). The green management overview of the region shows explicit signs of improvement prospects (Florida and Davison, 2001). Characteristic managerial methods on the subject such as monitoring, diagnosis, policy, strategy and implementation are imperative to open global markets and provide a competitive advantage on locally-run businesses in developing countries (Dini and Stumpo, 2014; 2018; Marcus and Fremeth, 2009; Kjaerheim, 2005).

Research methods

The method of literature analysis and documentary analysis was used, which consists in the collection, selection, description and scientific interpretation of data contained in books and articles.

An essential aspect of Latin-American economy resides with SMEs. Within them we analyse a heterogeneous group. In the first place we have the smallest and simplest the so called "microenterprises" which are created by a necessity to have a minimum income to sustain families, these operate almost in an informal scheme and with a very limited amount of resources and market knowledge. Most of them are family-run businesses, without a fixed structure, goals, or indicators. The main goal of these is to develop into a high-development SME, but as they do not receive the necessary support they struggle even to keep minimum profits. Environmental consciousness in this sector is scarce, therefore the idea to develop green management strategies is in most cases unthinkable for owners. The products marketed follow local requirements which do not comply with internationally acceptable standards, the main reason why the internationalisation of these companies is not possible. Various studies show that the development capacity of microenterprises is at low levels, local and national governments do not bring the necessary knowledge and tools for them to reach better productivity.

Research results

SMEs shape the 99.5% of enterprises in the region, and microenterprises are the 88.4% of the total. The national employment distribution of them figures with a 53% of total jobs with 28% for microenterprises, 20% for small companies, and 15% for medium companies. If we compare it to the European Union, the data follows the same pattern. Where we see significant differences is in the participation of companies in sales or production. On this subject Latin-American SMEs take part in just 24.6% compared to 56.2% of European companies. This shows that these types of enterprises in Latin America do not take such an important role in the region's productivity. This is an effect of how unproductive they are, mainly because of the harsh conditions that they are put into or their lack of market knowledge. These enterprises do not export either, an example in Brazil which their participation in exports is of just 0.3% for microenterprises, 1.6% for small companies, and 6.5% for medium companies compared to the 11.1%, 13.3% and 22.6% of Spain. The main problem resides with the insertion of companies in the productive structure. In Europe SMEs either produce personalized, high-quality

goods that aim at external markets whereas in Latin America they aim for underdeveloped, low-quality goods for internal markets (Cohen and Baralla, 2012).

All of the countries in the region take part in such environmental accords and points forward to improve the environment. Nevertheless, in the region environmental consciousness and compliance is a relatively new topic. Latin American governments are still evaluating and applying policies that can perform accordingly to rapidly changing economic, social and environmental aspects on each of their countries. Green Management comes in the picture as an unknown solution for the subjects proposed. Small and medium-sized enterprises should take advantage of those new environmental policies that bring several growth and improvement opportunities for them. The approach method is to create a win-win situation where these companies apply green management techniques and have a nationally and internationally competitive advantage, thus earning more profits. Once the companies realize the benefits from this situation, the next step is applying a continuous improvement system where the profits obtained are reinvested in developing green management practices. The main pillars of this management approach are sustainable development, corporate social responsibility, cost-effective solutions, high-standards compliance, and eco-innovation. We will further explore these methods and their applicability for Latin American SMEs (Kulfas and Goldstein, 2011).

Sustainable development turns out to be one of the most complex challenges of business management that business can face today, however, all the efforts made by a company to include these issues in the daily agenda, establishing them not only as part of its policies and norms but as the guidelines to carry out the daily activities of each employee directly or indirectly, will be reflected in the generation of value to customers, suppliers, employees, partners, financial entities and the community, among others. The inclusion of sustainability within the company's strategy is a difficult task, it is required that the managers have an awareness of social, environmental and ethical responsibility. It also requires a great awareness within the company regarding the commitment that involves including these issues in the decisions of employees. It is essential to apply good practices that do not require a large investment of money but that help to build a path for the implementation of best practices in the medium term (Ecocert Groupe, 2018).

Corporate Social Responsibility is probably the simplest and more advantageous part of applying green management. Including green products and services in the portfolio positively affects the image of a company, and demonstrates the commitment to society, its employees and its customers. Nowadays, we as consumers demand more to know the conditions in which a business is developing, and the implications and responsibilities that we assume when buying a brand.

When a company has ethical and responsibility issues within its management system, it also reduces the likelihood of being affected by non-compliance or a bad process that could possibly result in a penalty or a loss of prestige in the media or social networks. However, it is not enough just to consider CSR, it is also essential that the company adequately communicate these results so that each day it is consolidated as a sustainable, socially responsible company with a good reputation. The main difficulties to apply CSR in Latin American SMEs may reside the lack of a communicational structure and marketing abilities (Santoleri and Stumpo, 2014).

Green Management is cost-effective and pursues to reduce costs of the company through the help of methods such as Lean Management, Cleaner Production, and Continuous Improvement obtaining their foundations on environmental management systems. The main advantage of this is the reduction of operating costs. This can be achieved starting with the implementation of good practices, from the simplest to those that require more investment, some of them may be the renovation of the lighting installations for more efficiency and lower price, implementation of an energy efficiency system that allows a reduction of the total important expense in this area, and identify improvements in the processes productive to reduce and reuse waste materials that allow cleaner processes and considerable savings. The insertion of this may be delayed by the following of stubborn traditional management methods ingrained on the regions culture. Investment in high-cost new technologies is inconvenient as many of these companies do not possess the possibility to apply for credits or are willing to the take the risk.

Adopting high-quality standards for internal processes on SMEs is probably the most arduous operation of all mentioned. Through green management, companies can take immense steps by applying the ISO 14001 standard, which is an encouragement to go further and start ISO 9001 procedures. The European Union, through its policies, brings obtainable competitive advantages for companies to take part in. EU-eco-regulation and Fair-Trade arrangement are the most valuable ones, accessible to possible exporters in Latin America (Murray et al., 2006). Companies can achieve a high-value export status by complying bio-regulations established by the European Union (Official…, 2007; SEBRAE, 2007; Stumpo, 2007). The agriculture sector can take profits and access international markets by applying organic processes. The SMEs productive sector can take advantage of the Fair-Trade arrangement by giving its employees, partners and suppliers, which are mostly involved in the poorest sectors of society a fair income, access to health insurance and enterprise-related benefits (Wilson and Maizza-Neto, 2015).

Green Management is defined as the axis of eco-innovation throughout the world. It takes place when cross-company collaborations occur across borders and

can favour SMEs, as they are often more creative and flexible than large companies and that, therefore, have a greater tendency to experiment and are in a better position to redefine a strategy if that is the case. Environmental consciousness is a tendency that leads each organization involved in the production chain from the beginning to the final product, to show information about its compromise with the environment through the innovation of its processes. Eco-innovation represents an opportunity for many SMEs to increase their competitiveness and is essential to turn a circular economy into a reality. It presents ways for SMEs to turn environmental challenges into business opportunities, such as in the field of the "circular economy".

Conclusions

To conclude, the social and economic conditions region may not be optimal for the development of SMEs. Nonetheless green management is a valid method which can be adjusted for struggling enterprises in a congested market. Its applicability is possible through several simple steps that are subject to managerial willingness, productive improvement, market acceptance, environmental consciousness, and government assistance. The main pillars of green management are sustainable development, corporate social responsibility, cost-effective solutions, high-standards compliance, and eco-innovation. All of this points forward to generate a competitive advantage for small and medium-sized companies by inserting them into a green economy figure. The approach method is to create a win-win situation where these companies apply green management techniques and have a nationally and internationally competitive advantage thus earning more profits. Once the companies realize the benefits from this situation, the next step is applying a continuous improvement system where the profits obtained are reinvested in developing green management practices.

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INDUSTRY 4.0

INDUSTRY 4.0 AND IT'S APPLICATIONS

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Introduction

The term "Industry 4.0" was first used in 2011 at the Hannover Fair. In October 2012, Robert Bosch GmbH and Kagermann presented the fourth industrial revolution proposal file in the German Federal Government. At the Hannover Fair on April 8, 2013, the working group presented the Industry 4.0 final report.

"Industry 4.0" or "4th Industrial Revolution" is a collective term that includes many modern automation systems, data exchanges and production technologies. This revolution is a set of values consisting of the "Internet of Things (IoT)", services of the Internet and cyber-physical systems. At the same time, this structure plays an important role in the formation of an intelligent factory system. This revolution will allow more efficient business models to be created in the production environment, as each item of data will be collected and analyzed in a good way (Rojas et al., 2017).

Literature review

According to Salkin et al. (2018), there is no specific Industry 4.0 definition, and therefore, there is no definitive utilization of the enabling technologies to initiate the Iındustry 4.0 transformation. But the fact that this fourth revolution has been announced before it takes place, opens several opportunities for co-working environments between academic researchers and industrial practitioners, shaping the manufacturing future (Hermann et al., 2016).

Industry 4.0 is based on 6 principles. Interoperability: The ability of cyber-physical systems (e.g. workpiece carriers, assembly stations and products) to involve people and smart factories through the internet of objects and the internet of services to communicate with each other. Virtualization: This structure is a virtual

copy of smart factories. The system consists of connecting sensor data with virtual plant and simulation models. Independent Decision Structure: Cyber-physical systems are their ability to make their own decisions within smart factories. Real-Time Ability: The ability to collect and analyze data. This structure makes the process fast. Service Orientation: Cyber-physical systems, people and smart factory services are offered via the Internet of Services. Modularity: Provides flexible adaptation system to intelligent factories for changing requirements of individual modules.

The Systems integration of Industry 4.0 has two major characteristics relying on vertical and horizontal integration. The vertical integration of the manufacturing processes, breaks the traditional automation pyramid, focusing on distributed and collaborative architectures. Horizontal integration allows the creation of a new kind of value-added (Rojas et al., 2017). By this, there is an unavoidable surrounding of customers and suppliers that are involved just from the beginning of the product life cycle.

"Industry 4.0" offers the opportunity for manufacturers to optimize their operations quickly and efficiently by knowing what needs attention. For example, by using the data from sensors in its equipment, an African gold mine identified a problem with the oxygen levels during leaching. Once fixed, they were able to increase their yield by 3.7%, which saved them $20 million annually (Marr, 2018).

