INTERNATIONAL JOURNAL FOR REGIONAL DEVELOPMENT

IJRD

International Journal for Regional Development (IJRD) is a scientific, academic review covering all fields of policies, administration and management of regional and logistics affairs, including, but not limited to, business ethics, business strategy, entrepreneurship, innovation, international projects, cross-cultural studies, as well as supply chain and operations management.

Vol. II.
July 2020

Official Journal of

AREMA

AREMA – ACADEMY OF REGIONAL DEVELOPMENT

INTERNATIONAL JOURNAL FOR REGIONAL DEVELOPMENT

International Journal for Regional Development
(IJRD - Print) ISSN 2463-7920
(IJRD - Online) ISSN 2463-7939

PUBLISHED BY
AREMA, Academy of regional management
Kidričeva ulica 28
SI - 3250 Rogaška Slatina
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CONTENT

EDITORIAL COMENTARY

Dear colleagues,

even in these unpleasant and dangerous times of pandemic crises the academic and research spirit did not bend the knee to the virus. We kept on researching and writing even with more passion and momentum.

Vol. II of the IJRD is presenting the latest thinking and research on topics such as legal protection, sustainability, new technologies and modern management.

And as we did it before, we still are cordially inviting professionals, academics and researchers to join us as international editorial members as well as researchers who would like to publish their original scientific research work and projects.

Looking forward to cooperate with you

Dr. Patricija Jankovič
Editor In-chief

Matjaž Štor[1]

COMPUTERISATION OF THE LOGISTICAL PROCESS

Abstract:
The globalisation has brought many changes to the whole world, to Europe as well as to Slovenia. As far as contemporary business is considered, companies cannot imagine to work without information technologies. In the last decade, the development and progress of such technologies has been very rapid, which is also reflected in acceleration of computerisation of logistics processes within the organisations. Recently, the importance of informatics in logistics has still been growing because of the management that expects nothing less from the logistics than accurate information at any time. Gradually, logistics is growing over the company's strategic function, and this is why it has to overcome new challenges every day. Therefore, the vision of required information, that contemporary logistics is going to have to provide according to the needs of the management, is going to be presented in this article. Principally, logistics will have to provide information on the basis of commissions and payments in organisations; furthermore the field of information exchange throughout the whole supply chain is of high importance. The highest level of IT support in logistics processes in supply chains is undoubtedly going to be connecting individual IT systems and therefore creating an integral IT system.

Key words: *computerisation, globalisation, integration, IT systems, logistics processes, supply chain, strategic management.*

1 INTRODUCTION

Nowadays, in order to achieve, maintain an sustain advantage over competition either on local or on global markets, each company must optimise its business

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performance in all its business processes, meaning in the aspect of all the company's business functions. As one of the business functions that contributes to competitive advantages on the market, logistics, at least as far as computerisation is concerned, is the one advantage that can secure more optimal and profitable business performance. By computerising the logistics processes, costs can be diminished and quality of business performance can be improved already in the medium run.

Therefore, each company must establish an organisational structure, which is going to enable as rational and as economical business performance as possible. Consequently, the company intends to search its success and the success of its logistics function alongside strategic planning process, that should be in accordance to the future visions of the company.

What is important is that the organisation of the logistics function is going to be dealt with properly, if and only if it sustains its connecting characteristics towards fundamental business functions. All logistics tasks should be carried out in the competence of logistics. Logistics becomes the central service area of the business system with proper responsibility considering time and place adjustments of the material and products flow in accordance to the internal demands and demands on the market of the business system. Simultaneously, with this feature it becomes an important instrument for planning, steering and controlling, used and needed for the whole business system. (Oblak 1997, pages 53-54)

Not long ago, most companies were treating logistics as a supporting activity, which ensures lower costs when providing the next five criteria (the so-called ″5P″): proper material, in proper quantity, proper quality, at the proper time and proper place. There are new problems to be tackled by the logistic professionals, due to the development in global economy, globalisation and the changes in the conditions on the market that it has brought with it. The most important factors are the supply of various products in competitive markets, the demand to deliver smaller amounts just in time, the possibility to track the products (e.g. cold chain by the ″HACCP″ standard in accordance to food industry), the correct purchase planning and the ability to communicate with one's suppliers and customers qualitatively (″CMR″). However, the precondition for all the factors is making sure that quality information on each and every occurrence in the logistics chain is provided. (Logožar 2002, page 8)

The increased demand for logistics services is determined by reduction of the production depth. Based on this, the question about one's logistics range tightens even more. By handing over the logistics services to external partners, it can be contributed to achieving collective positive effects. Despite the fact that involving external suppliers causes bigger changes in IT flows. Based on all the references given, company's IT system has to be improved. (Ogorelc 2001, page 17)

In many companies, informatics is still discussed as an expense and not many have realised its competitive advantage. Many theories suggest that investing in new technology brings growth to the company. By improving IT systems, there is a possibility that companies may experience lower logistics costs and succeed in shortening the delivery time. The main step that managerial structures must take in order to optimise IT flows and technologies requires maximum support in making changes for the better. If the company's goal is to accelerate production for 10 per cent, informatics must aim for the same goal. Goals in improving informatics are mainly focused on gaining new customers, producing new products, optimising business processes and on data management. Especially, innovativeness is very essential in the area of informatics, because it can create the so much needed competitive advantage.

Convenient information at the right place and connectedness within every participant in the supply chain are the main two conditions and the foundation when it comes to right and quality decision making. Much needed is the connection between material flow, processes, information and people who participate in these processes. This connection is being secured by using modern informational and technological solutions for the sake of logistics and also by using standards such as using bar codes called ″EAN″ (in logistics ″SSCC″), and recently the so-called ″RFID″ technology has been used massively. When searching for the solution, standards that companies have already been using must be taken into consideration, so that the previously mentioned connections between companies are compatible.

Investment in mobile terminal equipment is also a necessity. The company's activity of ensuring good service for the customers brings huge demands on the employees and the equipment, such as just in time delivery of the products to the right location (literally ″to the buyer's desk″) and the products being stored at company's facilities, all this with the aim of lowering costs. With the use of the bar codes in compliance with ″EAN″ standards and radio-frequency equipment it was possible to bring successfulness up by 40 per cent (less errors, route optimisation, rewards after being effective, higher speed and responsiveness, reliability…). What is interesting is that some of the companies have gained business especially because they had the right IT support for their processes, allowing customers to physically find out how the centre operates before signing the contract on business cooperation. A concrete example from production area suggests that the behaviour is alike. A successful Slovenian company, whose most products get exported, has been sensing that the logistics function has been one of the advantages over competition. Nevertheless, this company is not one of the biggest producers on the European market, they are capable of being much more flexible when it comes to delivering their products to their customers than their competition. ″Order today, ship tomorrow″ is the motto guiding their work, which they realised by implementing bar codes and mobile terminal equipment.

When a company wants to make a breakthrough, it exploits various sales channels. Some of the most important sales channels (especially in food and beverage industry) are outpatient sales, order collection, and sales promotion on the field. Distributors use portable terminals with the ″WWAN″ communication (″GSM″, ″GPRS″) and can send information as soon as something has changed out in the field. The company then analyses the information and prepares requests for the production on the same day as the information has been reported by the distributors. As reported by one of the most pervasive Slovenian companies in the food industry, responsiveness to demands on the market is one of the essential advantages on a competitive battlefield. Furthermore, the system allows tracking in accordance with the legislation, which also includes ″HACCP″ demands.

Current technologies enable very good integration of distribution and storage process into company's business system. These technologies include automatization and computerisation of storage processes, suitable mobile terminal equipment, bar code labelling, ″WLAN″ equipment for wireless connection of terminals, printers and other equipment, and ″WWAN″ (″GSM″/″GPRS″) communication for mobile sales and to get information from the field. Even though these examples are from different operation areas and different fields, they all suggest that requirements are similar and that logistics processes have an important function in companies. Despite the proven savings, companies act rather slow when deciding to update their logistics function.

Why? There are many reasons, but we will mention only some of those:

- that company's management does not include a person who would be responsible for the logistics,
- that usually, the company focuses on the production, so logistics gets left out,
- that management does not recognise the opportunity and the advantage that investing in update would bring,
- that investment is hard to explain when results are not possible to measure immediately i.e. the results that the company did not pay enough necessary attention to when rationalising their business performance (e.g. less errors/refunds, route optimisation, rewarding for work, organisation…).

Let us finish the introduction with a thought by the storage distributive centre director, that says that without a solution, that enables gathering and accessing the information from the spot of the action, they would not be able to perform in any business. He also adds that many customers still do not use the bar code to label the logistics units. Therefore, there is still some space for individual companies to take a step forward and look for internal reserves.

2 HOW TO APPROACH THE COMPUTERISATION OF THE PROCESSES?

In last few years, logistics was captured by the wave of changes, originating from business globalisation, IT development and asserting business in real time as a generally accepted way of business performance. The introduction of new IT technologies was the factor that had a big impact on the changes being made in logistics concept. Computerisation in logistics enables that the required information is available at all times. This is the reason why it is absolutely crucial to optimise the route of the products, storage and the way of exchanging information within all participants in the process, in conformity with the demands for lowering costs. Connections take place not only on the order and payment basis, but also companies are linking their IT systems and by doing so allowing mutual information exchange. This contributes to more reliable business performance and not only to faster but also cheaper movement of goods.

Big distributors and big trading chains started by computerising their logistics processes first. More and more frequently, such companies are deciding to implement new IT systems in order to manage supply chains. These decisions were forced by the fact that the number of refunds had exceeded the critical point, because the products were falsely delivered. A higher number of their clients were threatening with quitting their business collaboration. Consequently, the company management and the internal partners unanimously agreed on making an analysis of the situation. Afterwards, idea projects on reorganisation of logistics processes by implementing IT support are to be made.

The fundamental system weaknesses that analyses were mostly suggesting were:

- response time from when orders are received and to when the ordered articles are delivered is too long,
- delivery errors,
- according to selected measures, insufficient order tracking,
- difficulties with labelling the products when they are ready to be shipped,
- multiple manual entries which means greater chance of making a mistake,
- time lag in between conducting physical manipulation and entry in the IT system.

One of the consequences was incomplete inventory. Deviation in accounting status of stocks was acknowledged during the inventory. They have been looking for reasons why this had happened for some time, but then put this issue aside until next year. Another finding was that logistics system and order is only in the minds of the warehouse employees.

Previously mentioned employees knew exactly where to store which articles, and which need to be issued earlier and which later, that is why they were practically irreplaceable.

Based on the analyses, they set up some of the most important demands, that should be the features of the new IT system:

- support of product tracking by using international standard bar codes and the possibility to track serial numbers, batches and dates of use,
- support of online business with customers and suppliers,
- collection of information in realistic time by using appropriate hardware based on radio communication, that enables a direct connection with the IT system,
- paperless business performance in internal logistics with the use of appropriate hardware,
- use of internet technology allowing different user access and business performance in real time,
- by introducing article labelling at takeover and shipping, the company becomes more flexible,
- the possibility of fast and dynamic upgrading of the computer application that could comply with demands for changes and completion in logistics processes.

To carry out the company's computerisation of logistics processes projects, companies hire external counselling companies that provide advice already during analysis and preparation of project's content. To support the performance there is also a project group consisting of those in charge of the company who are professionally responsible for all the important areas of the company's business performance.

After some time has passed, company's management prepares an economics analysis on the introduction of the project and in this case the benefits are the following:

- all expectations get fulfilled,
- the investment recompensates in less than a year,
- many of the imperfections get removed,
- competitive advantage gets bigger,
- quality of services improves.

Rather than focusing on these benefits, the company has pursued an analysis on their partners and tried their best to adjust to the demands on the market.
Quick changes in politics and economy, that we have witnessed also in Slovenia, have forced plenty companies to start looking for savings also in processes that were until recently considered as less important.

Joint European market is removing boarders and bringing new challenges along. Changes in key and important factors, such as price, quality, time and others were under more pressure than ever. One of the key paths to success is becoming the company's successfulness in sensing the demands on the market in time and then the ability to properly respond to these changes.

Various studies suggest that the same amount of investment in production brings only a small amount of improvement in comparison with the same amount of investment in logistics. If we analyse Slovenian companies, we can conclude that except some rare companies, the logistics area in a company and between companies is the one that has the best chance at optimisation (i.e. better work quality, shorter response times, bigger flexibility, shorter time of recompensating the investment).

3 CONTENT OVERVIEWS OF A PRACTICAL EXAMPLE

Induction of a new IT system in a company:

- ˝MBS Navision˝,
- critical success factors of inducting new solutions,
- critical success factors research according to company x case study's implementing methodology,
- Navision,
- standard solution,
- 260000 installations in the world, 260 in Slovenia,
- origin: Denmark, today under the patronage and ownership of Microsoft,
- implementation methodology.

Why critical success factor?

- higher implementation costs than planned for 178%,
- longer induction time than planned for 230%,
- 35% of all inductions of new solutions were declined,
- 10% were according to estimated deadline and costs,
- 20% successful projects

3.1 People and the employees

The table below represents the main ingredients for reforming the business processes.

The company, strategies and goals	• incorporation and support of the highest company's leadership, • clear goals, strategy and solution deployment scope, • change management, • active role of project's sponsor;
Project approach and project leadership	• choosing a suitable solution, • the use of project management's principle, • project organisation, • implementing internal counsellors, • user training, • communication between the participants of the

	project organisation • incorporation and cooperation between users of the solution;
Business processes renovation	• business processes renovation • minimal solution adjustments to the features of an organisation;
IT infrastructure	• choosing technological architecture, • data transfer from old solutions.

Picture 1: Business processes renovation
Source: Internal company (x)

Methodology:
- analysis,
- design,
- development and testing,
- deployment,
- on-going operations.

Case study:
- not having attained the deadline,
- having attained the financial framework,
- exposure to critical success factors and importance grade (discussion based on the phase is important),
- features, linked to the environment and the project (activity, size, employees, performer).

3.2 IT processes and their renovation

Business computerisation is systematic and planned integration of IT technology in a company's business, which is aiming to develop such IT system that is going to meet their business needs.

Even though the company may have computerised inefficient activities or activities without a proper cause, not even the best technology can solve the issues. This is why it is absolutely necessary to carry out adequate organisational changes in the company before computerising the business performance. Business renovation can be realised as a renovation of business performance.

3.3 The importance of planning

Generally speaking, companies' IT systems are complex and expensive, and are therefore being made gradually. Consequently, the whole construction is long-term, along the process some parts may already be out-of-date. This is why computerisation

is a continuous and constant activity. The issue that comes along can be connected to the incompatibility of individual parts or to bad integration of IT system. Thus, strategic plan of renovation and computerisation is highly demanded. Accordingly, business performance needs renovation as well.

Computerisation is a three-step process:

- strategic planning of renovation and computerisation,
- renovation of business processes,
- development and/or implementation of individual parts of the IT system.

Later approach speaks in favour of:

- strategic planning of renovation and computerisation,
- renovation of business processes and development of IT architecture,
- development and/or implementation of IT solutions.

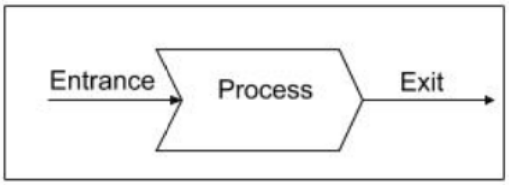
3.4 Strategic renovation planning

Strategic renovation planning deals with company's strategic orientation and with measurements taken for its business success. It includes conformity assessment of recent business processes implementation and their computerisation, determination of strategy, goals, politics (global business rules) and company's critical success factors, key business processes determination and rough IT needs analysis, options assessment and rough renovation and business computerisation plan.

Informatics' strategic plan is set of long-term goals, which describe main initiatives regarding company's IT system, that are necessary to fulfil company's goals and to determine IT infrastructure (technological architecture). It must enable efficient developmental resources allocation among different projects of constructing individual parts of the IT system, so the projects are carried out in estimated time frame, inside financial frames and with estimated results. It may contain job purpose determination for informatics. Usually, it is being improved annually (its nature is strategic; however, this term must not be equable to immutability).

Each **company** consists of a certain number of business processes of which understanding and improvement are vital for the company's survival and successfulness.

The process can be determined as the conversion of input resources into output resources.



Picture 3: Process
Source: Internal company (x)

Business process is a set of activities, that receives one or many different inputs and creates an output that brings some value to the customer. In practice, business processes are a complex web of activities. When renovating them, we help ourselves with business process modelling. This is why we develop a business process model, which we then discuss instead of the original process.

Difficulties, that may occur with so-called non-procedural organisation:

- companies are divided to different functions,
- generally, employees of different functions on lower hierarchical levels do not cooperate,
- problems regarding multi-function operation are delivered to the appropriate higher decision-making levels,
- business process used to fulfil the customer's needs goes through several functional departments,
- customer does not have the insight into his order's state, because a company, whose organisation involves functional fragmentation into so-called functional silos, is not prepared on current demands, which include real-time response to customer's demands and high-quality attendant services,
- functional silos,
- business processes.

Organisation capable of competing in current business environment, must be organised around its fundamental business processes. Business process has to be treated entirely and it has to have an established supervision system covering the process implementation. By using the operational business processes, the company focuses itself on its main activity.

We distinguish between:

- fundamental business processes, that create value for the customers and are in close relation to the strategical guidelines of the business system;
- supporting processes, that do not create the value for the customer directly, but create conditions for operation of other business processes;
- managing processes, that company uses to plan and supervises the implementation of other processes,

Business process renovation may be defined as thorough process verification and their radical change in order to achieve dramatical KPI (key performance indicator) improvements, such as: costs, service quality and quickness.

Processes can be renovated in a more or less radical way:

- complete or strategic business renovation, that is focused on all the fundamental strategic questions about the company's business and covers company's business processes and their computerisation altogether;
- rearrangement or renovation and computerisation of individual business processes or parts of the processes;
- business process renovation.

Human resources are definitely one of the most important factors affecting the business process renovation. **The head o renovation** is usually representative of the company's top management, who authorises and motivates in the whole renovation process. **The process owner** is a manager, who is responsible for the discussed process and its renovation. **The renovation team** consists of experts, who are currently working within the discussed process, and experts, who are not bound to the discussed process or are from external consulting companies even. **The steering committee** is usually used in case of larger dimension projects. The representative members in the committee are the process owners and organisational structure's top managers. **The expert of renovation** is an experienced individual who has been involved in a business renovation already in the past. His knowledge of methods and techniques used to renovate the processes is excellent and he is responsible for the methodological support of the process owners and the renovation team.

Renovation steps are the following:

- **Business process identification:** we identify the fundamental business processes and supporting processes, which enable their operation, and then choose the processes to renovate them. We must choose the processes that need to be renovated and the order in which they are going to be renovated.
- **Detailed understanding of the process:** in this step, it is necessary to develop a business process model and then divide the model into lower levels and define the working process along with their elements. The process renovation follows – the process should be transformed so that the weaknesses discovered in early phases are getting eliminated.

3.5 Consequences of the renovation

The units, where the work is done, are transformed from functional departments into process teams. The performer's role changes, so that they get authorisation and responsibility for successfully carrying out the assignment. The way that results are measured changes from measuring activity to measuring their results. The company's

value system changes towards direct link with customer satisfaction. The manager's role goes from the role of a supervisor to a role of a guide or a ″coach″. The organisational structure goes from a hierarchic to a flatter structure.

The renovation goals are the following:

- shortening the business cycle or every business process in the company;
- increasing the added value in every business procedure and at the same gradually increasing the quality of the products and company's services;
- lowering costs of process implementation when maintaining appropriate relationship with quality and the time needed;
- raising reliability and consistency of process implementation thereby the quality of products and services.

4 CONCLUSIONS

Due to quick changes in politics and in economy, that we have witnessed in Slovenia, many of the companies have been forced to start looking for savings also in processes that were up until recently considered as less important. Joint European market is deleting boarders and is bringing new challenges. Changes in key and important factors, such as price, quality, time and others were under more pressure than ever. One of the key paths to success is becoming the company's successfulness in sensing the demands on the market in time and then the ability to properly respond to these changes.
Various studies suggest that the same amount of investment in production brings only a small amount of improvement in comparison with the same amount of investment in logistics. If we analyse Slovenian companies, we can conclude that except some rare companies, the logistics area in a company and between companies is the one that has the best chance at optimisation (i.e. better work quality, shorter response times, bigger flexibility, shorter time of refunding the investment).

Should the logistics specialist want to be of higher quality and first and foremost cheaper in preforming logistics than the customer, the specialist must mainly invest in logistics infrastructure development (human resources, IT, equipment). Unification and process simplification of single products are very important. Tracking means implementing an efficient IT system that will offer 100 percent product traceability to the buyers at any time. However, the condition is that the logistics service providers provide them with the necessary services. In order for the logistics service provider to successfully enter the market, it has to meet the needs on the market with his proficiency, technical competence and innovativeness.

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5. Company (x)'s internal material.

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THE LEGAL PROTECTION OF EMPLOYEES, MANAGEMENT AND CAPITAL IN SMART INDUSTRY

Abstract
The research question: Through processes of research industry, its production and service activities the advanced industry is developing. Its role tends more and more to particular processes in direct industrial production and it is also very present in service activities. It comes to many procedures and processes that are linked to each other and are increasingly taken over by smart industry with programming leadership.
Aim of the research: With its use, new technology causes high international economic and commercial competition, quick changes in production, increasing digitalization of production and other processes and robotization of particular

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production and service activities. This is the era of increasing investment in technology, with forgotten employees, who are despite of development still an important element in industry and economy. The aim of this research was to find out the effects of technology on employees and what is the legal protection of employees in smart industry like.

Research method: We were studying individual elements of introduction of smart machinery and equipment to processes of industrial output and service activities, and in doing so we took pictures of the elements of the situation that the worker was in. The interpretation of the results and simultaneously finding appropriate solutions that will be in favour of use of the technology 4.0 and will divert work in industry, can differ. This is a scientific method that studies single occurrences in industry and the gain of new knowledge in order to improve capital's attitude towards work. The method is founded on collection of noticeable, empirical and measurable data, which is subject to specific criteria of thinking and may be reflected in the improvement of the processes as well as time and price unit.

Outcome of the research: The industry is searching for options to diminish costs of production and service activities (logistics), where there is neither obvious perception of how the people are being treated nor what their position is going to be in the future. The research showed that the costs could have been halved, have they implemented new technology in production stages and service activities. Also work and material position of the employees could have been improved at the same time.

Organization of the research: The focus of the research was to measure and study individual procedures of production and services activities, where we were looking for elements which display the position of employees, management and capital. We were looking for answers that justify technological improvement of use of smart technology and how its processes assist at work and its capital, and also the connection between smart devices and employees during the production process.

Limitations of the research: In the research field, we limited ourselves to procedures and technology, which, when used, interfere with the scope of work of individual worker and we were looking for elements of usefulness or causality violations of worker's rights. The limitation was more focused on the shape of the research field and less on the technology, economic or other elements that could restrict data retrieval or verification of data in any way.

Key words: *industry, technology, costs, legal protection.*

1. INTRODUCTION

Deep industry orientation is to find technical, technological and professional solutions, in order to improve production, improve the product, reduce costs and allow maximum revenue. Historically speaking, the industry was technologically improved during industrial periods, to begin with the industry 1.0 which dates back to the end of the 18th century and denotes mechanical production with power of water and steam. In the period of the industry 2.0 the period taking place in the 20th century the development continues, when electrification, mass production and new production line, which was never before known or used in production, were introduced. Proportional to the beginning of the development of the industry 3.0 should be appended to the early sixties of the last century, when first information systems were developed and automatization of production began. It was already at that time that the hardware was used for more demanding hard work, for example lifting materials, compressing materials, transfers and suchlike. The industry became globalized and has been reaching great development of the enlargement and has been moving to several continents ever since. (1) The period of the industry 4.0 meant a big step forward and it shaded previous development periods, since it is the highest form of industrial organization at the moment. With its software and the help of the internet connections, the computer manages technology, automatic guided machinery, equipment and principles. Because of the digital system, which is so much better in the case of the system and performance and is a multiple of the previous development, as a substitute, the analogic system has lost its worth. There exists this virtual world that enables thousands of times bigger linking abilities. A specific type of technology also called the robotization in the industry is guided by programmes and software, which create smart factories with their work. (2) All of these procedures were carried out without any concern about the role of labour, the role of management or capital. Neither the employer nor the industry nor any other branch never mentions the status of the employees, the role of management and also the role of the capital when they introduce contemporary technology, which may suggest that all of these questions were forgotten. Technological development is to be continued with developing the industry 5.0, which is expected to bring complete personalization of the machine and this explains that a human and a machine are going to collaborate perfectly in conformity with the system. Still, it is not clear where the boundaries of usability and advantageousness of the contemporary technology are and what is the role of the worker going to be or what kind of protection should the employer provide the worker put differently. All these factors clearly suggest that, through technological development, through the development of the internet, informatics, computer science, digitalization of leadership skills, and introduction of more modern production methods, introduction of robots and smart technology, the industry forgot about the main element of the whole system which is the role of people and their rights in a smart factory. The response of the capital and management to the employees and what is the position of individual recipients is

nowhere to be found in all this process. Contemporary technology and other technological equipment, fierce international, economic and commercial competition, quick changes in production, increasing digitalization of production and other processes, robotization of particular procedures in logistics and increasing investments in development of technology are all factors which necessarily demand research on position of an individual in a production system, what are his or hers obligations and duties, what is his or hers legal protection like. (3) On one hand, corporations in industry are searching for solutions, how to use more smart machinery in production and in service activities, how to lower their costs of business performance, but on the other hand no one seems to be interested in protection of their employees, even less interest is shown for the human rights in the modern industrial era.

1.1 Research field

We found out that in industrial development period 4.0 people came to a realization that any kind of activity in industry or in any other area, which has no direct connection to the production, is in reality a burden, even though they knew there is no industry without service activities. (4) They recognized that all the burdensome elements of the production must be eliminated from the production and left to the external contractor. Therefore all the warehouse activity, transport, mitigating logistics and every service process that does not have to be performed, were removed from their activity and were left to the external contactor (outsourcing). Regarding the costs, there has been a decrease in production, but there is still a problem with high costs of the accompanying activities, which were recognized as a cost of the final product. Data shows, that initially the proportion of the costs in industrial production and logistics was 50-50%, but nowadays the industry maintains a 62-38% ratio. Evidently, industrial production did not recognize the value and the importance of service activities. Later on, the industry was in need of updating the service activities. At the end of industry 4.0 era and at the beginning of era of the smart industry 5.0, the industry felt the need that its production part and its services should collaborate more to possibly lower the costs of the production preparation with the use of certain technology, automatization and systemic leadership. (5) This has therefore been the start of the automatization of service activities, including robots and hardware in all procedures, operations and processes in logistics. When going through data, the concern for the employees was completely out of the picture, even though it was clear that a lot of positions were systematically cancelled as the autonomous machines were introduced. Considering the trends of the industry 4.0, the industry has at first implemented 3% more smart machinery, later even 5%, and today 9% of the production in industry is represented by autonomous machines. We also reviewed internal acres of systematized posts and we found out that a systematic change has been made and workers were redistributed to other positions. Positive thing about this redistributions meant giving the worker an easier job or that the worker was in

control of the autonomous machines. The aim of the industry is to implement at least 50% of smart machinery in production and 30% in service area. (6)

1.2 Hypothetical premise

The introduction of contemporary technology in production and industrial service activities is changing the organization of production systems and has a huge impact on the human role in production. It is becoming more and more crucial that autonomous machines, system and leadership collaborate successfully. Unavoidably, people and machinery have to have a partner relationship and for this reason the position of the employees must be defined and legal protection must be provided for them. (7) Our research premise was: 'Since the machines are being personalized, their position must be legally confirmed and the employees must be protected'. Hence, the question about legal protection of workers, management and capital in industrial production arises. Guidelines of the industry 4.0 (FoF Factories of the Future) demand quick response to changes, fast production, assuring marketing advantages, competitiveness, wherein the role of employees, management and capital is not defined. Capital and labour are the basics of economy and industrial response in given time and place. The systems of service activities up to this point were based on the use of beforehand regulations, directions and instructions, high-load operations and procedures, and unnecessary refunds because of imprecise or careless work are also frequent. Introducing technological improvements to the industry, to its production and service processes, definitely means implementing delivery, load-bearing, distribution, scanned, weighing and other equipment, which was used to eliminate time and service errors in individual stages of production. Yet in all this, the role of the workers, the systemic regulation, the connection between the machinery and labour is not clearly defined and will have to be defined and legally regulated.

1.3 The purpose of the research

The purpose of this research was to define the position of the employees, management and capital through systemic organization of industrial production and with mutual clarification to come to optimal solution that will allow undisturbed and durable production, and employees' legal position should be guaranteed simultaneously. The position of labour and capital in this process is clear, which results in personalization of machinery to satisfy the needs of people and for both machinery and people to come to the unanimous goal which is that the production outcome of work is as successful as possible.