Conclusions

The foundations of Industry 4.0 are the advanced technologies of automation and the Information and Communication Technologies (ICT) present across this review. The key aim of Iındustry 4.0 is to make production systems more flexible and collaborative. For this purpose, the use of enabling technologies is the strategy that is behind the Industry 4.0 paradigm. On an industrial context, each implemented technology in an individual manner will present a lower impact. On the other hand, when implemented together, it offers new possibilities to embrace the future. For instance, one of the Industry 4.0 impacts will be the elimination of monotonous work as well as physically demanding jobs.

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IMPROVEMENT OF STRENGTH PROPERTIES OF CLAYEY SOILS FOR CONSTRUCTION PURPOSES

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Introduction

In this research, kaolin clay with river sand taken from Murat River, Elazig Turkey are used. The experiments are based on a mixture of tire crumbs with kaolin type of clay and river sand in different ratios. The amount of 60%, 70%, 80% and 100% of kaolin clay soil mixed with 40%, 30%, 20%, and 0% of river sand respectively. Then the optimum percent of lime powder (5%) is added to the soil. Afterwards, to achieve the maximum density the standard proctor test, applied to the each sample. With the same optimum moisture content (wopt), the samples were placed to dessicate for 28 days. After 28 days an unconfined compressive test (UCS) was applied to the samples to find out, the maximum bearing capacity of each sample.

In the another part of this study, mixtures of 60%, 70%, 80% and 100% of kaolin clay were mixed with 40%, 30%, 20% and 0% of river sand after finding the optimum water content (wopt) for each sample, the amount of 0%, 1%, 2%, 4% of tire crumbs were added to the soils. All samples were compacted at the proctor density. After preparing the samples, unconfined compressive strength of all samples were determined.

Literature review

The increasing numerous number of old tires each year in different parts of the world is a big problem for our eco-system. For instance, Masad et al. (1996) specified, in his research that every year 278 millions of rubbished tires are added to the deposited total of two billon waste tires in the USA. A mixture of 50% sand and 50% tire and 70% sand and 70% small chips were carried out in his research. The

size of the tire chips was about 4.75 mm, and a series of tests such as (permeability, consolidation, specific gravity, void ratio, and tri-axial test) were conducted. The final finding shows an upgrading value by adding the tire chip to the sand. Moreover, the investigator strongly suggests that the mixture should be used for lightweight filling material in highway constructions.

Dickson et al. (2001), mentioned that used tires are not an ecological issue but a financial problem due to non-recycling of the tires. Over 500 million tires in USA and 27 million in Canada are thrown out each year. Yoon et al. (2006) about 30 percent of these tires are buried while 70 percent are used in a second type of industry. Edincliler (2008), states that yearly, three million tons of rubbished tires are added to deposits in Europe, but due to the lack of space for depositing, this amount must be reduced to certain amounts. One of the ways they can be recycled is in soil stabilization and the construction sector. Young et al. (2003) According to the rubber compositions, it is not so easy to separate into simpler compounds. Therefore, engineers are trying to study to learn about the physical parameters and reactions of rubber with mixing to sandy soils which can used in numerous geotechnical projects, as lightweight filling materials, insulating layer to decrease permeability, bridge and dams slopes, and for dewatering purposes.

Ahmed (1993) stated that mixing sand with tire crumbs could increase the durability. The friction angle shows a maximum value with the addition of 30 percent tire chips with dense sand (Bosscher et al., 1997; Tweedie et al., 1998; Humphrey el al., 1998; Lee et al., 1999; Dickson et al., 2001; Zornberg et al., 2004). These articles indicate tire chips combinations can bring lower the compressibility and higher durability and changes the performance of the soil while using the tire crumbs.

While constructing bridges the soil with tire crumbs mixture can be a useful filling material, due to the high shear strength and less unit weight and little steeper in slopes. Its addition results in the minimization of the volume of used material and decrease in the settlement and slip off.

Tatlisoz et al. (1998), Edil and Boscher (1994), placed shard tire vertically in sand particles. The finding proves that placing tire shards vertically rather than placing horizontality can bring high durability. The tire itself or chips because it is light-weight can be used in geotechnical engineering in numerous areas. Therefor e, much research such as laboratory studying, physical modelling, numerical analysis, confirms that tire can be used as lightweight filling for embankment of bridges, dams, lightweight traffic, etc.

Ghani et al. (2002) worked with shard rubber beside rubber chips, to improve geo-mechanical properties of the embankments back fillings materials and inclu-

sions. These materials due to lower densities can be suitable for road construction projects. Lighter soil with high bearing capacity decreases the foundation design requirement, which reduces the cost to certain amounts, secondly it minimizes the project construction duration and avoids ground settlement. Lightweight filling material brings down the lateral earth pressure, so it can reduce overall structure supplies such as steel, cement, wall and foundations supplies.

The usages of various types of waste tire materials used in geotechnical engineering for soil improvement objectives are described in Table 1.

Table 1. Usages of various type of waste tire materials in geotechnical engineering

Type	Mass	Strength	Usage
Whole Tire	-	-	Most of the time used in soil stabilization. As well as suitable for tunnel, slope, embankment, reinforcement
Tire chips	3.0-3.55 kN/m3 , if compacted 7.99-8.99 kN/m3	Changes between 36.99-42.99 grade for soft soil and 84 for compressed	Better dewatering option with absorbing water one cm/sec
Tire chips Mixed with Soil	With density of 12.9 kN/m3 for soil mixture 50% soil and 50% Tire shreds	Compaction needed	Mixing of 37-39% tire chips provide best economically efficient and technical suitable benefits
Tire shared with mandatory additives	Density changes from 4.9-9.9 kN/m3, the density of other additive also has to be considered	The compaction force must apply up to necessity	Best dewatering properties. Used in dams or places where dewatering is necessary

Source: (Ghani et al., 2002).

Eul-lex (1999), suggests that tires due to the large volume and low-density is not suitable to deposit in landfills. Due to the rising number of waste tires each year in many countries, the legislators and environmental activists, have taken action to suggest the disposal or re-usage of these materials in industry. As an example can be European communities, where tires used in geo-technical engineering activities such as soil stabilization.

USEPA United State Environmental Protection Agency (2006), report mentions within the European community, the politics and regulations are inspiring the

Best Administration Practices (BAP) for recycling of waste tires produced. This procedure had also been applied in many other countries e.g. every state in USA, Germany, Norway, etc. The waste tire problems have also been debated among the United Nations Environmental Program (UNEP), which finally lead to the (BAP) project. In addition, they listed a technical usage of old tires as construction materials. By way of, example USA and Europe through making regulation for inspiring the usage of waste tires as an alternative for industry sectors will open new ways to other countries such as Poland to invest in such projects such as waste tires in construction materials.

Research methods

Two different soil samples (river sand and kaolin clay) with lime powder and tire crumbs have used for this research. All the materials have different gradation curves, which varied from 2.38 mm up to 0.0014 mm. The Proctor dry density was taken for all the samples.

In laboratory research, primarily all of the properties tests had done for all four types of materials used in the research. The liquid limit, plastic limit, specific gravity, hydrometer, sieve analysis and relative density of all materials were tested according to ASTM standards.

Afterwards, the samples were mixed in 12 different ratios, the Standard Proctor compaction test was performed (ASTM D698– 07) for each sample to find out the maximum dry density. After finding (γ_{dmax}), that samples were prepared at Proctor density to be conducted in the unconfined compressive test (UCS) test. A handmade sampler was used to take samples for unconfined compressive (UCS) test. For the samples with tire crumbs, the (UCS) test was performed after the sample was taken according to (ASTM D2166-00). On the other hand, for the samples with lime powder, the UCS test had carried out after 28 days.

Research results

The linear relationships between maximum dry density of kaolin clay and additive sand is shown in (Figure 1), as well as the linear relations between moisture content of kaolin clay and additive sand show in the graph (Figure 2).

In the same time, Figure 3 shows clay-sand mixture the Optimum Moisture Content (w_{opt}) %, graph changes while adding tire crumbs to the mixture.

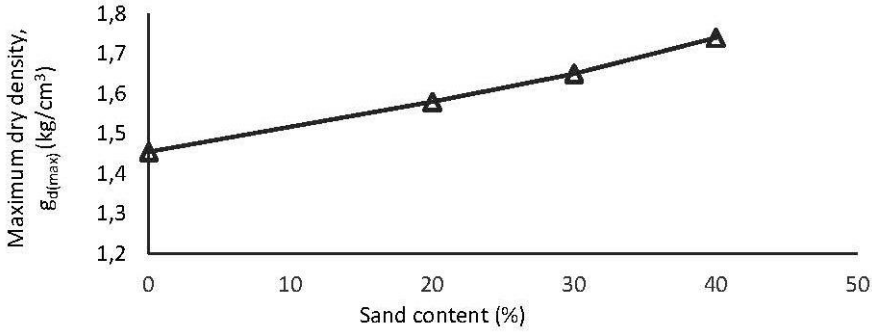

Figure 1. Maximum dry density and additive sand ratio, linear relationships
Source: author's elaboration.

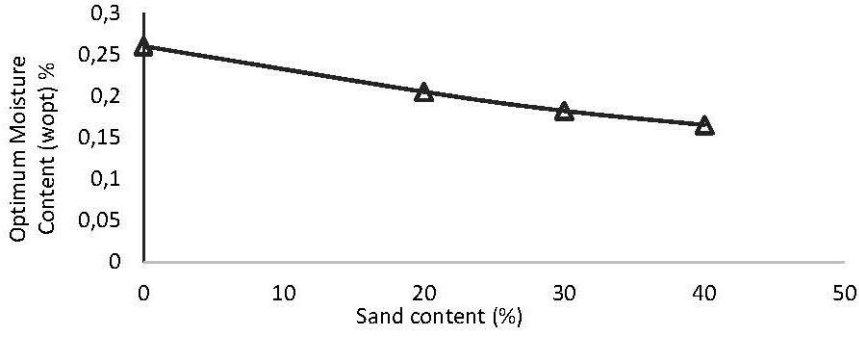

Figure 2. Moisture content and additive sand ratio, linear relationships
Source: author's elaboration.