The existing condition suggests that the procedures of production or service activities for the supply of required materials for industrial production are founded on physical preparations of single pieces, physical counting or inventory, use of mechanical handling, use of machinery guided by workers or use of other means of

transport, that are usually in the way of production. Based on this condition, the finding was that the supply was contingent on human and his physical ability, and this had both time and cost barriers in production. The next unavoidable fact is that people were always an important factor in production, with a variety of consequences, but their position has always been somehow settled and predictable. With introduction of contemporary technology and readiness on change, which is actually going to be beneficial for the employees, meaning that they would be relieved of hard work, it has to be made sure that employees' legal position is taken care of and that employees are aware of their rights and obligations. Significant technologies of systems are also crucial, because they enable quick change and adjustment of systems, and the system load of the employees should be noted. Timing of a machine and a man is very important, in order to coordinate autonomous machinery and employees and therefore achieve JIT ″Just in Time″ supply for production. Besides, we need to bear in mind that the technology is more advanced than human perception, so appropriate training is vital. In this context, our research was focused on technological processes, which are demonstrative of individual's position and role in processes of production of smart factories. We were looking especially into legal levers, to get information on how to protect the employees and make it possible for them to coordinate with the autonomous machinery all at once. Coordination is very important since, men are still dominant over the processes in the industry.

2 THEORETICAL STARTING POINTS OF THE RESEARCH

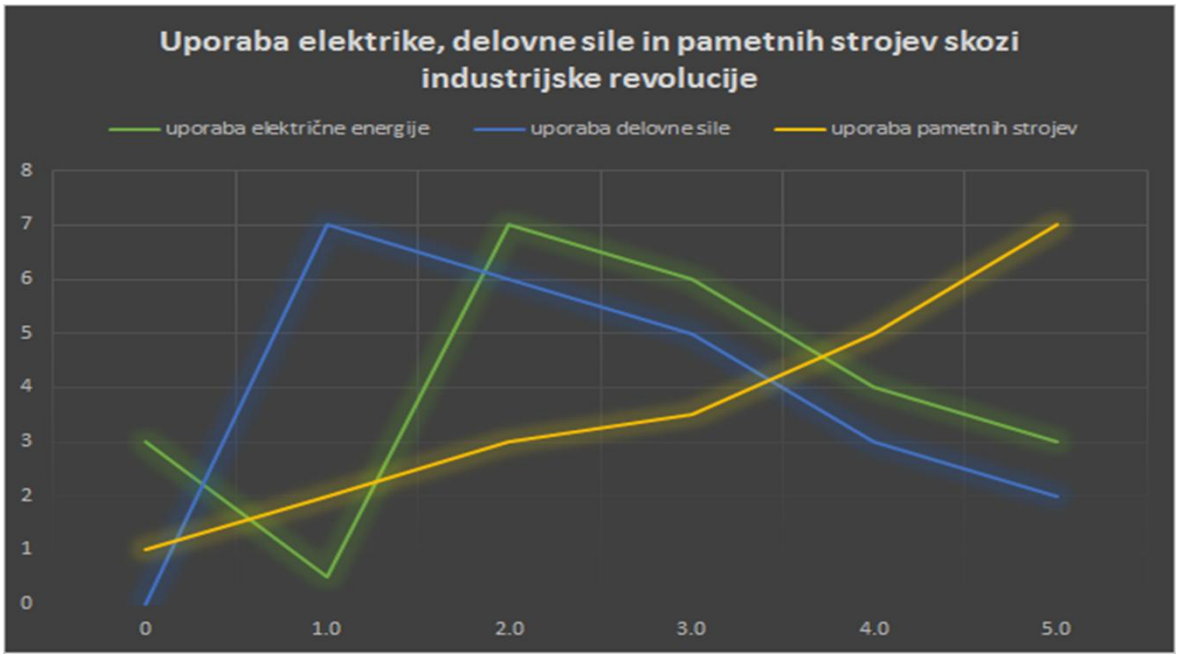
The specialty of this industry is its constant development and searching for progressive technological, informational, digital and other elements, which are going to allow undisturbed production, diminish costs of production and keep the costumer or keep being dominant on the market. For this purposes, industry has been implementing completely autonomous processes of preparation, production and especially the processes of all the production in order to enable better preparation of products for the customer's needs to choose from. (8) These procedures have been showing mostly when particular technologies of organization of packaging, palletizing, storage and other procedures were implemented, where the presence of workers is not needed, at least as physical labour. The aim of the industry is to guarantee a completely autonomous system of data processing, considering everything from purchase to placement of the production plan and all the way to the final constructing of intermediate products and products for shipping. This depicts the union of mathematical optimization and data intelligence for purposes of industrial expert knowledge and of developing new planning tool to function in industrial production systems. Furthermore, this is a new scientific method which comes in handy for phenomenon exploration and to gain the new knowledge for process improvement that could optimize production. The method is based on collection of noticeable,

empirical and measurable data, which is observed under certain standards of industrial production. Following the guidelines for the contemporary production of the industry 4.0, the industry uses the concepts that are suitable for lean production, which despite the fact that it helps to improve the overall value of key indicators in the industry, it is not possible without human knowledge and cooperation. This technology uses a number of equipment to discover and permanently eliminate the losses and therefore it should improve the quality of the production, reduce manufacturing time and reduce costs. The philosophy, held up by various equipment which is used in industry, is to organize production and service activities, where the interaction of a supplier and a buyer is included. Theoretically speaking, the introduction of all the systems would be possible and permissible, but in reality there are some elements that suggest that manpower is still the most suitable to get work done and it should therefore be used. With that being said, the role of the worker has gone form an active participant in production to an observer and a companion of industrial processes. Another theoretical fact is that autonomous equipment has taken over the hard and difficult jobs in industrial production, but nevertheless the full trust factor in technology is still present, which puts a man in a position where he has to be fully present in the whole chain of industrial production and he has to fill in the role of either a worker, management or capital. The examination of the whole system never mentions the legal protection of the workers, which leads to the question, has the industry forgotten about this matter intentionally or has it left it up to the time for the question to be solved in the future.

2.1 Technology as a support mechanism

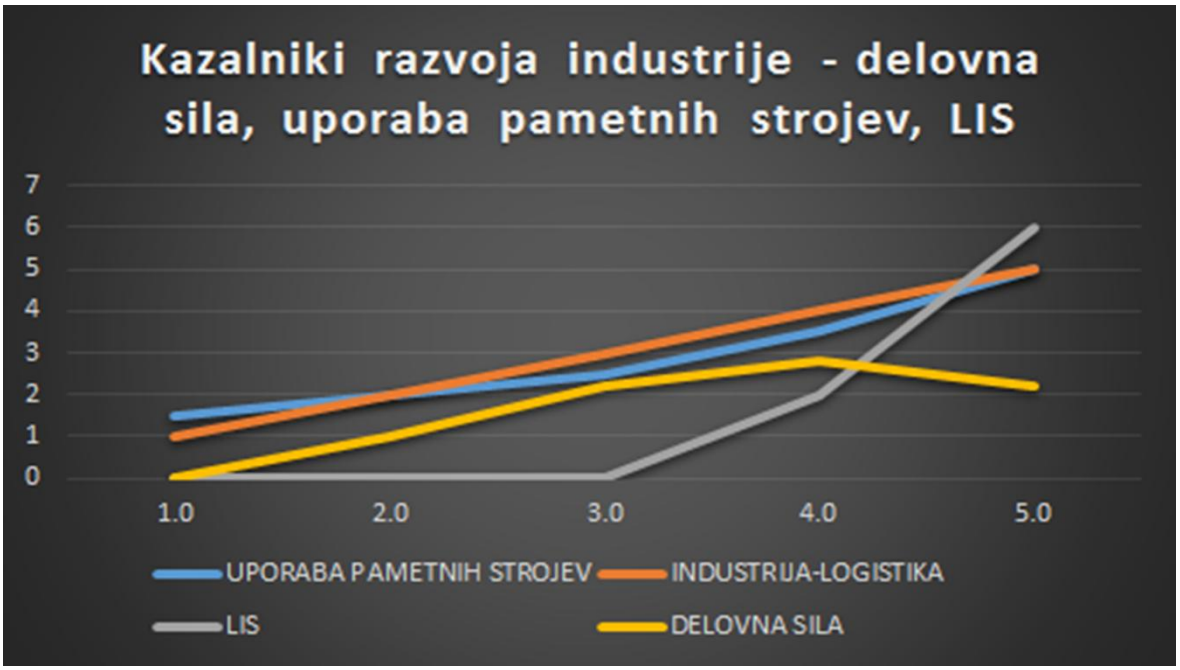
Technology is present in different phases, through both industrial development and introduction of hardware in production. But there is no way to ignore the fact that technology has always been used and designed by people who adjusted it in accordance with their needs. When different machinery was firstly used in warehouses and in production itself, either for pulling, pushing, lifting of materials or for shifting, loading of materials, these tasks were the first signs that technology is present. At the beginning it was mostly hardware whose structure, shape, purpose and usefulness was not only meant for service activity but also for carrying out the deeds and tasks which were too hard and difficult for a man. In nowadays modern era of industrial development also called the industry 4.0, contractors of service activity tend to be fonder of the use of smart machinery, robots and software in order to maintain individual long-lasting tasks. In some sense, this technology represents support that a worker needs, accepts and approves, furthermore this equipment helps the worker and the worker cooperates with as he would with another worker. In this particular research area of industrial production pre-processing, we have restricted ourselves to AGV robot support, which has been a substitute to a lot of workers according to our investigations. An exclusive technological support in industrial production called AGV SMARTCART

100TT has been used for carrying out various logistic tasks such as transporting products and materials from nearby storage to other parts of the factory where production takes place. These are so called smart devices of the new generation, which are beneficial to the workers and if they have beforehand set infrastructure and proper guidance, they are capable of thinking on their own and making decisions for themselves based on previously stored programme. Currently, there are two methods that are being used the most. First method is the fixed track course method, where the tracks are coded in the programme thoroughly. The robot follows a magnetic strip, which is considered as its infrastructure, and uses RFID technology which connects it to a production system that controls the course of several robots. Following the marked trace, this hardware is either programmed to transport dedicated strollers to supply the industrial production or the reverse, so the strollers transport final products to the storage. Identifiable characteristics are its efficiency, functionality and energy-saving. The cost effect, which the industry realizes in relation to the use of manpower in return for the same amount of finished work, is vital here. As regards the studying of support of technology and how it is justified to carry out the deeds and the tasks that were initially a man's job, we were looking for parameters which not only could indicate that people should be included in the whole process but could also define the role of energy, a man and the machinery. The table below illustrates the use of energy, workforce and smart machinery through the development of the industry, wherein it is possible to understand the role of the worker, management and capital. At every point of the progress, work and capital were and still are fundamental elements, which are being showed through economic and social development.



Picture 1: Display of electricity, workforce and machinery consumption

It is impossible to define the role of a man as a worker in this sophisticated development, depending on the type and the difficulty of a single job and task, but it is possible to recognize the demand of capital for constant capital force development and craving for making profit. Undoubtedly, technology is as far the biggest support to industrial development, which represents the pillar of the social development and its potentials, and at the same time it is the element of social development that does not entirely reveal what will the role of the worker in the future look like according to these development processes. New smart factories are being built and new and new products are being made every day, so we are witnessing a technological development which never mentions people neither does it feel the need to include people in its processes, let alone mentions their rights and duties.



Picture 2: Development indicators of workforce, machinery and information systems

3 RESEARCH METHODS

The fact that the industry is oriented towards technological upgrading of service activities, has convinced the contractors and the industry that they must place all the processes and the procedures, which can be done with hardware, all in one place where preparation of production and service activities are going to take place. Analysis showed that in the past most of the operations in logistics were done manually and it was mostly all about physical pushing, carrying, shifting, packing, palletizing, pieces counting and making decisions based on regulations, instructions or directions with human factor being taken into consideration.

Therefore, this meant heavy load on operators and workers in production, higher demand for operators and as a consequence a high number of complaints about the product have been made due to unsuitable or unprofessional work, damage that has occurred, inappropriate use of materials, pieces, weighing and support. The consequences were that buyers were returning materials or products, recounting and reprocessing, costs increased, unnecessary costs, end-of-labour force. Analysis showed that it was necessary to step up to the process upgrading and introduction of modern hardware, which will allow elimination of all the problems that the industry has when it comes to procedures of industrial and external logistics. These are clear characterizations of management and capital, but a form of organized protection of workers' rights is not recognized, even though this is the job of the capital of production of smart machinery, to recognize and then solve the problems. The research method was based on finding specific factors that would encourage management and capital to think about how to protect employees' rights and duties in production or service activity under conditions of the operation of smart factories. We were also searching for answers to workers' attitude towards introduction of contemporary technology, and based on this attitude we were examining how and if any kind of employees' rights are being violated in terms of concluded working relationship.

Analysis of measurable data showed that in the initial phase of induction of smart hardware as robots, workers were not keen on the new technology in the production, and later on not even in service activity. Employees' were scared at the beginning, thinking that robots would take over their work and eventually they would lose their jobs, because they would not be needed anymore. But with appropriate knowledge and training, the employees came to a realization that the robot as a whole, its shape, structure and functions that it can perform, all these features are only helpful for the employees, so the robot does the hard work, which had to be done by people in the past. Operators and workers discovered that they neither have to physically carry objects and materials neither have to execute inventories and calculations nor have to perform certain movement that could possibly mean chronic occupational disease in the long run. Slowly they figured out the usefulness, showing as complementarity where a robot and a person in the warehouse or in production or elsewhere can coordinate to carry out the tasks. This is how the worker in production and service activities became more important as a supervisory link, so he supervises and checks on the work that hardware has already finished. The proportion of human's hard work and robot's hard work was also examined and the conclusion was that a robot carries out the hard work in proportion 85 – 15%, which is an incentive for the industry and the health of people that work in the industry. We recognized that employed workers were satisfied with the use of the smart devices where they do not interfere with work of the employees directly or where workers found out themselves that the contemporary technology really helps them. When we interviewed them and asked them what has changed for the better in terms of legal protection of their position,

we found out that there were no changes made in their working relationship, at least not in the direction where the employer would offer them a new contract which would either include the employee's rights and duties or changes that were made by introduction of the smart factory. It was enough that employees had become aware of the features of autonomous machines, that they help them with hard and more demanding tasks, so they adapted to new forms of work, they taught themselves to communicate with new devices in order to work with them.
Management as well did not make a change, forms of managing were subordinated to the requirements of contemporary technology, the processes of production and service activities were adjusted to the needs of the industry. There are no elements that would point that at least management of industry has suggested changes in the protection of the employees, claiming there was no need of change, which still shows that work is dependent on capital and capital is superior to work at the same time. With help of the research methods, we were looking for legal standing that allows the development of smart factories, especially we were looking for standings for legal protection of the employees, management and capital. The Constitution of the Republic of Slovenia (Official Journal of the Republic of Slovenia, no. 33/91-I, 42/97 – UZS68, 66/00 – UZ80, 24/03 – UZ3a, 47, 68, 69/04 – UZ14, 69/04 – UZ43, 69/04 – UZ50, 68/06 – UZ121,140,143, 47/13 – UZ148, 47/13 – UZ90,97,99 and 75/16 – UZ70a) has a provision of human rights and freedoms, which includes the right to work, the right to education, which is somehow taken into account and therefore it is secured for the workers. The Law on labour relations (Official Journal of the Republic of Slovenia, no. 21/13, 78/13 – corrected, 47/15 – ZZSDT, 33/16 – PZ-F, 52/16 and 15/17 – the decision of the Constitutional Court) provides minimum workers' rights that the workers are entitled to because of their concluded employment relationship. This Law defines the relationship, contractual freedom, employee's and employer's duties, but guidance on how should the worker act in case of introduction of smart factories is not provided. However, the Law states that the employer manages work processes with the internal Act of posts systematization, where he can define processes and determine the format of the work, difficulty of the tasks and suchlike. The contract between the employer and the employee is the foundation of their relationship, because it provides insight into agreement that the employer and the employee made about carrying out the job and the tasks.