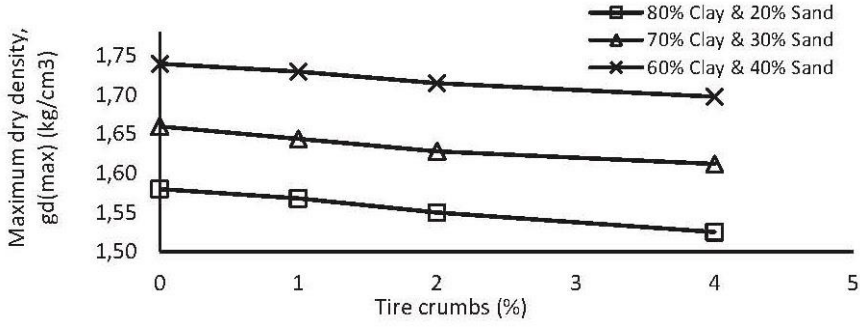

Figure 3. Maximum Dry Density changes with adding tire crumbs to the clay-sand mixture
Source: author's elaboration.

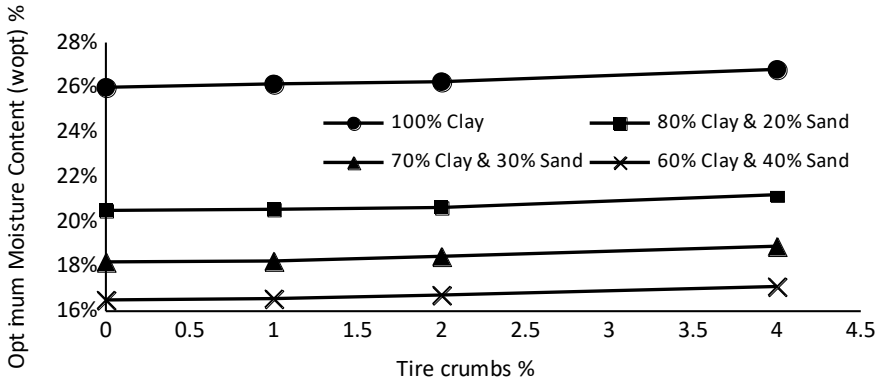

Figure 4. Optimum moisture content changes with adding tire crumbs to the clay-sand mixture
Source: author's elaboration.

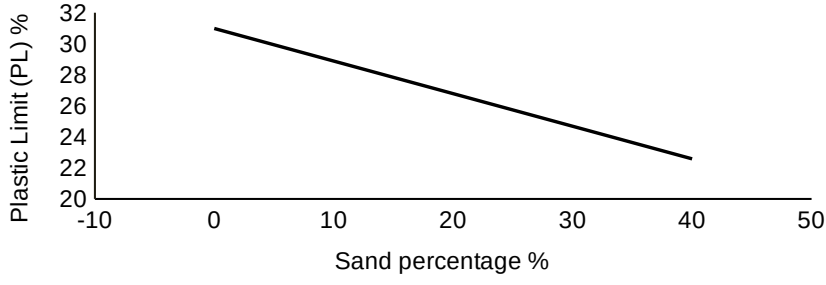

Figure 5. Variation of plastic limit by increasing sand percentage
Source: author's elaboration.

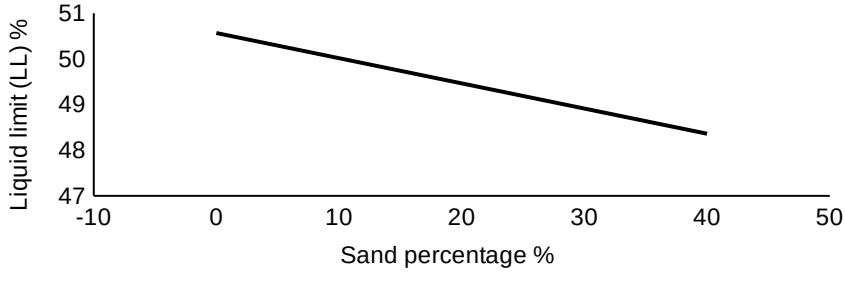

Figure 6. Variation of liquid limit by increasing sand percentage
Source: author's elaboration.

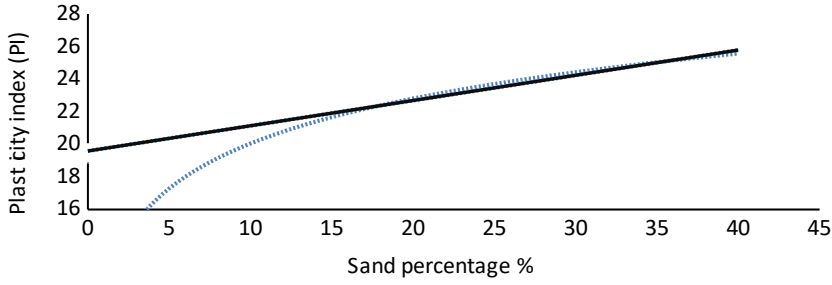

Figure 7. Plasticity index and sand percentage relationship
Source: author's elaboration.

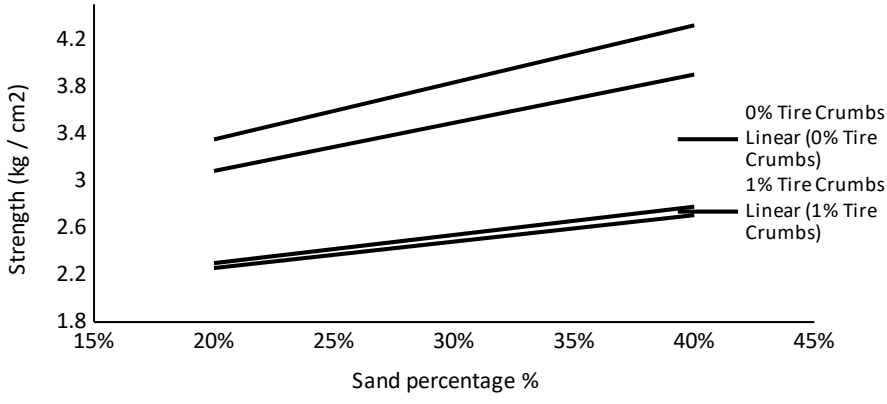

Figure 8. Optimum strength graph of tire-crumbs in kaolin clay-sand mixture
Source: author's elaboration.

Through these studies, it was found that adding sand to kaolin clay increased the shear strength, so the unconfined compressive strength values increase when sand percentage increases from to 0% to 20%, 30% and 40% in the clay-sand mixture.

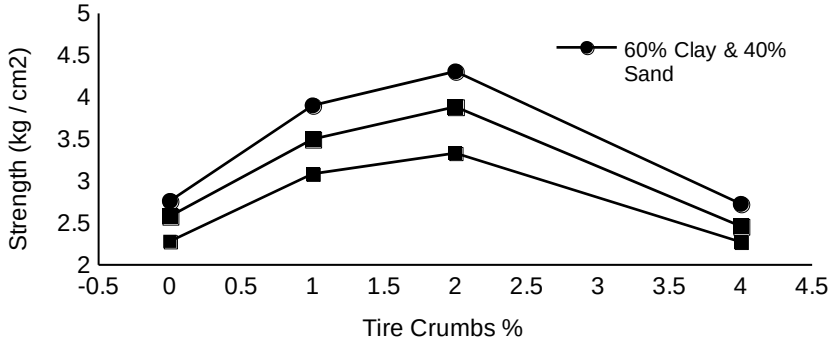

Figure 9. Shear strength and additive sand with tire crumbs, linear relationship
Source: author's elaboration.

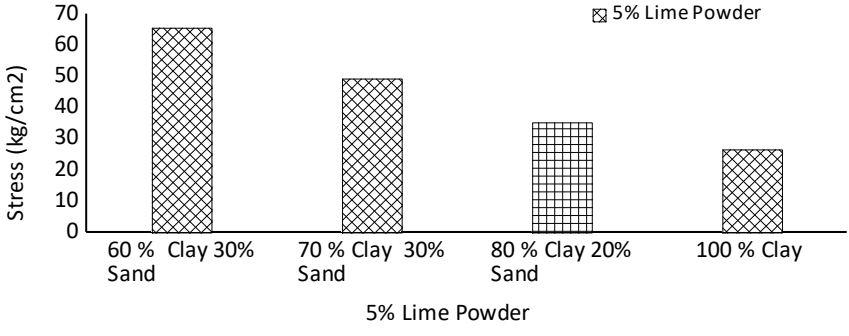

Figure 10. Shear strength chart of kaolin clay-sand mixture with 5% lime powder after 28 days
Source: author's elaboration.

Conclusions

In this study, a series of unconfined compressive strength (UCS) tests were conducted on clay-sand and tire crumbs mixtures and clay-sand and lime powder mixtures.

Each sample in the first class of studies were mixed with 60% kaolin clay, 40% river sand and (0%, 1%, 2% and 4%) tire crumbs by total weight. The sand and kaolin clay varied to (70% sand and 30% kaolin clay) and (80% sand and 20% kaolin clay) mixed with (0%,1%,2% and 4%) tire crumbs. In the second class of studies, the same ratio of sand and kaolin clay was mixed with just 5% of lime

powder. Before starting, the (UCS) test the optimum moisture content (w_{opt}) for all the samples were obtained by standard Proctor tests.

The maximum dry density and optimum moisture content of clay, tire crumbs, clay-sand mixture with tire crumbs and clay-sand with lime powder mixtures were determined by standard Proctor test in the laboratory (ASTM D698 – 07). Afterwards, unconfined compressive test (UCS) were carried out on samples prepared at Proctor density. The following observations and conclusions can be made:

The maximum dry density (γ_{dmax}) of clay-sand mixture increase while the sand content increases, as well as the optimum moisture content of kaolin clay-sand mixture decreases while sand percentage increases. In contrast, adding tire crumbs to the clay-sand mixture decreases the maximum dry density (γ_{dmax}) and increases the optimum water content (w_{opt})

Liquid limit (LL) and plastic limit (PL) of kaolin clay-sand mixture decreases, while sand percentage increases, but the plasticity index (PI) have significantly increases.