4 RESEARCH OUTCOME

The industry strives to introduce even more smart industry because of the changes that are being made on the global market and to maintain the market situation. This finding leads to development of the industry 5.0 with intentions of changing production and service processes even more. Instead of classical approach of examining the products, the industry has implemented a new virtual world based on new modern and technologically improved way of production. A worker, a man

in production or in service area of industry is becoming more and more crucial in the process itself, whereas all the examinations are being performed by a computer programme in a virtual world, which makes separate parts of the project, gives the shape of the metal, the colour, weight, immunity, flexibility, usefulness and it examines its performance. Virtual experiments are way better than the experiments that are performed by a man, since the virtual experiments can be done over and over again in the virtual world until the product has been approved to be reliable and only then it can be produced by robots and then they can actually be used. For example, the transporting vehicle for internal transport such as AGV has been tested in the virtual world and only then put in the factories to help the workers. In smart factories, some of the jobs have been taken over by the machinery so the workers became of no use, but the production is still natural, since workers have a new role. The tasks that were considered as too onerous for the workers are now robots' jobs, since robots with their software can do the work faster, more precise and in doing so they use less energy. We have mentioned software, procedures and working methods that are now the main mechanisms in smart factories, such as the Kaizen (14) method, the Poka Yoke method, the Kanban method and lean production, we have also mentioned the Just in time method, and in all these methods it is impossible to compare the services of a man and a robot. Nevertheless, the main part of the whole production process is the supervisory work the worker does when he supervises the work that technology does itself. The role of the worker has changed for the better, at least in terms of hard work, and at the same time his role requires that he educates himself regularly, complements his knowledge and that he actively participates in development of the industry. In this part, there are no indicators of any rights or duties of the employees, management or capital being violated. However, there are no elements that may suggest that any kind of new legal protection has been provided when new contemporary technology was being introduced and smart factories have been developing. If we ignore the Constitution and the Law on labour relations, we can find the basis of security and protection of the employees right at the spot of their posting, where the Law on safety and health at work (Official Journal of the Republic of Slovenia, no. 43/11) demands the risk assessment for each posting and defines the employer's duties to provide safety. This could be understood as the only legal basis that will protect the employees' rights by the law. The results cannot be evaluated at least not from the legal perspective, since there are no legal bases that would in any way provide new kind of legal protection of employees in smart factories. We are aware that there is still more research that has to be done in this field, also more searching for new elements that are either an advantage or a burden for the employees and only then new legal basis can be built so that it would protect employees' rights. Specifically, in Slovenia it is not possible to talk about real recognition of work and capital, since there is no real work evaluation, at least not in terms of capital's desire for the best possible enrichment, which is a result of introducing contemporary technology and smart factories. Time will tell how well can smart factories manage

on their own and only then will the relationship between capital and work be evaluated appropriately.

4 DISCUSSION

The present case of searching for legal basis for protection of employees' rights and duties in smart factories is all about the results of teamwork, experience, which are supported by methods to diminish the losses in preparation and production processes and finally when storing the products it is about improving the flow and the productivity in the industry. We confirmed the assumption that in science, everything is relative and everything can be upgraded, supplemented, improved, changed, innovated and this gives the answer that our research is not finished yet. With the research method we have been studying the posts of the employees with, we started where the material enters and is later being marked, sorted, checked and made ready to go to the storage, then all the way to where the signs and numbers are being defined and finally, how important people are and how much are they needed in the production process, or in other words we were looking into processes that the machine can do without people being present. Through the research we gained new knowledge on smart factories, mostly on how beneficial the technology is for people and their post. The goal was to collect noticeable, empirical and measurable data which can be measured with specific methods of measurement and evaluation and then based on these participate in development of new norms that may protect employees' rights. With the aim to confirm, we stated a hypothesis that people are still an important factor in the industry, even though this is contemporary smart industry. With the use of appropriate methods in industry, such as the Kaizen method, the Poka Yoke method, the Kanban method, the Pull method, the JIT method that are all linked to people as well, we supported our hypothesis and experimented it all with virtual processes. We are determined that we have achieved our planned goals, because not only economic effects but also individual's role in the process of industrial production and service activity were successfully displayed. The research does not stop at this point, however we will sustain with searching for new possibilities, better solutions and legal protection for the employees. It is also interesting that employees in the industry have recognized the advantages of the system, which has been acknowledged as very important and employees are systematically taking advantage of it, especially where ergonomic heavy and unproductive tasks take place, where there is no night posting and no recording, and where mistakes, losses and other disruptive manufacturing factors are being recognized.

5 CONCLUSION

Industry is a specific field of production. It stabilizes the market as well as it stabilizes economic relationships, relationships between organizations and

relationships between corporations and industry is usually also the element of transnational and political relationships. Not only countries, communities, international associations and economy as a whole depend on the industry, but also workplaces, employment of many workers, management and different professionals. The industry is aware of its demanding responsibility, so it is searching for permanent solutions, it is developing technology, infrastructure, systems and production processes, and it is also searching for professional solutions that would enable maintaining the industrial production and organization on the market. The industry also wants to find adequate proportion between supply and demand, and also suitable proportion between interventions in nature and the needs for human existence. The industry is constantly looking for methods, commercial and other ways to attract customers and this is how it plans to secure for the industrial work and development to continue. The introduction of new smart technology is the main module of the development and updating of the industry, which is why production, logistics and logistics processes updates are a systematic improvement of the industry in current circumstances and conditions on the market. The introduction of smart machinery such as AGV, has already inspired many other manufacturers, like pharmacy, food providers, metal industry etc., to implement novelties to their processes and by doing so save energy, save on staff, safety, environment protection and on even much wider matters. Through its structure, introduction of new systems, new technology, robots, informational systems and links between organizations has had an impact on internal and external relationships in the industry, which undoubtedly affects the forms of organization, employment, education, training and suchlike. Not only in scientific research and theoretical assumptions, but also in doing internal jobs and tasks in production or service activity, the key factor to these changes was a human. The basic rule in industry and development are the changes and adjustment to them. This rule is employees' guidance in smart factories on how to get adjusted to new forms of work, how to follow new technology's performance and how to achieve the best production results at the same time. As all these new changes were implemented and all these processes of developing new production forms, with the help of management, the capital has created forms and ways of work that are beneficial to itself, in order to enrich and make money. In all this doing, there is no trace of legal acts, legal rules and legal norms that would manage the legal employees' protection, as the employees are the weakest link in the smart industry. Provision of the Republic of Slovenia, the Law on labour relations and the Law on safety and health at work are the only legal protection that the employees get. This is why, in the future it can be expected that the capital owners, management and other suitable institutions and specialist services, will handle this matter of legal regulation. In particular, it is expected that the state will use its legal apparatus and research both legal options to watch the development of smart factories and reasonable employees' protection. First and foremost, the state has to take care that the system and the internal organization do not get misused because the development and the use of smart factories. It may also be possible that in the

future the shop stewards that represent the employees in different parts of the industry, will make sure that the workers, work procedures and the relationship between the capital and work is settled and evaluated correctly. We are aware that our writing is only an attempt to encourage at least the thinking about the employees' protection in smart factories and that maybe some others will try to think in this direction.

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TECHNOLOGICAL MODERNIZATION OF LOGISTICS IN SMART FACTORIES

Abstract
Research question: Logistics is a service activity in an industry where there are multiple, interconnected processes that can be performed by using specific machines, computer equipment, computer programs.

Purpose of the research: Modern technology, digitization of processes in the production and elsewhere, robotisation of individual processes and development of smart factories requires that the accompanying service and other activities follow the development. The purpose of the research was to find out how and with what development potentials, we can use modern technology in logistics and what would be the effects of this use.

Research Method: Throughout the different phases of logistics, we learned about the effects of introducing modern technology. The results can be interpreted differently while finding appropriate solutions that justify the use of technology

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in logistics. It is a scientific method of studying individual phenomena in industry and acquiring new knowledge to improve individual processes. The method is based on the collection of observable, empirical and measurable data, which is subject to specific criteria of thinking and may be reflected in process improvement, time or cost unit.

Research results: Technology allows reducing the cost of logistics and services in the industry before the preparation. The research showed that by introducing new technology in the stages of performing logistics operations, costs could be halved, processes improved, and production modernized.

The organization of the research: The research was focused on measuring and studying individual processes from the arrival of materials for production, storage, production preparation, palletizing and to the transportation of finished products. We were looking for technological improvements and opportunities to use modern technology in individual phases from the arrival in the industry to the departure from the industry. We found that the industry has many logistical processes that cannot all be studied simultaneously, so we focused on processes that will be cheaper and more efficient if modern technology is implemented.

Research limitations: In the research area, we have limited ourselves to procedures and technology that would be useful in the implementation of logistics and its processes. The limitation is more focused on the form of the research area and less on technological, economic or other elements that would, in any way, restrict the acquisition or verification of studied data.

Keywords: logistics, technology, cost, smart factories.

1 INTRODUCTION

Throughout its industrial development, the industry is focused on finding technical, technological, professional, intellectual and other solutions that will improve production processes, create a better product, and at the same time reduce the cost of the entire industrial production process. The theory tells us that the industry has made technological progress gradually through industrial periods, beginning with Industry 1.0, which covers the period at the end of the 18th century. The first industrial period is represented by the introduction of mechanical production driven by the power of water and water vapor.

The period of the 20th century when electricity for mass production was discovered and introduced continued during the development period of Industry 2.0. The beginning of the development of industry 3.0 is believed to start in the early 1960s, when computerization, production automation emerged, and when we saw the first forms of hardware that performed more demanding physical work.

During this time, the industry has reached major development expansions and moved to all continents of the world [1].

The era of the industry 4.0 has taken a significant step and has somehow overshadowed all of its development to date by introducing new technology, automated machines, equipment, and incorporating software into the processes. This is a time when the industry has moved from an analogue system of operation to a projection of the digital as well as the virtual world which provides thousands of times greater connectivity. Such technology is driven by programs and hardware, which in the processes of industry and beyond is started to be known as robots. Robots started shaping smart factories and virtual production started taking emerging [2].

Undoubtedly there is an emerging industry 5.0 (examples are India, China) in which machine personalization is expected, which tells us that humans and machines will fully interact with the system, machines and robots to increase creativity in the industry or anywhere where smart technology is present. All this shows that the industry managed to reduce production costs and raise the level of quality of its products through technological development, through the development of the Internet, computer science, computerization, digitalization of process management, the introduction of more modern production methods, the introduction of robots and smart technology that is managed by information systems and the introduction of robots that perform various jobs faster and more precisely than man.

Everything mentioned before has been created by the industry in its production phase however not enough has been done in the fields of those tasks and services that are not part of the production process, but are still an essential part of the production. This is logistics, service industry in industry, economy, public administration, and wherever it is necessary to carry out specific preparations for work. It also carries out specific processes, or it is used to perform certain phases of work that enable the continuation of production, sales, supply and such. These are several interconnected processes that, as often as production, depend on the use of machines, computer equipment, computer programs, various other equipment and utilities that enable the execution of individual tasks.

Modern technology and other technological equipment, strong international, economic and commercial competition, rapid changes in production, increasing digitalization of manufacturing and other processes, robotisation of individual processes in logistics and increasing investment in technology development are all serious factors that dictate research about the use of hardware even in the logistics stages and processes [3]. On behalf of the industry, science and practice are looking for solutions of how and in what way to use as much hardware as possible in logistics processes to be able to reduce business costs.

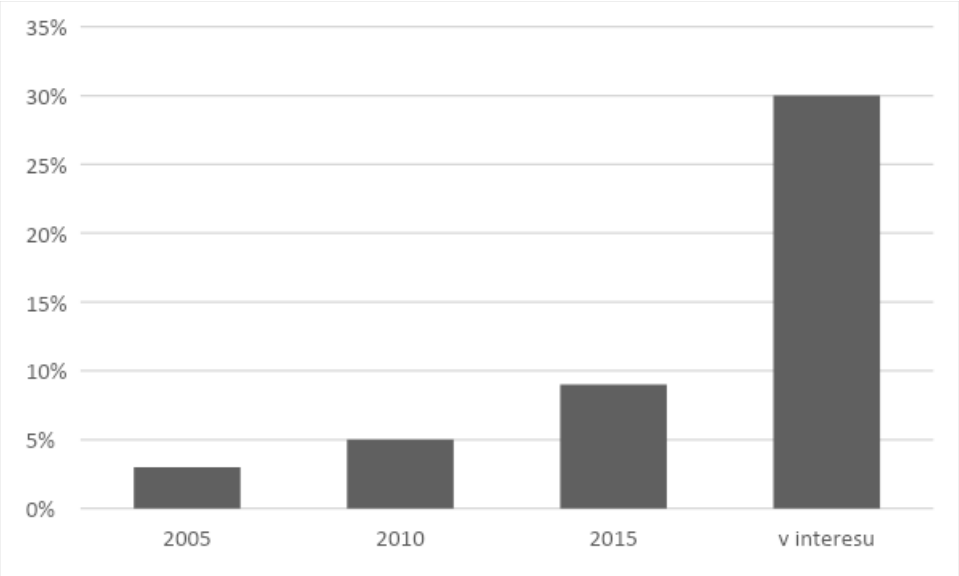
1.1 Research Field

The practice has shown that over the development period of Industry 4.0, any activity in the industry or elsewhere that is not directly part of the production, is burdensome to industry [4]. The goal was to eliminate all such elements of production and leave them to those entities that are qualified to perform them or to those that consider it to be the main activity. After globalization and the international economic crisis, the industry realized that it had to focus its resources on technological advancement, preservation of the market and consumers. It eliminated all warehousing, transportation, freight logistics and all those service processes that cannot be handled by its own force and it decided to outsource them.