Throughout these studies, it has been found that adding up to 2% tire crumbs to the clay-sand mixture increases the shear strength parameters. After 2%, adding tire crumbs decrease the unconfined compressive strength. However, the shear strength values for 60% kaolin clay and 40% sand mixture after adding 2% tire crumbs have increases of 56%, while with adding 4% tire crumbs to the samples strength has a 1.3% decrease. Similarly, the shear strength value for 70% kaolin clay and 30% sand mixture increased to 50.6% with adding 2% tire crumbs, whereas by adding 4% tire crumbs to the mixture the strength values had 4.3% decreases. In the same time, the unconfined compressive strength (UCS) values for 80% clay and 20% sand mixture have 46.2% increases with adding 2% tire crumbs, and decreases to 0.4% on adding 4% tire crumbs.

The unconfined compressive strength (UCS) values decrease when sand percentage decreases from 40% to 30%, 20% and 0 in the mixture.

The unconfined compressive strength (UCS) for kaolin clay-sand and lime powder mixtures were tested after 28 days and the strength values changed as follows.

The shear strength values for 100% kaolin clay, without lime were found at 1 kg/cm2, but then after 28 days and adding 5% lime powder the strength values changed to 26.61 kg/cm2. In the same time, the shear strength values in 60% clay and 40% sand mixture with 5% lime after 28 days increased 146.5% that shows the highest value among all other samples. In addition, the shear strength values for 70% clay and 30% sand mixture with 5% lime after 28 days increased 85.32%.

While, the UCS values for 80% clay and 20% sand mixture with 5% lime after 28 days had raised 32.57%.

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FORKLIFT ACCIDENT WARNING SYSTEM IN PRODUCTION COMPANIES

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Introduction

It is commonly known that job health security is important for every company and its management. They have to care about their workers. Some enterprises should teach safety rules to all workers, including students. If they have an accident, the enterprise will have charges and additional costs, their production process will slow down. The main aim of the project is to inform about modern systems that increase job security, reduce the risk of accidents and build a safe protection area for workers and equipment around the work machine. The project is made using the case study method based on the example of Wipelot SafeZone – a modern preventing accidents system. Among the key advantages of the system can be named the following: easy setup, warning to driver and worker, audible, visual and vibrating, adjustable risk area.

Literature review

In the common sense, safety can be understood as the state of being "safe", the condition of being protected from harm or other non-desirable outcomes. Safety can also refer to the control of recognized hazards in order to achieve an acceptable level of risk.

In order to achieve safety, safety management systems are introduced. A safety management system (SMS) is a comprehensive management system designed to manage safety elements in the workplace. It includes policy, objectives, plans, procedures, organisation, responsibilities and other measures. The SMS is used in industries that manage significant safety risks, including aviation, petroleum, chemical, electricity generation and others. The issue of SMS is actively practically im-

plemented and to a large extent, the demands are predetermined by ISO 26000. ISO 26000 focuses on labor practice, occupational safety and health, and working environment as a foundation for human capital development (Phusavat et al., 2017).

Research methods

The main aim of research is to describe modern systems increasing job security and minimizing work accidents based on the example of Wipelot SafeZone. The research method is the case-study method of the Ocean Technology Company (Turkey). The research was made within the internship that was held in June 2018. As for the source of information, secondary data was used, including the web-site of the company producing the Wipelot SafeZone, the reviews and rankings of the experts from the field of the production safety.

Research results

The use of forklift technologies is growing every year worldwide in many industrial and transport operations. The figure below represents the usage of forklifts between 2003 and 2018 in Turkey. As Figure 1 shows, the minimal forklift usage rate was observed in 2003-2005, maximum – in 2014-2018. The rate was fluctuating within the analysed period of time, though in general, growth can be observed.

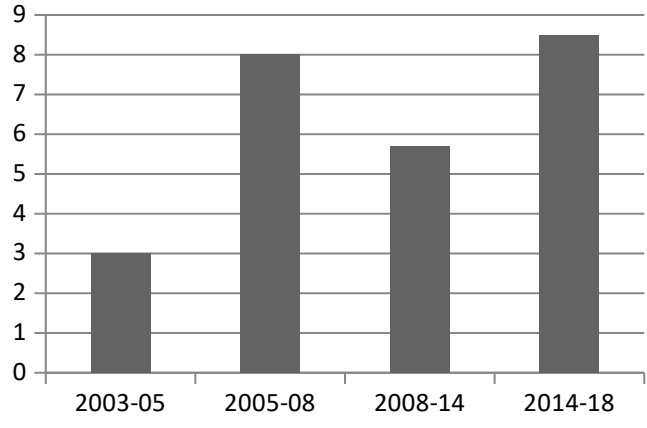

Figure 1. Forklift usage rate 2003-2018

Source: (Yavuz, 2015).

The growing popularity of forklift equipment predetermines the necessity of control of safety. Concerning statistics, nearly 100 workers are killed and another 20,000 are seriously injured in forklift-related incidents each year in the United States (Horberry et al., 2004). As the figure below shows, object crash, carelessness and pressure are among the principal reasons for the forklift accidents. The biggest share belongs carelessness.

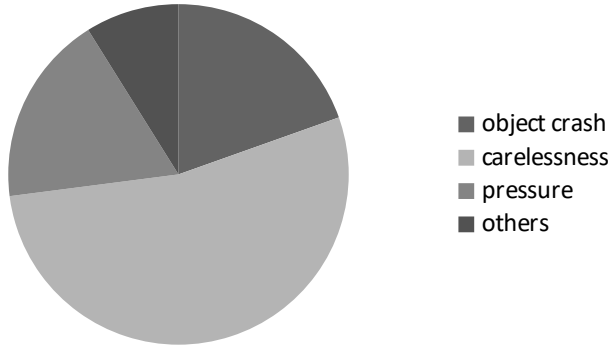

Figure 2. reasons of forklift accidents
Source: (Lawrence, 2007).

Due to the growing popularity of forklift technology in Turkey and the large share of accidents because of carelessness, there is a need in automatic safety systems that can eliminate the risk. Among the pioneers for introducing the latest solutions for safety, innovative companies can be named, such as Ocean Technology Company (Turkey). Ocean Technology was established in 2005, and it is a technology company capable of producing R&D design, specialized in equipment environmental monitoring technologies. The products of the company are developed according to the elaborations in Industry 4.0, IoT, RFID, mobile technologies and communication technologies. Among the most known solutions is the WIPELOT brand.

Wipelot SafeZone is implemented in a number of companies, for instance Mondi Group in Turkey, which is using this technology since 2000. Wipelot SafeZone is an approach-collision warning system to prevent accidents that may occur between work machines, workers or equipment. When the work machine and the worker come too close together, they warn the driver and pedestrians against collisions by giving a sound, vibrating and visual warning. When the worker enters the area that should not be entered, it is aimed to prevent the possible accidents by giv-

ing warning to the workers and authorities. Among the main rules of Wipelot Safety Systems can be named (Wipelot, 2006):

- work with a valid work permit if necessary;
- when driving, follow speed limits, do not leave the road, use a seat belt and use your mobile phone only in hands-free mode;
- when entering an enclosed area, obtain permission and follow the necessary precautions;
- protect yourself from falling when working at height;
- perform insulation testing and use life-saving equipment before starting work;
- obtain authorization before removing or deactivating protective equipment.
- do not pass under suspended load and do not stand under it;
- if necessary, carry out chemical substance assessment and use personal protective equipment;
- always leave certain distance when running in the forest.

Besides the rules mentioned above, different solutions are elaborated, taking into account the specificity of a company. Ocean Technology Company needed to implement a solution to prevent or decrease the probability of a forklift accident. Regarding this demand, Wipelot SafeZone system was implemented, belonging to the family of Forklift Alert Systems. The key features of the Forklift Alert Systems are:

- Convenient safety systems for reducing forklift accidents
- They are designed to raise employee awareness and avoid collisions in warehouses and similar other facilities.

Wipelot system works as follows:

- readers or zone labels are placed in the areas to be monitored;
- a worker label or badge is given to the worker and will not affect his / her work;
- in case of an emergency, an emergency alarm is given to the operator in the event that the worker presses the button on the label or if the worker stays still or horizontally and falls;
- location and status information of the person who needs help is determined and displayed at the control center;
- in addition, other authorized persons are informed via SMS / E-mail;
- as an option, location and status information can be tracked via the Wipelot software / web application.

The implementation of the mentioned above steps provides the safety in the zones, where the Wipelot is implemented.

Conclusions

Nowadays, companies face new challenges and have new opportunities, that have appeared due to the industry 4.0 realities. Though some of the workers are substituted with robots, safety is still the principal requirement in organizing the working zones. The requirements toward the safety systems are predetermined by the specificity of the company. Among the examples can be named Wipelot SafeZone, belonging to the family of Forklift Alert Systems. Besides safety, Wipelot SafeZone uses the sensors to orientate within the environment and move around in the most efficient way, that additionally enables the cutting of costs. Usage of the sensors leads to achievement of the main goal, namely safety, by keeping the safe distance, speed and other essential requirements. The example of Wipelot SafeZone shows that implementation of Industry 4.0 technologies positively contributes to the safer organization of the production zone.

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RESOURCE MANAGEMENT

TRADITIONAL MANAGEMENT OF PASTURE RESOURCES OF KYRGYZ PEOPLE

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Introduction

For centuries, mountainous regions of the Kyrgyz Republic have been used for pastoralism. Pasture resources of foothill and mountain regions as a single territorially, economically and natural-climatic complex most fully respond to the conditions of pastoralism – the nomadic management type, which was based on traditional knowledge.

Literature review

Features of the Kyrgyz Republic are severe physical conditions and high vulnerability of mountain ecosystems. The mountainous nature of the relief of the Kyrgyz Republic causes the vertical value of climatic zones. The same changeover of climatic zones is observed moving from the foot of the mountains to the tops as of a movement from subtropical to arctic coast. The climate of the Kyrgyz Republic is sharply continental. Winter is cold, summer is hot. The arid climate character, somewhat smoothed from the increase in cloudiness and precipitation due to the high-mountainous terrain, is due to three factors: the location in the Northern Hemisphere in the center of Eurasia, remoteness from significant water objects and the close proximity of deserts (National Statistics Committee, 2013-2017).