During the initial period, there were some organizational issues because the industry transferred some of the expenses to the logistics and logistics providers. There was also a reduction in production costs created by the use of modern technology and information systems, but the problem of the high cost of supporting logistics activities remained, which was reflected in the cost of the end product that the industry offered to the market.

The initial ratio of industrial production and logistics cost was 50-50%. Later the industry managed to reach the current lowest ratio of 62-38% by implementing various interventions. In the late part of Industry 4.0 and the introduction of the new smart industry 5.0, the need for greater collaboration of the manufacturing part of the industry with service work or logistics was recognized. This has shown that the use of certain technology, through automation and system management, can reduce the cost of logistics in pre-production and post-production [5]. With this realization, the modernization of logistics services began by introducing robots and autonomous equipment into all logistics procedures, operations and processes.

The data collected in the motor vehicle industry (interviews conducted) show that 3% (2005) of smart machinery was introduced at the beginning of the introduction of industry 4.0 guidelines, followed by 5% (2010) and then by 9% (2015). In the last phase, when there was a virtual technological development of different processes, verification and testing of individual production systems and the introduction of smart machines (robots), this percentage is increased, but there is no definite calculation. By 2030, the goal of the industry is to reach at least 30% of the deployment of smart machinery into manufacturing and logistics processes. If the individual phases of car production are divided, this percentage could also reach 80 or even more, however, the whole process of making the vehicle from preparation to the final product must be taken into account [6].



Graph 1: Timeline of smart technology involvement in manufacturing by years

1.2 Hypothesis

The process of introducing new technology and information systems into the execution of individual processes in the pre-production phases and subsequent care for finished products leads us to the conclusion that it is essential to integrate modern technology into service processes, which will provide rapid, accurate and professional support to the industry [7].

In the research field, we established the following hypothesis: "Technological modernization of logistics in smart factories is essential", and thus we raised the question of whether modern equipment that is already recognized in production processes can also be used in logistics with appropriate reprogramming where necessary. We recognized the guidelines of industry 4.0 (FoF Factories of the Future) that require a rapid response to change, reduction of inventory in pre-production or at the end of the production, the introduction of lean logistics, gaining the advantage in the market and increased competitiveness, led to quick responses.

The logistics system used to date was based on physical work, using regulations, policies and instructions as well as high workloads and operations. This often resulted in wasted time, unnecessary complaints about inappropriate labelling, packaging, palletizing, etc. We were aware that the introduction of technological improvements in logistics processes meant that delivery, carrier, distribution, scanning, weighing and other equipment needed to be implemented in order to eliminate time and service errors in individual stages of logistics services. The underlying hypothesis showed us that without smart logistics, there are no smart factories.

1.3 The Vision of the Research

It was necessary to find the elements in the processes of logistics that would enable the development of individual processes and would ensure the accurate, secure, timely supply of materials for production. Up to date, the logistics processes for supplying the necessary materials for the industrial production of motor vehicles were based on the manual preparation of individual pieces, the manual counting and inventorying, the use of prepared packaging, the use of trolleys, forklifts driven by the workers, or other means of transportation. All of which were often in the way of the production process and the effort of the employees on the production line. The supply depended on the man and his physical ability, which had time and cost obstacles in production. Recognizing the need for collaboration between the production and logistics and the need to provide a quick JIT "Just in Time" supply of manufacturing components, due to time alignment, has led to thinking about the use of individual robots in pre-production, transportation, packaging, scanning, palletizing, storage and loading.

In terms of research, our vision was to find ways to implement logistics in industrial production, how to use modern technology to improve logistics processes, and how to allow the industry to keep its production running smoothly. The vision was to figure out how to automate logistics so that it would be accompanying, rather than a burdensome activity.

2 BACKGROUND OF THE THEORY AND SCIENCE

2.1 Guidelines in Logistics

When looking at the motor vehicle industry, we found that in its continuous search for advanced technological, informational, digital and other elements that will enable smooth production, reduction of the production costs and maintenance of the market in the direction of its development. Through these guidelines, the industry introduced fully autonomous pre-production, production and, in particular, production-wide processes to enable better preparation of goods for the customer [8]. The processes are primarily reflected in the deployment of packaging, palletizing, warehousing and many other essential logistical processes while trying to take advantage and experiences learned from Industry 4.0 [9]. This is an entirely autonomous system of processing the data from orders, to the layout of the plan and the final placement of pallets with different products.

Through the integration of mathematical optimization and data intelligence, knowledge and experience to develop IT tools for the design and operation of industrial production systems, the industry expertise should be developed. Mathematical optimization and data intelligence are scientific methods of studying phenomena and acquiring new knowledge to improve industrial production. We

should keep in mind that this method is based on the collection of observable, empirical and measurable data that are subject to specific criteria for understanding industrial production.

According to the guidelines of Industry 4.0, lean manufacturing which helps to improve the overall value of the KPI Key Performance Indicator in the industry is suitable for modern management of logistics processes. It is a set of tools for detecting and permanently eliminating losses, improving quality, shortening production times and reducing costs.

Lean production - Toyota Production System is a system of Toyota's philosophy of organizing production and logistics, including the interaction between the supplier and customer that is backed by various tools. Some of these are the tools for continuous process improvement (kaizen) and elimination (poka-yoke). Toyota's other approach of the lean industry focuses on a steady flow of work through systems, balancing production based on the quantity or the product by using Kanban pull system. The advantage of steady workflow is that it naturally captures the entire production system while detecting existing problems in quality and thus contributing to reducing losses. Tools, methods, techniques and strategies such as 6 sigma, 5S, 20 keys, comprehensive productivity management, TPN (Total Productive Maintenance), SMED, JIT (Just in Time) and JIS (Just in Sequence) and many other technologies that are also relevant to logistics and its processes are used to improve the quality, productivity and efficiency of production in the motor vehicle industry.

2.2 Specific Theory and Science of Logistics in the Automotive Industry

In the recent period, it has come to the realization that logistics in the automotive industry is crucial because it is a series of preparatory and implementation works and tasks without which the industry cannot carry out its industrial mission. These are a number of procedures, processes and tasks that enable production which then enables the procurement, supply, storage and transportation for the needs of the industry. In the process of industry development 4.0, automotive logistics uses scientific and other methods that, through the collection of observable, empirical and measurable data, enable the continuous development of the processes and secure services to the industry which is the basis of science.

In this particular case, we were looking for the specific use of logistics for the purpose of securing production in terms of supplying materials from convenient warehouses to production (internal logistics). We used the kanban system that splits the work tasks and manages the workspaces [10] because it works on a pull basis, where there are no predictions as it works on recalling quantities in production itself. This way of working is all about detecting the needs and punctual supply that is achieved with a signal that can be in the form of a card, an empty crate or an empty space.

The type of product and the number of pieces to be produced or brought from the warehouse are indicated on the kanban card. The kanban card tells the consumer (robot or machine) what needs to be brought, produced, shipped and the quantity needed. The consumer always takes only as many goods as he needs at the moment and the manufacturer must then replenish that exact quantity. Kanban is suitable for large industrial batch production, where there is less regularly need for a change and where even and balanced production processes are ensured.

2.3 Autonomous Machines as Exclusive Support for Logistics in the Automotive Industry

Technology present through industrial development and the introduction of hardware into production is also present in logistics and logistics processes. It is already recognized in the first forms of use of various machines with the purposes of pulling, pushing, lifting materials, loading materials, found in warehouses and also in the production itself. Indeed, in the beginning, it was more about the hardware that, by its structure, form, purpose and utility, was not intended solely for logistics and the implementation of logistics processes, but it was used for jobs and tasks that were part of logistics.

In today's industrial development, in Industry 4.0, logistics and logistics contractors are increasingly leaning toward using smart autonomous machines, robots and software to perform individual, ongoing tasks. In this part of the research, we have limited our support to AGV robots and robotic or autonomous forklifts. As exclusive technological support in industrial production, the AGV SMARTCART 100TT (Automated guided vehicle) is used to carry out logistical tasks for the transport of goods and materials from convenient warehouses to the various parts of the factory where the production takes place. These are next-generation smart devices that are programmed with the infrastructure in place and with the appropriate form of management to make their own choices. They use a fixed path method that is accurately coded in the program. The robot follows a magnetic stripe that is its infrastructure; it uses RFID technology and is connected to a production system that controls the paths of multiple robots. It transports trolleys with the purpose of supplying needed products or finished products to the warehouse. The robot is characterized by its productivity, functionality and energy efficiency. Most importantly, the cost-effectiveness that the industry achieves with respect to the use of the workforce for an equal amount of work, the logistics gets exclusive support.

As technology support, forklifts assist industrial production and are equipped with software to perform work as smart machines. These are highly sophisticated and technologically refined machines with equipment that perform all the work required to pick up the pallets of finished products and store them in appropriate storage locations without any help from humans. Its software and magnetic strip guidance as a form of infrastructure encoded and streamlined paths, Wifi system guidance and other software digital sensing.

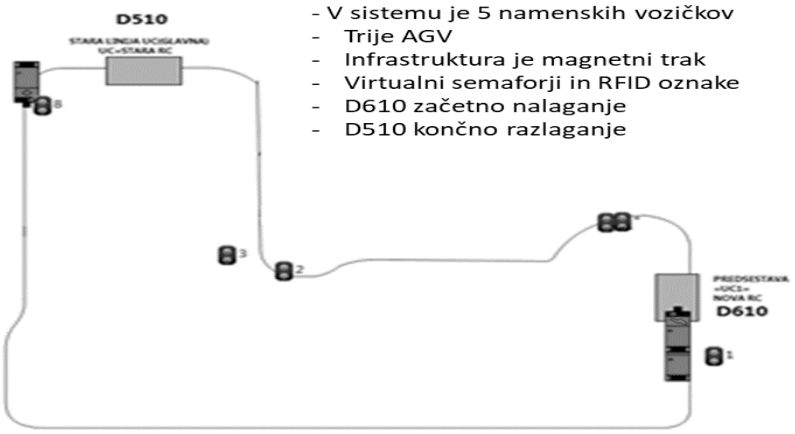


Figure 1: Schematic diagram of the AGV maneuver post at work - its own simulation

3 METHODS

3.1 Examining the Need for Technology Support in Logistics

The fact that the industry recognized the need for technological modernization of logistics services convinced contractors and industry that all processes and operations that can be replaced with the hardware in the production or storage preparation or logistics space should be replaced. The analysis showed that in the past, most logistics operations were performed manually, with the sole purpose of physically pushing, carrying, moving, packing, palletizing, counting pieces, making decisions based on regulations, instructions or orientations with human factor in mind, which meant heavy burdens on operators and workers, the need for more operators, wasted time, a large number of complaints about improper or unprofessional work, resulting damage, improper use of materials, cuts, weighing and so on. Consequently, the materials or products were returned by the customer, which meant re-counting and processing, increased costs, unnecessary costs and exhausted labor. These were orientations towards updating the logistics processes and introducing modern hardware, which will enable the elimination of all the problems that the industry has in the processes of industrial and external logistics.

3.2 Concrete Technological Support in the Concrete Process

Various forms of hardware have been present in the logistics field for many years, especially in the process of storing industrial semi-finished products, downstream products or finished products for the market. It represented various forms of machines for lifting, storing, sorting materials by specific codes and numbers that are being read by computer programs with the help of reading scanners. The recognition of the need for the technological use of the AGV SMARTCART 100TT in pre-production and in production itself was a novelty that attracted many

different types of industry to use. In addition to the automotive industry, AGV can be detected in pharmacy, the food industry and elsewhere.

In the actual process, equipment is listed as a smart robot that independently transports materials for industrial installation from the warehouse to the production belts, during production processes, and when transporting finished products, it transports them to the packaging, palletizing and storage [11]. The introduction meant reducing the number of jobs for people, reducing operators, computer control, and operational control from the control center, the precision of services rendered and energy savings. For the industry, the introduction of AGV in logistics has meant cheaper services, fewer employees and much more [12]. From a technological point of view, the introduction of AGV meant accurate and safe processes, the achievement of quality services without errors, complaints and easier control.

The scientific study of observable, empirical and measurable data in the industry using the AGV robot has shown us that for three production belts, for three-shift work in the motor vehicle industry, it is only necessary to employ three workers per shift. To supply nine production belts, nine workers need to be employed in three shifts preparing material for production, loading it into carts and physically pushing it to the production belt. In calculation, this averaged € 9,000 in employee payroll costs over a month and multiplying that by 12 months resulted in an industry cost of logistic procedures of € 108,000.00. When compared to the cost of purchasing and using technology, or robot, the data was more than astonishing [13].

3.3 Employee and Machine

An analysis of the measurable data obtained in the motor vehicle industry revealed that there was a deviation in the initial phase of the deployment of smart robot hardware, especially by logistics and industry employees. It was originally thought that robots would take over the jobs and that the company or the owner of the industry would fire the employees. With the proper education and training of employees, it came to the realization that the robot, in its complete form, structure and functions, can assist the employees and perform the difficult tasks that would otherwise have to be done by workers.

Operators and workers realized that they did not need to lift objects and materials physically, that they did not have to carry out inventories and calculations that they did not have to perform heavy lifting or other movements that would result in chronic occupational disease. They slowly came to the realization that the robot and the worker could perform their tasks in harmony in the warehouse, in production or elsewhere.

A robot, technological equipment, computer-controlled equipment works together with the worker and complement each other. In the process of performing logistics

or manufacturing, the worker has become more important than the control member who oversees and inspects the completed work of the hardware. In a heavy-duty ratio, the machine performs heavy-duty work in the ratio of 85 - 15%, which is encouraging for the industry and for the health of the human employees in the industry or in logistics.

4 RESULTS

4.1 Applied Technological Development Models

The industry is striving to introduce smart technology and monitor the global marketplace as required by recent Guidelines and Industrial Development 5.0. This need has, especially in the automotive industry, ushered in a new virtual world that underpins a new modern and technologically advanced mode of production. With the help of digitization, computer equipment and simultaneous programs, development departments in the automotive industry are creating virtual programs that allow the creation of imaginary individual tools for the production of motor vehicle parts.

In a virtual world, a program draws an individual part, giving it metal structure, color, weight, resistance, agility, usability, and it tests its capabilities. The advantage of using virtual parts is the number of trials that can be run, which can be in thousands of cases. Once a reliable product certification is obtained, it goes into the manufacturing process and into concrete use where robots make the product. Also, the procedures for using AGV, the procedures for using individual robots for indirect production, the procedures for using smart forklifts, palletizing procedures, etc. have been tested in the virtual world. Because they have shown immediate advantages, they have become applicable in the automotive industry.

The proposal for the technological development model is conceived through individual operations and successfully performed simulations in the virtual world, which is supposed to study individual processes of material procurement, convenient storage, sorting, preparation and internal transport. It is most recognizable in the process of preparation of finished products, palletization, storage and transport, where a semi-finished product or finished product is prepared for further transport for the needs of the client. Measurable data and technological knowledge can lead to improvements in logistics processes and, consequently, to improved industrial production.

4.2 Useful Components of the Model

Throughout the research, we searched for relevant templates, elements and components of the model for the use of technology in the packaging and palletization of semi-finished or downstream products for a known customer in the virtual world. The results were astonishing as they showed us that logistic

palletization processes could be performed without errors, congestion or complaints. With the help of technology and computer equipment, we tried out a new format in which we discovered possible errors and problems.

In this first part of automation, we tried to solve and remove all quality problems regarding the shipment of industrial pieces. We identified a number of problems and errors that we encountered when manually performing these logistical procedures, and we knew what caused the many complaints that led to a loss of reputation, problems in defending IATF 16949, and ultimately what were the additional costs in the form of emergency transport and by the potential of stopping the production with our customer. Our goal with the new technology was to accelerate work in logistics, eliminate emerging mistakes and prevent logistical complaints.

Establishing and introducing new technology, following the guidelines of Industry 5.0, required the use of known and already proven methods in the world. By proposing a technology, to use the Kaizen method [14], we came up with an appropriate and acceptable solution with a machine that can do the scanning and weighing of all production pieces before shipment.

The device worked by sending all the pieces through the supervision line before shipment, where it scanned all the data on the galley with the scanner (thus already fulfilling the first requirement, barcode readability) and sent the data to the next programming station. At the next programming station, the camera is used to check that a suitable bin is selected in the system if the crate is damaged, that all of the products are suitable and that the packaging film is in the proper shape.

In the final part, the crate is weighed to determine whether a sufficient number of products are in the crate. If any of the criteria are not met, the hardware automatically eliminates the crate for re-examination and manual verification. After technological implementation with the Kaizen program, the conditions of logistical complaints based on the packaging unit of the crate were eliminated. We are looking for other solutions, by using virtual programs, which would fully meet all the criteria of performing logistics processes with hardware, thus eliminating any fears of errors, complaints and unnecessary costs. We were looking for an autonomous process for using hardware in palletization. The goal was to process all orders automatically, create a layout plan, and to trigger material needs directly to the storekeeper. In this way, we have come closer to the principle of lean manufacturing in the automotive industry through virtual technology and experimentation of using hardware.

A scientific perspective has shown us that a virtual program is unaware of unintended errors that are connected to human errors in logistics or production. Therefore, we also had to perform a test with intentional errors and avoidance of these, according to the Poka Yoke program (Japanese term inadvertent, avoidance)

that is based on the legality that man or machine are capable of avoiding errors completely [15].

For elements and components of the application of the models of technology in logistics, we must consider the proper supply and distribution of materials and sequential processes. We have achieved this through a kanban system. There are no predictions from the system, and it works on the principle of recalling quantities, which enables the customer to get exactly what he needs and exactly when the material is needed as well. The system operates with a kanban signal, which can be in the form of a magnetic record card, an empty bin or an empty space.

The type of product and the number of pieces that need to be produced are written on the kanban card so it provides the information of what must be produced at that point and how much of it is needed. The system always tells the consumer to take only as many goods as they currently need, and the manufacturer must then replenish this quantity. The kanban system is useful in industrial production because it can only prove to be justified in massive production [16]. In the automotive industry where small materials are used, electronic Kanban is used to call forklifts to bring in new material from the warehouse. It is also used at the end of the line when the assembled pallet needs to be taken, and a new empty pallet delivered.

4.3 Relevant Effects

The purpose of introduction and the use of technology in logistics and the purpose of updating logistics processes to increase the industrial production capacity in the automotive industry was used to accelerate production, simplify logistics and production processes, reduce energy consumption, increase productivity and reduce material costs of the final product. In order to achieve this with technology (robots), it is necessary to consider some systems that can reduce costs in industrial or other productions.

The JIT (Just in Time) method is widely used in the industry. JIT is the concept of a stock-free business developed in the 1960s in Japan. In its most basic form, it requires a precise quantity of products at a specific time. In this concept, it should be taken into account that the production of one unit more or less than necessary increases the operating costs. Material, semi-finished products and finished products must be made or delivered to JIT at the right time - when needed. For this system operation to be a stable production flexible workforce, high quality of materials and products, good durability of hardware, reliable suppliers, rapid change of tools on machines and continuous maintenance of other elements of the business are all needed.

4.3.1 Economic Effects

With the introduction of new technology in the industrial production of motor vehicles and individual parts for the assembly of different sorts and types of vehicles, we also expected economic effects in production and logistics, that can be seen in lower labor requirements, better utilization of existing machinery, production facilities, production processes and better execution of logistics processes.

With the introduction of technology, we have avoided manual operations, physical counting, decision making by following written instructions, there is less burden on operators, and there are fewer employees and fewer complaints. Automatic packing of products and electronic warehouse management system according to WMS (Warehouse Management System) programs is arranged, which completely changes the form and procedures of logistics work, making economic effects very visible.

In the future, it is expected that modern software will be installed, which will complement and enrich the existing technology with processes, system data processing and electronic data transfers. This time the virtual testing phase is running, and when the required conditions are met, the matter will be put into system operation.

4.3.2 Logistics Teachers

Logistic effects are visible in the introduction of hardware at all stages and processes of production preparation and execution in the automotive industry. The field of automatic packing plan generation from customer orders has been established, which has necessitated new logistical procedures through which the device must read data directly from SAP or the corresponding SQL database.

Customer's orders are grouped by consignment (loading and unloading locations), each product in the contract is assigned a specific number of places based on the product specification, and the number of pallets required is calculated based on a set of packaging rules. Thus, a final list of crates or products (including empty crates) is compiled for each pallet, and the exact coordinates of each container for robotics placement instructions (palletization) are calculated. All data is recorded in the results table in a database (SAP / SQL). This data is used to print the labels for pallets and to produce robotic packaging instructions.

The logistic effect also shows the AutoPack system, which consists of specific components that lead and manage the entire packing line, within which is a model design that calculates a packing plan from the order list for a particular shipment, containing pallet IDs, exact coordinates and contents of each bin, reduces the number of total pallets, the number of mixed pallets, and / or the total number of empty crates (depending on the design parameters). The management module integrates SAP / SQL (reading/writing) data interfaces and handles all

communication with the design engine. It also manages the system and configuration of the operating parameters. The procedures were virtually verified and evaluated for use.

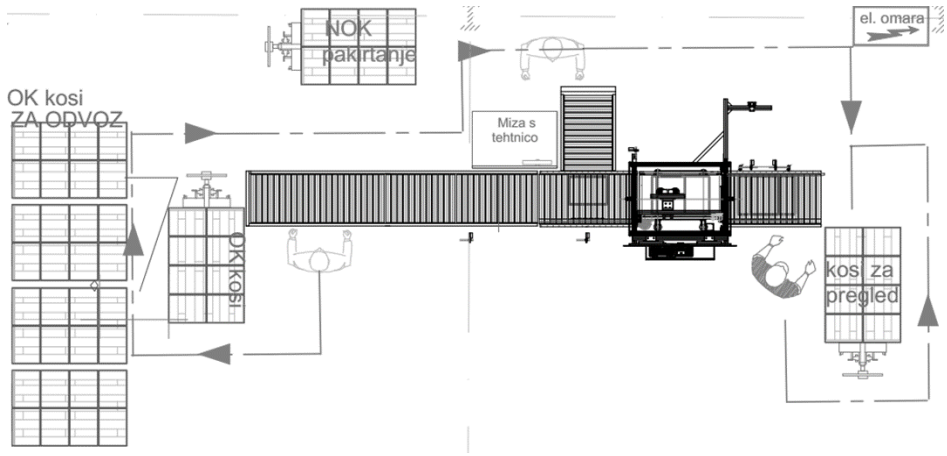


Figure 2: Demonstration of the use of automated equipment in the palletization process

4.4Achievements and Validation

Given the expected effects of hardware in logistics, the systematic regulation of the use of individual machines in pre-production, where logistic processes are lowered in the preparation of repro material for production and carried out with an AGV robot, according to the systematic arrangement of palletization and preparation of finished products, great success has been achieved for the customer and the use of smart forklifts, demonstrating both economic and logistical viability. The system of new use of hardware in logistics was developed as a product of all the methods mentioned in this chapter and achieved the goal of an autonomous palletizing system for the customer. The procedures are performed automatically so that the system collects data regarding recalls from the SAP operating system and then it, in its program part, virtually assembles all the pallets and calls the material to the entrance where the palletization and removal process is carried out to the rack warehouse.

The new system has greatly simplified the old one since technology (devices) consists of 20 pallets simultaneously, which means that less material is manipulated from the warehouse and back (previously, for each pallet, the material was collected in the warehouse separately). The use of the new system resulted in fewer errors or jams as well.

The systemic advantage of using new smart hardware is the speed of shipping preparation, economic savings, and eliminating human errors. Advantages are also shown in the system management of the hardware, which itself checks all the crates, completes the entire pallet and equips it with a galio label. The hardware

comes from the smart that takes the pallet from the device to a rack warehouse or a transport vehicle.

5 DISCUSSION

The collaboration of industry, science and theory, in this specific case, is the result of teamwork, a great deal of experience, backed by loss reduction methods in the manufacturing and manufacturing processes. In the final part, it is a result of product storage and in improving the throughput and productivity in the automotive industry. We are aware that everything is relative in science and that everything can be upgraded, supplemented, refined, modified, innovated, which means that we have not finished our research.

Using the scientific method, we studied the phenomena of material flow from its entrance into the industry, to marking, sorting, inspection and preparation of storage, determining individual characters, numbers, codes, ordering individual materials for individual production belts and preparing for internal transport into production. We have acquired new knowledge to improve individual processes in logistics, with the aim of supporting industrial production.

Our goal was to collect observable as well as empirical and measurable data that can be measured with specific measurement and evaluation methods and to collaborate on the development of new technology that would help to manage logistics in the industry faster. We set a hypothesis with which we wanted to confirm that technology is key to the development of the industry and to all the processes that accompany industrial production.

We have substantiated our claim by using appropriate industry methods such as Kaizen, Poka Yoke, Kanban, Pull, JT, and have tested everything virtually. We have estimated that we have achieved our goals as we have shown the economic effects seen in automatic packaging under the VMS (Wharehouse Management System) program. The research is ongoing, and it continues in order to find new options, better solutions and competitive advantage for the automotive industry.

Also interesting is the finding that showed us that employees in the automotive industry had accepted the made changes in introduced autonomous process that were recognised as the benefits of a system. That system is also recognized as necessary, and they exploit it systematically, especially in areas where there are ergonomic problems and unproductive tasks. There is no more manual posting and recording, which make it easier to detect errors, losses and other disruptive factors in production.

6 CONCLUSION

Economy, industry and especially the motor vehicle industry belong to a specific area of production that regulates the market, regulates economic, inter-organizational and inter-corporate relations. The motor vehicle industry is often also an element between country and political relations. Countries, communities, and international associations depend on whole economy. Being aware of such demanding responsibilities, the industry is seeking sustainable solutions, developing technology, infrastructure, systems and production processes, and is looking for professional solutions that would help maintain industrial production and organize the market. It is seeking an appropriate supply-demand ratio, well-regulated impact on nature and the environment, and the needs for humans to exist. It is also seeking for the methods and levers, commercial and other options to attract customers to ensure continued industrial work and development.

The introduction of new technology, the introduction of smart technology is a significant part in the development and modernization of the automotive and other industries, so any updates of production, logistics and logistics processes are a systematic improvement of the industry. The introduction of the AGV robot (smart machine) has inspired many other manufacturers, such as pharmacy, food industry, metal industry, etc. These industries have introduced innovations into their processes, energy-saving, human resources, security, environmental protection and much more.

The introduction of new systems, new technologies, robots like AGV, palletizing machines, the introduction of smart forklift trucks that work without humans, the introduction of smart, self-supplying warehouses that perform various physical work that is otherwise dangerous to humans are a step further to the general development of science, systems, economy and the whole society. In this particular case, we have shown how systematic it is through the use of different methods. It is possible to come up with new smart machines that are supporting the industry and especially in our specific case, are helpful to the automotive industry by doing a virtual analysis.

The smart machines (robots) are evidence that the Slovenian industry is developing with the world industry and in some cases, it is even overtaking it, which should make development centers of individual industries, schools, faculties, universities, institutes and all of us involved in development processes proud. In the specific case where we have shown the system integration and the use of smart machines in the motor vehicle industry in Slovenia, we are currently in the phase of virtual verification of the capabilities of individual functions and the use of smart machines for broader purposes, which we will show in the following periods.

Demonstrating the use of AGV, a smart palletizing machine (which we have not named yet) and smart forklift are just a couple of pieces of equipment, a piece of

technology that the industry is developing. Scientific knowledge about individual equipment provides a starting point for further research, which completely confirmed the hypothesis and gave the reader the opportunity to become acquainted with innovations in the development of the industry, knowing that we described and presented only those parts of the development of smart hardware that do not represent the business secrets of each manufacturer. For this reason, we did not mention where scientific research was done and where the information presented was obtained.

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INTER-ORGANIZATIONAL INTEGRATION IN LOGISTICS

Abstract:
The research matter: the organization of transport of goods, and related logistics operations were of great importance for the economy and human existence through the development of industry and still are today. It is about more inter-connected procedures and processes that are organizationally driven, their management is often subjected to a social regulation of individual countries, the bilateral agreement, and type of industry, and market demand. Recently, the

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organizational integration, in particular the management of transports, has been increasingly linked to the globalization of production and the market, the relocation of production to places with cheaper labour, environmental protection, etc. which represents a new paradigm of organizational integration.