Kyrgyz people, as true nomads, have for centuries accumulated unique traditional knowledge of breeding and keeping cattle, respect for the environment and

the rational use of pasture resources, have been passed down from generation to generation. Traditional practices, such as terracing, attempts at afforestation of slopes, and planting trees along irrigation canals (aryk), helped to limit erosion and irreversible water loss. The key factor in maintaining sustainable agriculture was an ancient system of resource management which included a set of rules limiting land and water use, control over their implementation by elected representatives, and penalties for non-compliance (Tulobaev et al., 2014).

Unfortunately, as a result of certain changes in the political system, socioeconomic changes and forms of management, much of this traditional knowledge has been lost and forgotten. Several generations have grown up in the village but have not inherited this knowledge and these skills, people who carry traditional knowledge in breeding and keeping livestock are becoming fewer and fewer (Bartold, 1943). The consequences are the irrational use of mountain pastures according to the seasons of the year, the widespread degradation of pasture resources. Sustainable management of pastures is an important factor for the ecological and socio-economic stability of Central Asian countries, especially under changing climatic conditions. Pasture livestock farming of the Kyrgyz people suggests aboriginal pasture animals: a Kyrgyz horse, coarse-haired fat-tailed sheep, yak population, goats; taigan and dobot. Aboriginal species of animals is not only a jewel the people inherited from their ancestors, but also animals that are best adapted to the harsh mountain conditions (Tulobaev et al., 2015).

Pasture resources have always been and remain the national wealth of the Kyrgyz Republic. Pastures make up 86% of all agricultural land and cover a total area of more than 9 million hectares. Pastures mainly used for livestock, as well as for other purposes - hunting, beekeeping, collecting medicinal herbs, fruits and berries, harvesting hay and fuel, tourism and rest of the citizens serve as a source of biodiversity of flora and fauna. Pasture resources of the country make it possible to maintain livestock throughout the year on pasture and sustainable development of pasture livestock (Kerven et al., 2011).

Seasonal migrations along traditional routes from one pasture to another indicate a careful attitude of Kyrgyz people to the environment and the maintenance of its ecology. The length of the nomadic roads in different areas was not the same, it ranged from a few dozen to 100-120 km, and in some places reached 150-200 km (Humphrey and Smith, 2006). For grazing of each type of livestock, pastures were selected with the appropriate terrain and a certain grass stand. The descent into the valleys and the downward movement of livestock also had its own order. For ramming snow-covered roads, horses were first driven over, followed by yaks and cows, then sheep and horses with packs were let in. Migrating required taking into

account many factors: assessment of readiness to settle a new pasture; forecasting meteorological conditions; respecting the sequence of running livestock. All these activities were not noticeable to some researchers, they thought that the nomad was not burdened with any work. Arbitrary violations of the routes or the seizure of pastures by other clans and tribes caused frequent civil strife that affected the fragmentation or even destruction of pasture-nomadic communities and entire villages. Even more tragic consequences were the barymta and taking of pastures by neighbors, which was the cause of armed conflicts between them, and then the payment of compensation, in the form of livestock and other material values (Baybosunov, 1990).

Reseach methods

Literature analysis was performed. The focus was on important book positions, articles and legal texts.

Research results

Natural pastures are an important reserve in the production of cheap and fully nutritious fodder. They give the farm animals more than half the feed.

Classification of mountainous areas of the Kyrgyz Republic by height above sea level: 5.8% – to 1000 m above sea level; 22.6% – from 1000 to 2000 м above sea level; 30.2% – from 2000 to 3000 m above sea level; 40.8% – from 3000 m and more above sea level (Abdurasulova, 2014).

Classification of pastures by location and distance from settlements:

- landing pastures located near villages include cultivated pastures, hayfields, pastures on garden and forest lands (~ 40%);
- intense pastures, pastures located between the distant pastures and the near pastures (~ 30%).

Classification of mountainous areas of the Kyrgyz Republic by seasonal using: Winter pastures (2,063,000 hectares) are located close to settlements in areas with little snowfall. Grazing on these pastures occurs year-round, as a result they are heavily grazed. Summer pastures (4.129.000 hectares) are located in mid-mountain and high-mountain valleys and gorges at a far distance from the settlements. Such pastures are highly productive and are used during one to four months of the summer season. Spring-autumn pastures (2.955.000 hectares) are located in the foothills at an altitude of less than 2500 m. Grazing begins in early spring with the appearance of vegetation and in the autumn after harvesting. Unfortunately, the tradi-

tional cycle of pasture usage is broken now. According to the Institute of Land Management (Kyrgyzgiprozem), the total area of degraded pastures is 1,661 thousand hectares or 18% of the total area. Conditionally clean are 2741 thousand hectares or 30% (Tulobaev et al., 2016; Tulobaev, 2016).

Due to a sharp increase in livestock population, the load on nearby pastures increased. Distant pastures are not fully utilized, or are no longer used at all. Therefore, agriculture faces the most urgent task of accelerating measures for the effective use of the republic's basic wealth, which are pastures (Abdyraeva and Rasheva, 2014).

According to the scheme developed by us, traditional management of pasture resources is one of the main factors for the development of pasture livestock.

The Constitution of the Kyrgyz Republic states that the Land may also be in private, municipal and other forms of ownership, with the exception of pastures that cannot be privately owned (Constitution of Kyrgyz Republic).

The Kyrgyz Republic has a regulatory framework governing the use of land, including pasture resources. In the legal use of natural resources and the provision of guarantees, human rights to access resources that are not harmful to health were taken into account. And also scientifically based social, environmental and economic interests are taken into account.

To draw up a regulatory framework for pastures, the Ministry of Agriculture of the Kyrgyz Republic developed draft laws that were adopted by the Parliament of the Kyrgyz Republic. Thus, the Law on Pastures was adopted. Amendments and additions were also made to the Law "On the Management of Agricultural Lands" and to the Land Code of the Kyrgyz Republic (The Law…, 2009).

These legal documents establish completely new principles of pasture use, enable local communities to create pasture user associations, which have an executive body in their management structure – Pasture Committees. A new approach is that the local authority has the right to delegate management in pasture use to public associations of pasture users. There are two monitoring systems. (1) At the community level, Pasture Committees make plans for pasture management and participate in assessment teams formed at the level of the local village government. Traditional knowledge is used in these assessments. (2) At the national level, the Kyrgyzgiprozem is supposed to conduct scientific assessments at key plots (Constitution of Kyrgyz Republic).

Innovation in the law is a ban on the transfer of pastures for rent and sublease. From the moment the new law comes into force, pastures are provided only for use on the basis of pasture tickets, and citizens will have to buy pasture tickets from the Pasture committees. The Pasture Committee consists of representatives of pasture

users, deputies of the representative body of local self-government, heads of the executive and administrative body of local self-government. Their total number should be odd, and representatives of the pasture users association should form a majority among the members of the Pasture Committee. Pasture management decentralization was aimed from the outset at fair allocation of user rights to all villagers, not only livestock holders. The major instrument for pasture management is the Community Pasture Management Plan, which is developed and approved at the local level (Tulobaev, 2008; The Law…, 2009).

Along with traditional pasture management, in order to increase competitiveness in the global market, farms are modernizing their production under the HACCP (Hazard Analysis and Critical Control Points) system. This system provides control at all stages of food production, every point of the process of production, storage and sale of products. In addition, individual farms produce products that meet the Halal standard (everything that is permitted and permissible in Islam), which will increase interest in meat and dairy products of Kyrgyzstan in Muslim countries (Asankanov et al., 2016).

However, the lack of financial opportunities does not allow carrying out the process of modernization everywhere, which complicates the export of products and causes significant damage to the country's economy.

Conclusions

If the measure of wealth in Western society is the presence of capital and its investment in an efficient and profitable sphere, for many Kyrgyz the number of livestock determines its material wealth and social status. Continuing a long tradition, the livestock sector is one of the most powerful components of the economy of the Kyrgyz Republic. In Kyrgyzstan, over 96% of cattle and sheep, 97% of horses belong to small owners (household farms and private farms), the growth of livestock production has made a serious contribution to reducing rural poverty. Its share in the structure of gross agricultural output is 47.5%. This is a unique creation of nature, our nationwide wealth. Reasonable use of it, respect for it, care for its preservation and augmentation is our common cause.

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CHALLENGES AND DIGITAL ENERGY OF PETROLEUM SMART TECHNOLOGY

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Introduction

The value loop for smart fields combines the elements measure, model and control to optimize the performance of wells or fields. Modeling of the reservoir is based on geological, seismic, and well information. This is collected from measurements of the wells (such as borehole logging) and the initial production data (such as the flow rates of the wells). Static models are built to describe the reservoir architecture, whilst dynamic models predict the flow of fluids during production. These models determine the initial control settings and the well designs; for example, which well should produce what quantities of hydrocarbons from certain zones. Smart wells can then sense each zone's actual production form. This information can be used to restart the value loop, adjusting the model to fit the reality, which may change the controls required, the measurements, and so forth (Naus et al., 2004).

The value loop shows that an integrated structural approach is a fundamental part of making things smart. Only by integrating these elements and looking at the work processes and skills necessary to make those processes run is it possible to generate maximum business value (Arenas and Dolle, 2003).

Literature review

We found that it was possible to extend this model over the life cycle of the field by analysing a number of our core business processes at Shell. Most noticeably, at each stage of field development and field life cycles, opportunities for further smaller scale optimisation can be identified. For example, in the exploration and appraisal phase there are decisions taken that potentially impact subsequent

value generation. An overview is, therefore, required to look at optimisation in time and at each stage, as well as analyse the complete life cycle of the asset to ensure the organization of capabilities and data optimises asset value. This is the real challenge of the Petroleum digital industry (Brouwer and Jansen, 2002).

The ground in the oil patch has shifted dramatically. The forecast for the industry is extremely different today compared with how it looked just a couple of years ago, when the fundamentals of the oil industry were controlled by cartels. That traditional structural discipline has been replaced by a systemic imbalance marked by vastly increased supply and receding demand growth. Global economic weakness (in particular, slower growth in China and continuing financial woes in Europe); tougher fuel economy regulations; more viable forms of alternative energy; and the development of extraordinarily efficient engines in equipment as varied as cars, earthmovers, and power plants have all combined to dramatically curtail the need for oil. Meanwhile, robust new reserves, especially of shale oil, in numerous regions around the world are glutting the market (Naus et al., 2004).