The purpose of the research: Since the Slovenian economy in the past was already linked with its industry to the Western industry, were these links often and still are conditioned by bridging the goods in the form of half-products for further production or finished product for the market. In this connection, the organization of transport and logistics processes linked to it has a strong role, which is responsible for delivery on time and implementation of individual production, economic, market and other activities. The purpose of the study is to determine how to implement inter-organizational integration and how does the logistics work.

The research method: We used methodological collection, review, analysis, measurement, study, and assessment of data related to the organization of transport and interconnection, data processed by the relevant program and to adapt them to the requirements of stakeholders interviewed.
The results: The research showed that there is no strategy prepared or a unified methodology for the organizational management of transport in Slovenia. Therefore, we have surveyed collecting data among transport organizations in Slovenia, which showed us what the actual situation is. The obtained and analysed data confirmed our assumption, at the same time they gave us the basis for the search of building blocks and preparation of paradigms for possible solutions.
Organization of the research: The study included a greater number of transport organizations, which varied according to the form of the organization, the number of usable transport organizations, transport and the extent of the transport, and their influence on the organizational integration.
Limitations of the research: It was necessary to determine the transport operations, interconnections methodologically, as well as consider a wider field of research and to obtain relevant information on the situation in the transport business, which was due to a number of obstacles impossible, so we limited ourselves to the methodology and models of organization of transport.

Keywords: *organization, inter-organizational integration, transport in outsourcing*

1 INTRODUCTION

The methodology of studying the activities of individual economic companies or individuals in the inter-organizational integration in the transport activity (read: legal and natural persons) requested that we first define the concept of inter-

organizational integration in transport activity and establish procedures and logistics processes, which are in its content and usability directly linked to the execution of transport. Logistics has introduced a definition that it is about service activities that allow to economy, industry, manufacturing and other organizations that do not have their own transports to overcome time and space, and ensures that the specific goods are at a given time in a particular place, which enables the production, sale, transportation, and supply of industry, market, population, and beyond. An organization of logistics, transport and the individual logistic processes are needed, which enable the internal, inter-state and international exchange of goods and the exchange in general, the supply of the economy, industry, market and marketing activities. The survey has shown that the Slovenian transport organizations are included into the overall trade in goods and services, who take care for the delivery of raw materials or semi-finished products for industrial production, transportation of finished products for the international exchange of goods, and ultimately expand the market and marketing activities. In the study, we have followed the legal form of organization which participated in the survey of companies (legal and natural persons) and provided allowed ways of safe business operation considering the foundation of economic law.

The survey has shown that logistic processes create important inter-organizational integration that is related to the functioning of the economy and industry. Due to the volume of the study areas we limited ourselves to key logistical processes that are directly related to transportation, namely freight forwarding, transport documents drafting, preparing goods for transportation, packaging, packing, loading, etc. From a legal point of view, the economic and legal affairs that have to be admissible, workable and possible (Murtič, Jankovič, 2018). The methodology of collection, review, and processing of the data collected has shown that many authors described logistics and logistics processes differently, individually and shared them and determined their importance. For the research area, we have gained numerous domestic and foreign literature, using only those that opened up the possibility of acquiring new knowledge in our field of research. It is impossible to ignore the writing on logistics processes since it is much written about them in Slovenian and foreign literature, which is undoubtedly a great help to manufacturing organizations, users and providers of transport activity. We have limited only to some authors, who were close in their research or writing and dealt with the same matters. We are listing that based business forwarding has been recently described by Jakomin, Jelenc and Vlacic (2006), transport technology and transport systems Jakomin, Zelenika and Medeot (2002), basic transport technology Gajšek (2007), international transport and logistics Ogorelec (2004), transport law Pavliha and Vlacic (2007), insurance law Pavliha and Simoniti (2007) and many others. It is about the organization of processes which are known and well described, there is also a lot of domestic and foreign literature about the issues, but there is no trace of a unified methodology of inter-organizational integration of these processes, which is essential for the successful organization and execution of transport.

However, Zelenika and Pupovac (2001) presented the logistics processes in inter-organizational integration as logistics activities from direct production, processing or treatment, maintenance, packaging, packing, marking, stacking, sorting, weighing, storage, loading, and unloading of means of transport to the transport, the performance of freight forwarding, providing insurance, customs clearance, purchase and sale, distribution, management, financing, etc. Zelenika (Zelenika 2005, p. 164-187) has thoroughly moved closer to most of the processes that form the inter-organizational integration but does not mention their inter-organizational connection or joint control. It is understood that Zelenika and other authors of articles, in their writings, in their publications, individual processes, individual processes, and activities leave to individual organizations that execute it as principal activity. While doing so, they do not engage in form, purpose, and needs of combining individual procedures, nor do they engage in inter-organizational integration. The very methodology of the research has given us a starting point for assessing that the inter-organizational process management traffic, transport, logistics, and other activities are interesting and worth reading from a scientific perspective. It has been reasonable to focus ourselves on organizations and their linkages, the emphasis has been put on the organization of transport, as the most important part of the external business logistics in industry and economy. We wanted to figure out how transportation organizations, especially those engaged in the transport of goods in Slovenia and Europe, have command over the organization, inter-organizational integration and how do they cope with daily changes related to transport (Murtič, Jankovič, 2019).

2 PURPOSE AND GOALS OF THE RESEARCH

The methodology of the research has given us already in its basis directions to determine the purpose and objectives of the research, which in the present case was to determine how transportation organizations which are involved in the transportation of goods, control the business inter-organizationally and what are their economic effects. Certainly, the basic purpose of the research was to list methodologically and by using the theory of organizational and business studies, taking into account internationally comparable relevant facts of development, in a professional and argumentative way, give credible views on the actual situation in the transport of goods and give reliable directions of the development model of the future inter-organizational integration of various economic and other organizations. To demonstrate, compare and by doing sampling, we have used the scientific research and theoretical conclusions of individual authors that discussed the matter in their work or their own research fields, which relates to our present scope. Unfortunately, due to different opinions and different areas covered, we have not used specific references or citations, as the matter discussed did not allow it. The findings of other authors enabled us to expand the knowledge and recognition of the profession and gave us the platform to identify the building blocks for the preparation of (possibly unified) a model of inter-organizational integration. The task of its content was challenging and comprehensive, and there

was not any appropriate literature or practical research that would enable the insight into the area under consideration. The methodology of the survey required that we previously set research goals and then collect, analyse and assess the acquired material, namely the objectives of our study were:

- to define the concepts of the theoretical basis and to establish the building blocks for the inter-organizational integration in the area of transport,
- to analyse the current situation and gain new insights into the interdependence and intertwining field of performance of organizational integration with respect to economic changes,
- to look for models that would facilitate the inter-organizational integration,
- to prepare appropriate models that would be acceptable as a modelling solution to transport and transport-related organizations,
- to confirm or refute the set hypotheses, and
- to indicate possibilities for further development in the field of inter-organizational management of logistics processes in the transport business.

3. THE RESEARCH HYPOTHESES

In order to establish hypotheses, we searched for the factors which were considered to have the greatest impact on the actual and future situation in the area of inter-organizational integration between transport and other organizations in Slovenia. Based on them, we anticipated six key hypotheses and put them to follow in sequence. Hypotheses were conditioned by the volume of the substance under consideration, as follows:

1. Human resources - a key element in the management of inter-organizational processes.
2. Models - are conditioned by the degree of maturity of the organization.
3. Management - managing in organizations.
4. Trust - a prerequisite of successful work.
5. Communication - a reflection of successful management.
6. The paradigm - the introduction of new forms.

The definition of hypotheses was the basis for the search for answers to the question of what are global, inter-personal and inter-organizational relations, through which the whole process of organizational integration between transport organizations regenerates. The methodology explains that it is about multi-annual and multi-layered studying and researching of the field of inter-organizational integration among transportation organizations, which was the starting point for relevant hypotheses and draw up an exploratory questionnaire. The prepared questionnaire was the basis for the acquisition of data with which we wanted to confirm or refute our arguments.

4 THE RESEARCH METHODS USED

While developing a questionnaire, we based on the assumptions and hypotheses, which we defined in the introductory part of the study. We reasonably associated individual assumptions with the hypotheses and developed some arguments for each hypothesis below. We decided to determine the perception of the factual situation, as well as the desired (future) situation, therefore, we needed to adjust the questionnaire reasonably. Such an approach enabled us to identify the gaps between the perception of the actual state and the desired state. The larger the gap, the more opportunities are there to improve which was our purpose and a starting point for formulating proposals for improving the situation.

The ready questionnaire requested testing, which was conducted at 300 transport organizations in Slovenia. After a successful test and the identification of issues through which the process management of logistics processes regenerated, we addressed the questionnaire to several transport organizations throughout Slovenia. The assumption of an ideal sample was 150 returned and completed questionnaires, which should be sufficient for the research and extraction of the necessary data. We received the estimated number of completed forms, but due to the inadequacy of some answers, 10 questionnaires had to be excluded from the analysis. The inadequacy of samples was manifested in equality of answers that apply to a specific organization, but they are methodologically useless for finding solutions. Only one such sample could be used because of the same answers, however, the others were excluded and defined as useless. The total number of responses received was sufficient for the purpose, which was a sufficient sample for the analysis and survey. Based on the data obtained, we performed quantitative, factor, and regression study. It turned out that the information obtained to a great extent confirmed the hypotheses, by which the research presumption was confirmed that in Slovenia there is (does not exist) no single model of inter-organizational management of logistics processes.

5. THE OBTAINED RESULTS OF THE RESEARCH

Due to the methodology of the research, we lent ourselves on the actual state or the state while doing the research in the questionnaire, which included 33 questions and 17 questions about the desired future condition. With the first part of the questionnaire, we wanted to gain an insight into the current situation of the inter-organizational management of logistics processes. In the second part, we focused on those areas that require change, and which would allow us to find the building blocks for the preparation of a possible single model of inter-organizational management of logistics processes.

The data obtained were ideal for working with SPSS 19.0., which provides a comprehensive overview and a wider range of data processing. We showed the data of attributive (arithmetic) type in the form of the frequency of responses, and we used contingency tables to see the links between variables. We calculated the

basic statistical parameters, namely the arithmetic average, the lowest score, the maximum score, and the standard deviation.

Methodologically, we demonstrated in Table 1 and Table 2 the average levels of agreement with the given arguments that made to the respondents possible to evaluate each specified argument with values on the five-point scale, while the score 1 (the lowest) means that he/she disagrees with the claim and the score 5 (the highest) means a complete agreement of an individual respondent. The value, which was in its rate higher, ordered the need for a specific organization. We can see this already in the first indent of the facts under B12, which says that the economic crisis has had a negative impact on our business and demonstrates the need for urgent change and finding appropriate solutions. This assessment is followed by others, pointing to the need for a unified model of inter-organizational management of logistics processes, the inter-organizational cooperation, teamwork, cooperation with successful organizations, continuous cooperation, etc., as shown in Table 1.

Table1: the assessment of a factual state in the organization

		average value
B12	The economic crisis had e negative impact on our business operation	4,32
B33	A unified model of logistics processes management would help our organization	4,19
B5	Our organization always takes into account the demands of a contracting authority and adjust to the demands	4,07
B8	Cooperation with new and successful organizations has a positive on the success of our company	3,94
B3	Teamwork is successful and at a high level in our organization	3,88
B18	We have continuing cooperation with the same contracting authorities	3,88
B2	The foreign languages knowledge of our employees is high enough	3,81
B4	Our company is successful when developing new contacts	3,81
B19	The communication among different units and organizations flows effectively and without any	3,81

	disturbance	
B17	We satisfy the payment obligations in due course	3,80
B21	We follow the official journals and regulation publishment regularly	3,79
B31	Organized transportations are beneficial for our organization	3,79
B27	We are active in the circle of transportation associations	3,75
B1	The level of education of our management is suitable and has a positive effect on the success of our organization	3,74
B11	The assessments and rewarding take place objectively and fairly in our organization	3,71
B25	The work is organized in the way that one can quickly adapt to changes	3,71
B6	Our organization is technologically at enough high and demanding level	3,68
B9	We are effective enough when recognizing and solving problems	3,68
B16	The tensions are calmed down nicely and polite, without screaming	3,68
B13	There are open discussions between management and subordinate	3,66
B15	The management understands the problems of employees and tries to eliminate them	3,64
B10	There are a positive climax and satisfaction of employees in our organization	3,62
B32	We are familiar with the European model of sharing of logistic processes	3,57
B22	We have strong informal contact with other organizations	3,53
B24	The management of our organization is democratic and networking	3,52

B26	We have a suitable form of interconnection with other organizations	3,50
B28	Our efficiency and success is higher within associations	3,50
B14	Our regulation of work is coordinated	3,40
B20	The knowledge of international and EU regulations is satisfying	3,39
B30	Our form of organization is suitable according to the demands of the market for the needs of transportation	3,37
B7	We have precisely formed logistics support	3,26
B23	We know the habits and culture of other countries	2,91
B29	We know Fords Motors Company or Toyota Company model of transport	2,08

Source: own simulation data obtained by SPSS 19.0

The overview of evaluated data in the field or the desired or future state also demonstrates a high level of needs for timely financial transactions 4.69, needs for a unified methodology, the management of logistics processes 4:47, the need for long-term cooperation and so on. These are values that are also shown with claims ranging from 1 (the lowest) and 5 (the maximum). Their analysis shows that confirmatory scales are placed in the range above the half, which clearly indicates urgent changes and the need for greater inter-organizational integration. The data processing methodology was difficult, but the results gave a good starting point to identify the facts and at the same time alternative assumptions for the preparation of building blocks that would enable the introduction of new technologies and new approaches to substantiate the situation and the results gave new possibilities for arranging and taking into account the desire of stakeholders which identified possible starting points and improvements.