It is good to know what the risks are that a company in that sector must face to be successful. General risks apply to every stock, such as management risk, but there are also more concentrated risks & issues that affect that specific industry (Glandt, 2003).

Geological risk refers to both the difficulty of extraction and the possibility that the accessible reserves in any deposit will be smaller than estimated. Oil and gas geologists work hard to minimize geological risk by testing frequently, so it is rare that estimates vary from the real situation. In fact, they use the terms “proven”, “probable” and “possible” before reserve estimates, to express their level of confidence in the findings (Glandt, 2003; Leemhuis et al., 2007).

Oil and gas companies tend to prefer countries with stable political systems and a history of granting and enforcing long-term leases. However, some companies simply go where the oil and gas is, even if a particular country does not quite match their preferences. Numerous issues may arise from this, including sudden nationalization and/or shifting political winds that change the regulatory environment. Depending on what country the oil is being extracted from, the deal a company starts with is not always the deal it ends up with, as the government may change its mind after the capital is invested, in order to take more profit for itself (Leemhuis et al., 2007).

Politically it can be obvious, such as developing in countries with an unstable dictatorship and a history of sudden nationalization – or more subtle – as found in nations that adjust foreign ownership rules to guarantee that domestic corporations gain an interest. An important approach that a company takes in mitigating

this risk is careful analysis and building sustainable relationships with its international oil and gas partners, if it hopes to remain in there for the long run.

Beyond the geological risk, the price of oil and gas is the primary factor in deciding whether a reserve is economically feasible. Basically, the higher the geological barriers to easy extraction, the more price risk a given project faces. This is because unconventional extraction usually costs more than a vertical drill down to a deposit. This does not mean that oil and gas companies automatically mothball a project that becomes unprofitable due to a price dip. Often, these projects cannot be quickly shut down and then restarted. Instead, O&G companies attempt to forecast the likely prices over the term of the project in order to decide whether to begin. Once a project has begun, price risk is a constant companion (van der Steen, 2006).

Supply and demand shocks are a very real risk for oil and gas companies. As mentioned, operations take a lot of capital and time to get going, and they are not easy to mothball when prices go south, or ramp up when they go north. The uneven nature of production is part of what makes the price of oil and gas so volatile. Other economic factors also play into this, as financial crises and macroeconomic factors can dry up capital or otherwise affect the industry independently of the usual price risks (van der Steen, 2006).

All of these preceding risks feed into the biggest of them all – operational costs. More onerous regulation, difficult drilling so the project becomes more expensive. Couple this with uncertain prices due to worldwide production beyond any one company's control, and you have some real cost concerns. This is not the end, however, as many oil and gas companies struggle to find and retain the qualified workers that they need during boom times, so payroll can quickly rise to add another cost to the overall picture. These costs, in turn, have made oil and gas a very capital-intensive industry, with fewer and fewer players all the time (van der Steen, 2006).

Improved economic ultimate recovery remains the key goal. Reservoir simulation studies have shown that zonal injection and production control in water injection schemes can add significant value. We have studied the value of smart wells and found that most of the value of smart completions is at the asset level, not the production system level – smart wells are about asset value, not well cost.

The industry needs a new paradigm. In order to survive, old dogs are going to have to learn new tricks. The digital age is here to stay and those who do not, at least in part, embrace it will fall by the wayside. To really make the most of these new capabilities, the industry needs to start fundamentally thinking about how to change the way in which we innovate and think. The industry also needs to look

outside itself and its traditional partners to find new skill sets and capabilities – to consider partnerships and knowledge sharing with new and unrelated industries (National Oil…, 2009).

Finally, it is important to remember that our growing involvement in the world of digital technology is a vital conduit to a new generation of engineers and technologists. Our challenge is not just in producing the oil and gas, but also in ensuring that society's expectations of minimal environmental impact are achieved. Good global neighbour relations and sensitivity to the diverse needs of the different regions in which we work, and people with whom we work, are fundamental to global success (Cleetus et al., 2009).

Despite the risks, there is still a very real demand for energy, and oil and gas fills part of that demand. Produers can still find rewards in oil and gas but it helps to know the potential risks that go along with those potential rewards. The biggest mistake that oil and gas companies can make in this difficult business landscape is to focus on reducing costs (either operating or general and administrative) and this strategy is effective only in a very narrow range of market conditions and rarely effective enough to make businesses successful over the long term. Rather, companies should carefully consider the supply of assets, analyze the logistics of accessing available markets and ensure a long-term presence in these markets without getting into a bidding war. Oversupply and lower prices represent a real challenge to the industry, but that doesn't mean the future is all gloom. It just means that producers and refiners need to be prepared and adopt strategies that take advantage of the new reality (Cleetus et al., 2009; van der Steen, 2006).

Conclusions

The Smart Wells Technology enables operators to have 'real-time' data from the wellbore so it has the ability to acquire the relevant information required for future decision-making. Consequently, the operators can remotely monitor and control the production of hydrocarbons through remotely operated completion systems. This technology has been applied in many assets to increase production and reduce intervention costs, especially in offshore fields. It enables quick reaction to unexpected events during the life of a reservoir, such as delaying early water breakthrough.

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TECHNOLOGY DEVELOPMENT

HIKARIYON: 4TH GENERATION INTERACTION PLATFORM

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Introduction

The era of technology has grown tremendously in the last half century as many research contributions have demonstrated its relevance and impact in the field of every production process, consumer products, and even in the gaming industry. In this article, we focused on the game world and its effects on human interaction. Especially, interactive systems have become one of the most important points in technology that will help reshape the game world. After successful prototype versions of gaming interactive systems, there is a strong need and aim for using these systems in the gaming field. Many companies are interested in developing various types of interaction systems for the gaming industry with glasses, bracelets, rings etc. Also, they provide funds for research and development.

In our country, gaming technologies and markets are supported to a great extent and the technological infrastructure support required for the start is also provided. These conditions will provide a large opportunity for our startups for changing the gaming future.

People on the playground need strong passion and creativity. The success will rely on how those people focus on playing. In this article, we identified a new type of interaction system called "HIKARIYON" which can be used to understand muscle movements, reading of electromyography (EMG) data, bits of vector data, other devices with magnetic interactions, and electrical signals of our body especially inside our arm. This device has powerful algorithms which are understood and translated into commands to game with human movements.

The HIKARIYON project was created as a solution and development proposal in this regard. Thus, each person will receive the opportunity for better interaction.

This device will be a system that helps to cement the basic requirements for a better quality society order. The rest of the paper is organized as follows; used technologies, used algorithms, discussion of the opportunities and the threats, suggested solutions. At the end of this paper, conclusions and future works are discussed.

Literature review

We planned to design a device with the HIKARIYON project Which will be equipped with several sensors (gesture, magnetic hall effect, accelerometer, EMG sensors, RFID) that can recognize movements of the hands and the arms. By using a processor, it solved the data of electromyography and other sensor values and then recognized the movements following our algorithms. All of the sensors are responsible to recognize and optimize movements of strength for our open-world reality platforms. Therefore, it is necessary for each user to make a calibration step before using the device. This is very important as each user has different types of body characteristics; muscle size, type of skin, movements speed, etc. In addition, the defined sensors, the device has a three-axis gyroscope for supporting calculation and tactile sensor for transmitting feedback. Thus, each user makes a correct move or optimizes their game tactics. Also, this system provides the opportunities to make an easily-activated system. For the connection, two options are possible using the latest Bluetooth and wi-fi technologies. Both of them use less power with current versions. We are thinking about focusing on the wi-fi module.

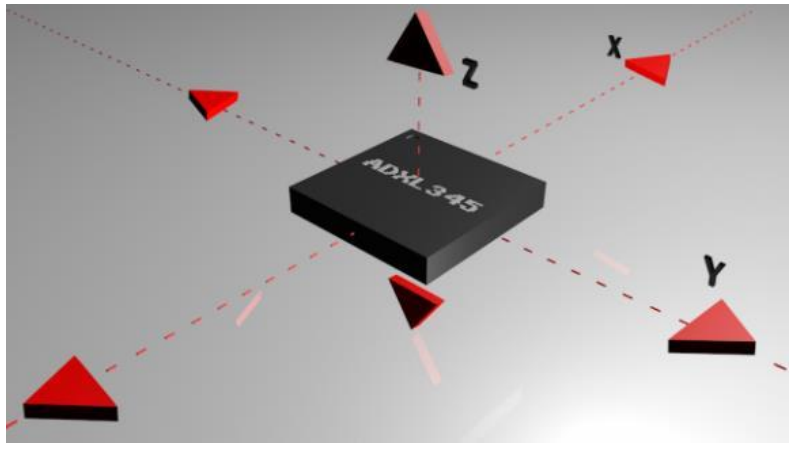

Figure 1. Wireless Dynamics Sensor System

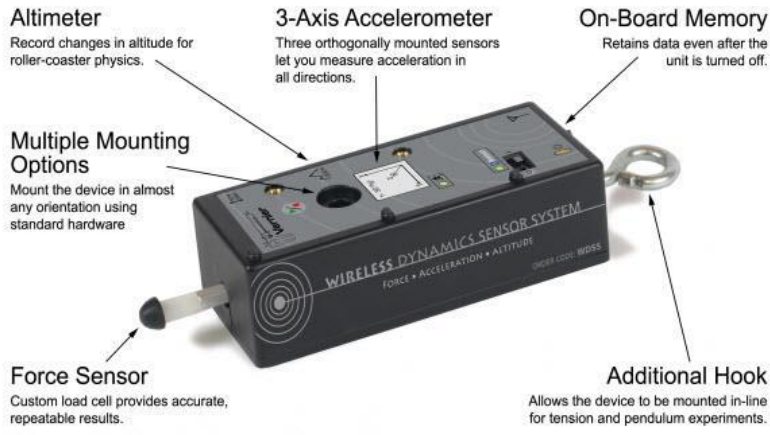

Figure 2. Axes of measurement for a triple axis accelerometer

In this study, we tried to foresee the potential of HIKARIYON and how we will adapt it to our platform. We have reviewed existing projects on the market. We have focused on projects on the market like MYO which has interesting interaction. The MYO project has very similar approach to our aim, but they are using this technology in the medical industry. Based on MYO, we have examined some of the sources they have searched for due to the similarity of our objectives. The examined sources are Mulling and Sathiyanarayanan (2015), Lu et al. (2014), Pavlovic et al. (1997), Pang and Ismail (2015), Sathiyanarayanan and Burlutskiy (2015). We examined the size of the market. We started to prepare the first prototype for collecting user experience. It is evident that the user's pleasure increases and attracts more attention with increasing performance in such devices. Our aim is to provide a quality service to the user with high performance and short communication time.

Conclusions

We researched several interaction projects, understanding the advantages and disadvantages. After that, we focused on finding the better solution. We realized that this device can be in different parts of the gaming industry. Thus, based on the positive results, we offered that the interaction device which will be produced has a new way to interact with our algorithms and platforms. The users body's data is sufficient to be calculated and recognized by this device. Also, the software solu-

tions supported the technologies. Both of them give better options for interaction systems.

Finally, HIKARIYON gives us a new chance for entry into the gaming industry by fixing missing elements about emotion and feelings. Our future aim is to improve the device and create more abilities with newly equipped sensors, powerful processors, and new algorithms which will offer more opportunities for entertainment in virtual worlds. Also, our long term aims are developing a suitable prototype with different interaction abilities for the gaming field. Lastly, we are very engaged in improving this interaction system.

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TOURISM MANAGEMENT

TOURISM SERVICES SECTOR IN THE ERA OF CHANGES IN THE INDUSTRIAL REVOLUTION 4.0

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Introduction

The main goal of this article is reviewing innovative solutions of the 4.0 industry implemented into the tourism branch around the world. It is said, that the current scientific advancement, especially in the field of IT, cybernetics, nanotechnology, biotechnology and ecotechnology is a beginning to a new era called "industry 4.0". The research mainly refers to the industrial branch, associated with production (Ślusarczyk, 2018). In a limited extent, research on the influence of industry 4.0 on changes in certain branches, especially tourism – dubbed the most rapidly developing, is being conducted. An inspection of bibliography in the EBSCO databases for the phrase "industry 4.0 in tourism" and years 2005-2018, indicates 5 occurring articles with the phrase in their titles and 135 articles with this phrase in their keywords. An overview of the Web of Science database for the same

phrase indicated 1 article with the phrase in title and 19 with the phrase in keywords. Because of those results, checking if industry 4.0 technologies are implemented in the public sector is believed to be crucial from the tourism sector research's point of view.

Literature review

An overview of the literature on research of industry 4.0 (Koop, 2014; Bendkowski, 2017; Piątek, 2017; Thimsen, 2014; Roszak, 2018; Haiduk, 2018) indicates that the definition of "industry 4.0" is interpreted in a variety of ways. The most frequent definitions refer to concepts such as technological revolution, technologic processes, processes of automatization and digitization of industry, virtual reality of the Internet and information technology, IT systems, intelligent systems, modern communication, digitalization, merging industry technology and digitalization. An overview of research in the field of tourism defines tourism 4.0 as: Tourism 4.0 is a name for the current trend of processing significant amounts of data, gathered from a gigantic number of tourists aimed to create personalized travelling. It is based on many modern high-tech computer technologies. The term derives from a new paradigm in industry, called "industry 4.0" (Götz and Gracel, 2017; Spałek, 2017; Stolarczyk, 2017; Furmanek, 2018; Łupicka and Grzybowska, 2017; Wittbrodt and Łapuńka, 2017; Bendkowski, 2017; Szulewski, 2016; Paprocki, 2016; Woliński, 2016). According to authors, tourism 4.0 is supposed to be interpreted as a platform linking innovative technologies, principally IT, cybernetics, biotechnology, ecotechnology and nanotechnology with digitalization leading to groundbreaking changes in tourism companies functioning. Specifically, the platform of tourism 4.0 assists the development of intelligent communication infrastructure, opens a way to processing great amounts of data, which serve improvement and personalization of touristic services and commits to creating an innovative product of advanced technology.

Research methods

Research was conducted by applying the stocktaking method and desk research. The desk research method has enabled us to determine which technologies are being identified with industry 4.0".

Using methods of desk research and stocktaking, an overview of innovative solutions applied in tourism around the world, directly associated with technologies 4.0, has been conducted. A stocktaking of websites led by touristic objects has

been conducted as well. It was undertaken by 28 students of tourism and recreation of the Faculty of Administration of Engineering at Bialystok University of Technology. The research resulted in extracting 102 innovations carried out in touristic services. The stocktake innovations underwent grouping based on type of business, classified according to PKD. Five groups created to provide hotel, gastronomical, organisational, recreational and transport services, divided into subgroups, were identified. 79 innovations, which were included in those groups, were further researched. Stocktake innovations were rated by analysing the amount of innovations implemented in a certain group, identifications of technologies, on which the innovations were based and the degree of influence on the functioning of companies.

In further research, the innovations were assigned to a certain technology 4.0. The last step of this research was to discern a category of innovations based on the OECD classification for every group. The results were described and presented graphically.

Research results

During the analysis, 102 innovations were found, which both directly and indirectly concern the tourist branch. They were grouped based on type of business subject, classified according to PKD. Five groups of companies were discerned, all of which provide hotel, gastronomical, travel agency, reacreational transport services and one group of remaining services, dubbed in literature as "paratourism". Expanding each group, subgroups were discerned.

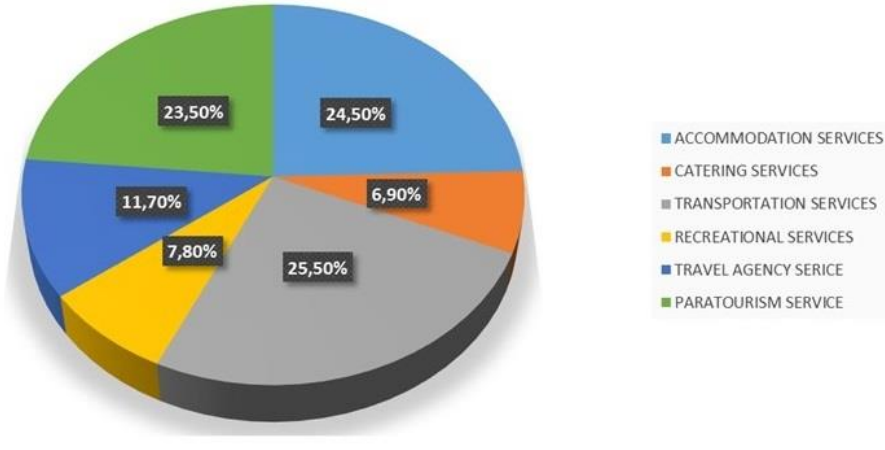

Figure 1. Division of the innovation according to services
Source: author's elaboration.

Results of the analysis of the graph show that the largest grouping with 25.5%, 26 innovations concern transport services divided into water, road and air transport. 24.5%, 25 innovations reside in accommodation services, and paratourism services have 24 innovations, which amounts to 23.5%. 12 further innovations, 11.7% are travel agency services. 8 innovations have been found for recreational services, accounting for 7.8%. The least 6.9%, 7 innovations have been assigned to catering services. The rest of the innovations are paratourism services.

It is clear, based on the data presented, that the most innovations were assigned to transport services. Taking into account the division into subgroups, over half of the implemented innovations comes from mechanical engineering. However, not only tourists have a variety of innovative conveniences, due to innovations for locals being placed second and their amount at 25. On the other hand, the least innovations are found in the gastronomical and recreational branches.

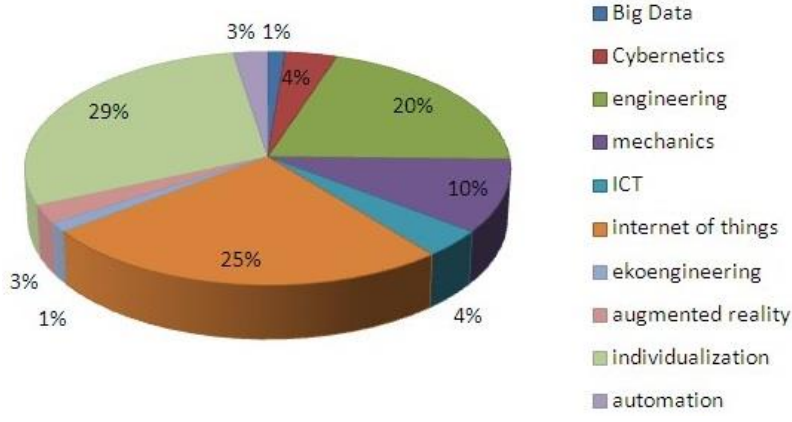

Figure 2. Division of the innovation according industry Technologies 4.0
Source: author's elaboration.

79 innovations, which were included in those groups, were further researched. Results from analysing the graph of the 79 innovations show that the most, 29% that is 23 innovations, are in individualization. We can see that a little less have internet of things (25.32%) and engineering (20.25%). On the fourth place is mechanics which have 10,12%. Technologies with the lowest amount in the graph is

Big Data (1.27%), Cybernetics (3.80%), ICT (3.80%), ekoengineering (1.27%), augmented reality (2.53%) and automation (2.53%).

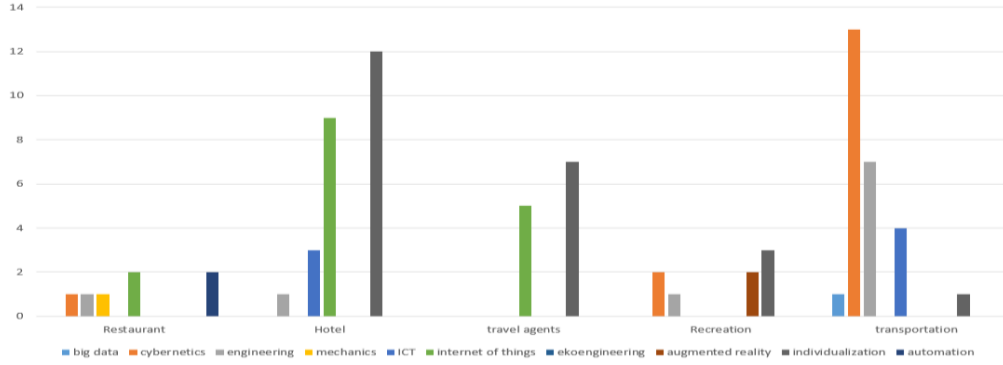

Figure 3. Results of analysis

Source: author's elaboration.

Seven innovations were assigned to restaurants, most of them related to the individualization of products. Of the 25 innovations in hotels as well as the 12 innovations in travel agencies, no technology was used. In recreational services, a technology for augmented reality has emerged. However, with 26 innovations in transport services, we can see that cybernetics prevails.

Conclusions

The research on tourism market observation due to the process of production of tourism services, including the 4.0 technology, allows us to separate 3 areas which will be affected by these changes, among others: (1) creating a personalised tourism offer by processing large amounts of data collected from a large number of travellers and Internet usage, (2) communication between the customer and the tour operator through the implementation of Chat Bots and Robotic Assistance Devices, (3) customer service and service production through the use of robotics and artificial intelligence.

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TOURISM 4.0 – DEVELOPMENT TRENDS OF THE HOTEL INDUSTRY

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Introduction

Industry 4.0 illustrates changes in the economy which are based on four groups of technological systems and are related to four branches of scientific development, that is: N-Nanotechnology, B-Biotechnology, I-Information and communication, C-Cognitive technology (OECD, 2016).

In the tourism branch, technologies of Industry 4.0 change the reality in at least two categories, in the process of creating:

- offers for tourists, utilizing the progress of nano, bio, and eco technology in the form of innovative tourist products (simulating the sound and physical properties of waves, lighting up trees) which become, by themselves, a tourist attraction and the target of a trip;
- tourist services in firms, utilizing mainly advanced digital technologies, automated technologies, cybernetics, and robotics;
- both of those categories will have an impact on the future trends in tourism.

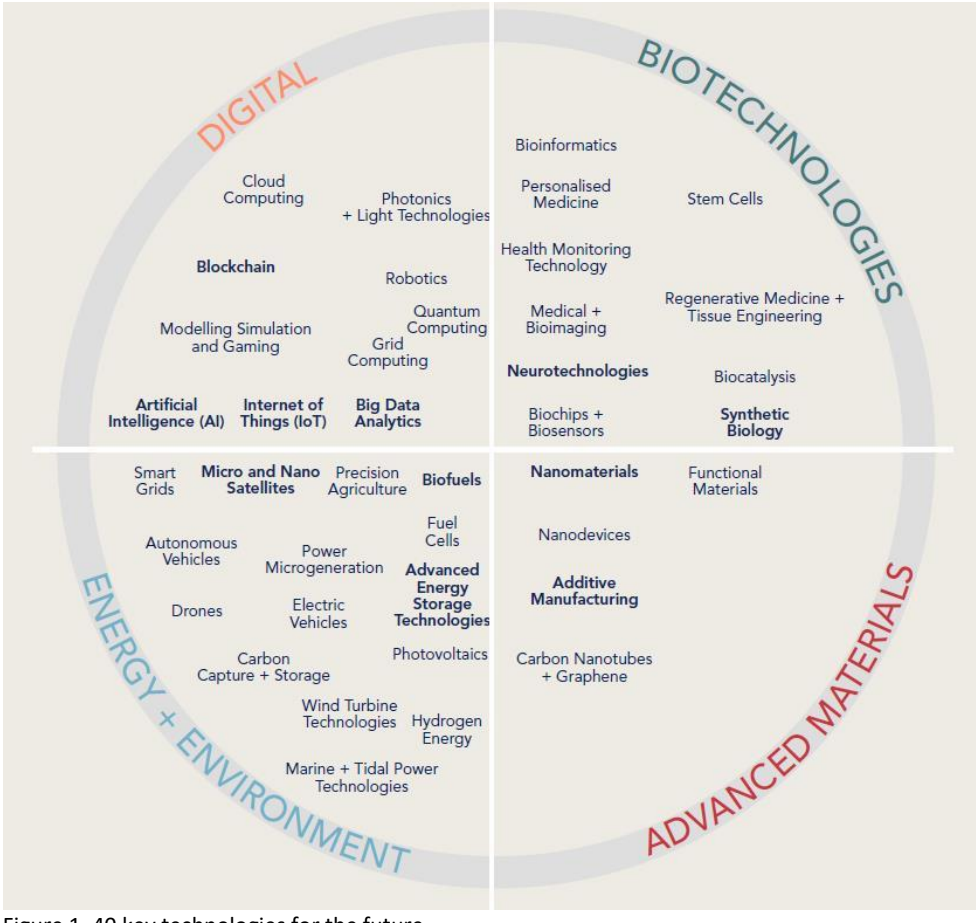

Figure 1. 40 key technologies for the future

Source: (OECD, 2016).

Literature review

Industry 4.0 horizontally transforms and integrates operation of the whole organization, starting with the purchase and documenting the concept of the product, such as its manufacturing, logistics and services. Data concerning efficiency and planning of operations as well as quality management is supported by augmented reality, and optimized in an integrated network available in real-time (Hermann et al., 1998).

Digital conversion of the products includes expanding the current portfolio, for example by adding communication technology or intelligent sensors that could be used in conjunction with data analysis tools (Zhong et al., 2017).

Industry 4.0 is a concept that will permanently change the operational model of companies from various industries, including the hotel industry. Transformation of industry to the digital 4.0 models will also be an important change from the point of view of businesses and processes. The Machine-to-Machine (M2M) technology, the Internet of Things (IoT) as well as advanced methods of processing and storing data are key factors of this transformation (Ivanović et al., 2016).

Tourism based on technology, commonly known as e-tourism has a major influence on businesses tied to tourism, especially the hotel industry. They are, in a way, forced to keep up with the novel and innovative technical and technological solutions to be competitive on the tourism services market. The progress of ICT technology without doubt is of importance both to the business models as well as strategies chosen by the companies and forming operational processes and organizational structures (Morais et al., 2013).

Tourism and hotel enterprises gradually introduce some of the solutions of Industry 4.0 such as: automation of services (RAISA), chat bots, delivery robots, janitor robots, portable restaurants, self service information kiosks that could be, for example, used for check-in, and many others (Morais et al., 2013).

Robotics studies in tourism are meager, it is an important science gap that needs to be filled (Ivanov and Webster, 2017).

The need to perform studies concerning the level of capability to introduce the solutions of Industry 4.0 in the hotel line is determined by low consciousness of managers and the rest of the employees of the currently occurring technological changes that, in the near future will be a condition of operating a hotel business in the era of Industry 4.0 (Ivanov, 2019). Considering the character of hotel services, the most vital part in need of study is customer service, during the selection of a service as well as when it is being performed, but also after providing it (Az-Eddine et al., 2006).

Research methods

The aim of this article is to analyze various kinds of technologies being introduced by Industry 4.0 in tourist services, hospitality industry as well as how to identify them in a hotel's management structure.

The study was conducted using a method of a partially structured expanded interview by using a questionnaire and the face-to-face method (Mazurek-

Łopacińska, 2016). The person to be questioned was the CEO of the Polish Hotel Holding, Gheorgh Marian Cristescu on the 28th of May, 2019.

Research results

The study has ascertained that, regardless of the organizational structure, hotels utilize the technology of «the internet of things (IoT)» and «the Internet of Services (IoS)», the dominating chain of customer service in which ICT technologies are introduced – reservation systems, occasionally in the reception desk and in the hotel guest service. A small number of hotels use Product Life-cycle Management (PLC), processing, and Big Data Analysis (BDA) technology. The other technological solutions (ie. Robotics, Automation) are known to hotel management but are not planned to be introduced in the near future.

Studies have determined that the fourth industrial revolution has significance to the hotel industry and the managerial staff perceives their knowledge on the solutions of Industry 4.0 as adequate. The study has also ascertained that Industry 4.0 can influence, but not in a major way, the advancements in the hotel industry. When it comes to the degree of changes a hotel could introduce, each hotel should be investigated on a case-by-case basis. The greatest chance of successfully introducing major solutions and conveniences is in a hotel chain, as their flow of theoretical knowledge and practical solutions in conjunction with sufficient funds eases innovative undertakings. Information about potential economical benefits and the value added to the hotel object related to introducing new technologies are gained during training courses, cyclical worker meetings, and work experience.

The main factors inhibiting the introduction of new solutions are:

- lack of financial support from the government at the stage of introduction of modern solutions;
- lack of technical support from research centers;
- lack of contact with Industry 4.0 professionals;
- lack of conscience of the risk tied to changes resulting from introducing high tech solutions.

The findings of the study established that the most commonly introduced innovative solutions take place in marketing cells of an object (such as: on-line marketing strategies, the CRM system, personalized service in each stage of using a hotel service, active on-line cooperation with the customer to obtain feedback) and in customer service (for example: a hotel reservation app, magnetic cards/keys linked to the computer system of the hotel).

The most important factor in planning and introducing modern technological solutions is considered to be the law, which has not yet caught up to the technological advancements, especially robotics in service. At the same time, it prevents usage of the funding and development programs available from the European Union. Another important factor hindering planning and introducing new solutions is insufficient communications in management cells, that could be a result of the organizational structure of the studied hotels.

Conclusions

Studies have shown that hotels in Poland are not yet ready to introduce 4.0 technology and do not commit to introducing innovative solutions. The problems appear right at the planning stage of new investments. Insufficient communication and low consciousness of the potential profits resulting from planned changes are a major hindrance to the progress of Industry 4.0 in the Polish hotel industry.

The social and cultural environment also has a major influence on the level of introduced changes. Religious and political views could hamper the growth of Industry 4.0 in the tourism line. Consumers of hotel services still consider personal contact a very important factor. This is why the introduction of robots in some hotels is not advised.

The performed studies encourage further study of the topic of the fourth industrial revolution in the tourism branch, as it is a major sector of the Polish economy and is continuing to grow further.

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