Table 2: Views about the ideal state

		average value
C9	the payment obligations in due course are decisive for the success of an organization	4,69
C17	The unified methodology EU in the field of transport	4,47

	would affect our work	
C8	Long-term inter-organizational cooperation affects the success positively	4,22
C7	Trust enables the successful work of employees in an organization	4,14
C10	Suitable cooperation with creators of legislation would affect the effectiveness and successfulness of an organization	4,09
C6	An open discussion with employees affects the success of an organization positively	4,06
C5	The satisfaction of our employees affects the success of an organization positively	4,02
C16	Contracting authorities should adjust transportation companies and their needs	3,96
C2	A higher degree of effectiveness of an organization is reached by older and experienced management	3,92
C4	A friendly managing of employees aids in the improvement of an organization	3,84
C15	Activity within large associations aids in the provision of labour	3,75
C1	Younger and more educated management aids more in higher effectiveness of an organization	3,71
C3	Hard managing of employees aids in the successfulness of an organization	3,45
C14	just in time - delivery on a specified time is appropriate and reasonable for the good cooperation	3,32
C13	outsourcing is a suitable form of transportation execution	3,06
C12	Reno model affects inter-organizational cooperation of transport companies in Slovenia	2,93
C11	Ford Motors in Toyota models affect inter-organizational cooperation	2,31

Source: own simulation of the data obtained by SPSS 19.0

A comparison of the two sets reveals a certain gap between the actual situation and aspects that respondents consider to be relevant to the effectiveness and efficiency of their organizations. The largest gap comes at the knowledge and implementation of business models. The respondents clearly expressed the need and desire for changes and suitable business models that help them improve the effectiveness and efficiency of their organizations. At the same time, they show that their knowledge of existing models is at a fairly low level or they are not familiar with them at all. This clearly tells us that models from abroad are not reasonable nor useful to directly transfer them to the Slovenian space, so one of the goals of our study (doctoral dissertation) was to develop a model that would satisfy the specific needs of Slovenian transport organizations and facilitate the realization of the set goals.

The respondents globally agree that a unified methodology in the field of transport would have an impact on their work (C17 - 4.47), and their organization. It is particularly important their clearly expressed need for a useful model - namely, the respondents believe that a unified model of management of logistics processes would help their organization (B33 - 4.19). Despite the expressed need for business models, their poor knowledge of existing models it is not clear, which suggests that they expect something new, while they are not willing to actively seek solutions or models that exist abroad. The rating of the argument B29: »We know Fords Motors Company or Toyota Company model of transport" is only 2.08. In accordance with the low level of knowledge, however, is their assessment of the impact of the two models on inter-organizational networking is very low (C11 - 2.31). Slightly higher is the European model of knowledge sharing logistics processes (B32 - 3.57), resulting from their everyday practices and cooperation. Many Slovenian transportation organizations are engaged in Slovenia and other European countries, irrespective of the European Union.

If we figure the actual situation data (B12 - 4.32), as the highest value, indicates that the economic crisis has a negative impact on our business and on the other side (C9 - 4.69) as the maximum value of the desired state, suggests that the timely payment would allow a successful business, the following information (B33 - 4.19) about a unified model of management of logistics processes would help organizations that is repeated in the ideal state (C17 - 4.47) the EU unified methodology would have a positive impact on the organization's work suggests that respondents want a unified model of inter-organizational management of logistics processes, which are not limited only to Slovenia. It is understood that the respondents want a new model of management of logistics processes, but they are not limited to Slovenia, which tells us that the Slovenian industry and economy, as well as the logistics processes in Europe, are integrated and globalized that, in this sense, the borders of state economies are disappearing.

A very important aspect represents mutual human relations in transport organizations and here we see that there is still a lot of space and need to improve

the situation. Respondents agree that the confidence of employees (C7 - 4.14), a frank conversation with employees (C6 - 4.06), employee satisfaction (C5 - 4.02) and a friendly management (C4 - 3.84) positively contribute to the success of individual organizations and increase the success of the inter-organizational integration.

By examining and comparing the data we can establish that assessment rates about the facts of the transport organizations are not so high and indicate a need for improvement, particularly in the areas of organizational management of logistics processes. As seen in the table, this need is reflected in particular in the field:

- Harmonized rules work (B14 - 3.40);
- Democratic and grid management organizations (B24 - 3.52);
- A positive climate and employee satisfaction (B10 - 3.62);
- Understanding and eliminating the problems of employees by management (B15 - 3.64);
- Open discussion between management and employees (B13 - 3.66);
- Friendly and polite calming tensions (B16 - 3.68)
- Assessing and rewarding according to objective criteria (B11 - 3.71);

There is also an interesting and told discrepancy between the opinion that the timely financial transactions are decisive for the success of the organization (C9 - 4.69) and the actual timely settlement of payment obligations by the organizations where the respondents are employed (B17 - 3.80). Also, the payment discipline is one of the problems that are most often cited as urgent (60.7%). Maybe this is impacted by the global crisis, recession, and poor economic situation, but it may be the result of poor discipline and legally regulated areas, but for this argument, we do not have the proper argument (B11 - 3.71);

Another area where the need for changes and improvements are shown is the knowledge of the regulations. Respondents believe that the proper cooperation of transport organizations with the creators of legal regulations would affect the efficiency and effectiveness of transport activity (C10 - 4.09). At the same time again, we see that the actual knowledge of international and EU regulations is at a rather low level (B20 - 3.39), as well as regular monitoring of official gazettes and announcements of regulations is not present enough (B21 - 3.79). We assume that the respondents are likely to leave the knowledge of legal regulation to the outsourced, who is responsible for the monitoring of regulations, adequate communication, and adaptation.

However, the picture is much more diverse in the field of inter-organizational cooperation. The respondents agree to an appreciable extent that the long-term inter-organizational cooperation has a positive effect on performance (C8 - 4.22). However, to a much lesser extent, they agree with the statement that the

activities of organizations within larger associations is a condition for success and to assist in the provision of labour (C15 - 3.75). The factual state in their organizations exhibit some form of inter-organizational integration and cooperation within the associations, but not at a sufficient level. Reviews of cooperation are as follows:

- They have a suitable form of interconnection with others (B26 - 3.50);
- Their effectiveness and efficiency is increased within the groupings (B28 - 3.50);
- working within transport associations (B27 - 3.75)
- Organized transport is beneficial for their organization (B31 - 3.79);
- The communication between the various units and organizations is carried out efficiently and smoothly (B19 - 3.81);
- A continuous co-operation with the same contracting authorities (B18 - 3.88);

The assessment of performance in different fields shows that the situation is solid, which is seen as some form of inter-organizational integration, but it would be still reasonable to slightly improve. We believe that the reasons for this are in the following responses, namely:

- The level of leadership education is reasonable and has a positive impact on the performance of the organization (B1 - 3.74);
- The organization is successful in making new contacts (B4 - 3.81);
- Teamwork in an organization is successful and at a sufficiently high level (3.88);

In the field of transport, the organizations follow guidelines and adapt to the requirements of clients (B5 - 4.07), the form of the organization itself is less appropriate according to the market requirements for the transport needs (B30 - 3.37), because the client does not enter into that. The client has the goal of minimizing costs to obtain adequate and high-quality transport services.

Among the most pressing problems, financial indiscipline respectively excessively long payment deadlines (60.7%) are most often cited, unfair competition (29.2%), inadequate legislation (14.3), excessive costs (11.4%) and the presence of foreigners in the Slovenian market (10%). Financial indiscipline can be caused by the global crisis, on the other hand, we can confirm with certainty that the reason for unfair competition, inadequate legislation, and the presence of foreign transport organizations in Slovenia, etc. lies in disorganized inter-organizational management of logistics processes.

The acquired data were also analysed by a *factor analysis of the data*, which is a mathematical process, where we put together seemingly chaotic data based on the individual factors and establish particular links or deviations. We established that certain questions coincide with a certain factor when doing the analysis of the individual survey responses using factor analysis. How strong this relationship

tells us the factor weight, which is actually a measure of the strength of the connection of individual survey responses with a single factor. The values are ranging in the interval between - 1 and + 1, wherein the value of the factor weights, comprised in the interval - 0.5 and + 0.5, means that there is no connection between the question and a factor. The values between +0.5 and +0.7 mean a sufficient value, the values between + 0.7 and + 0.8 mean a good value, the value above + 0.8 mean a very good linear integration (in terms the more of A, the more of B). The negative values of the factor weights show a negative linear integration (in terms the more of A, less of B). The interpretation of each factor is subjected to the discretion of the issues which coincide with each factor.

From the factor analysis of the used questionnaire is evident that the 7 components are explained by the 69.3% of the variance of the responses in the context of B (assessment of the actual status within the organization of the respondents). The components are not equivalent among each other, because the first component is explained with 18.83% of the variance, the second with 14.48%, and the third of 8.14%, etc.

The questions in context B, the seven aspects of the situation in the transport organizations were measured:

- to the factor "relations in the company " 9 claims are bound with weights from 0.779 to 0.510;
- to the factor "work organization and inter-organizational cooperation" 5 claims are bound with a weight of 0.737 to 0.552);
- to the factor "knowledge of models and partners" 4 claims are bound with weights from 0.695 to 0.495;
- to the factor "performance" (of leadership, teamwork, grooming) 3 claims are bound with weights from 0.667 to 0.460;
- to the factor "transport" 3 claims are bound with weights from 0.853 to 0.615;
- to the factor "rules" 3 claims are bound with weights from 0.756 to 0.512);
- to the last factor, two arguments are bound with weights 0.728 and -0.537.

In the set of questions C (ideal or desirable condition, according to respondents), 3 components explain 61% of the variance of responses. The components are relatively balanced among each other, because the first component is explained with 25.8% of the variance, the other with 17.8%, and the third with 17.55%.

According to the opinion of the respondents, three aspects of the desired situation were measured with the questions under paragraph 3. These three aspects are partly covered by the set of questions B:

- to the factor "relations in the company" 4 arguments are bound with weights from 0.886 to 0.718;

- to the factor "knowledge of models" 3 arguments are bound with weights from 0.822 to 0.570;
- to the factor "inter-organizational cooperation" 4 arguments are bound with weights from 0.809 to 0.471.

We used Deviations or confirmations of each individual factor or group of factors that explain the causes of deviations or confirmations of an individual argument between the actual and the desired state of inter-organizational management of logistics processes, to find the key causes that change the status of a variable.

We prepared a regression analysis of independent and dependent variables, where we searched for factor causes. It made sense to locate the variances indicating the reasons for deviations or equalities of individual variances in relation to the causative factor in the proportion between the identified variances of the actual and the desired state.

The regression analysis revealed independent and dependent variables in relation to the variances of the inflation factor, which has been shown in the acceptable limits of 1.40; 1.88; 1.95, which is understandable in the test below.

The independent variables are included in the F1-F7 - latent factors from the factor analysis and the dependent variable are included in the F1-turnover, $R^2 = 0.32$, $p = 0.00000$ ***, f5, f6, f7 are statistically significantly associated with the F1 - turnover, partial coefficients, which results in a -0.468, $p = 0.000000$, 0.343 $p = 0.00018$ and 0.260 $p = 0.00050$.

The variances of the inflation factor are in the variable limits: 1.40; 1.88; 1.95.

The prediction equation for "F1_turnover" "f1_turnover”= - 39039126 - 7010536 *" F5 "+66251209.8 * +" F6 "+39473037.2

*"F7"

6. FINAL DISCUSSION AND CONFIRMATION OF HYPOTHESES

The methodology of the research showed that the findings of a quantitative, factorial, and regressive analysis revealed that inter-organizational integration exists among transport organizations, but the integration is narrow and especially linked to transportation, not to other logistics processes. Most of the variances confirm our assumption that is impossible to speak about the unified model of organizational management of logistics processes in Slovenia because inter-organizational integration simply does not exist. It also confirms our assertion that the majority of inter-organizational integration flows according to the system of mutual integration of people, which enable the transport business conclusion, only a small part of the transport organizations is involved in international organizations, which take and organize transportation.

Our estimation is that a unified model of inter-organizational management of logistics processes (if it had been possible to create) would simplify the procedures and organization of the entire transport. Individual transport organizations would implement those works in transport, for which they are qualified and have adequate means of transport. All organizations should have an equal opportunity of access to specific offers and individual transport. Certified business excellence in individual organizations or groups of organizations, even if they have a certificate of quality, does not reflect a unified operation in the field of transport, much less the entire transport business excellence activities in Slovenia. It can only be a form of good practice that it is possible to use and transfer to other organizations positively.

We have learned that the management of logistics processes in transportation is a demanding task, as well as, the management of inter-organizational, economic, interpersonal, intercultural, linguistic, technical, educational and other differences, without which it is not possible to organize production, to provide material goods and to carry out other essential company processes. Logistic processes of transport, in the international industry, the economy, in trade, in a globalized society and much wider, certainly mean those processes, without which the modern world today cannot operate, there is no international integration without them, nor the successful globalization, nor the integration and modernization of the human environment (Logožar, 2002).

The analysis of the responses clearly demonstrates the situation that is not favourable for Slovenian transport organizations and confirms the status quo, which we have already assumed. The respondents recognized the need to improve and are willing to accept a unified model of inter-organizational management of logistics processes if that enhances their business. The check-up of obtained answers to individual questions gave answers to specific assumptions that we anticipated in the hypotheses:

1. In the first hypothesis, we have set the variance that human resources management is a key process in the inter-organizational management of logistics processes. This was followed by the questions of the existing and desired state in the survey relating to the level of education, level of knowledge of foreign languages, teamwork, and interpersonal relationships and the relationship to superiors. The finding showed that the average estimate is 3.88, which confirms our hypothesis and demonstrates the importance of human resources management in the inter-organizational management of logistics processes;
2. In the second hypothesis, we have set a specific model such as the variance, which gives the value and the conditions for the entry into the model, under the same or different conditions. We got answers that confirm the set hypothesis by the questions about success, harmonized rules of work, knowledge of regulations, knowledge of other models, etc. The average

estimate is 3.50 which indicates that the specific model is necessary, which should improve the business. A suitable estimate would be between 4.5 - 5.0, which tells us that there is still plenty of space and opportunities for improvement;

3. In the third hypothesis, we have assumed that the significant correlation between the quality of the management of each organization and the successful management of inter-organizational logistics business processes is important. We got an average rating of 3.71 when exploring the answers about assessing and rewarding, continuous cooperation between the same organizations, form the inter-connection, the organization of works, which again shows us that this area has enough open space for the introduction of new correlates and effective management;
4. In the fourth hypothesis, we have assumed that the mutual trust of the leadership of organizations involved in inter-organizational integration is a prerequisite for a successful business, which has proven to be appropriate. Heads of organizations make their added value and thus contribute to the successful inter-organizational cooperation and management of logistics processes;
5. In the fifth hypothesis, we have assumed that mutual communication is an essential condition for the success of the inter-organizational management of logistics business processes. On the question of identifying and solving problems, economic crisis, lack of payment discipline, knowledge of international rules, structure, adequacy forms of interconnection, we got an average rating of 3.50 which once again confirms the importance of mutual communication for successful mutual communication and management of logistics processes;
6. In the sixth hypothesis, we raised the question of the existence of a unified methodology for the management of logistics processes in our research using the hypothesis of the modern paradigm of inter-organizational management of logistics processes and we have searched the core of the purpose of the research in it. Thus, the assumption that in Slovenia there is no unified methodology for the management of logistics processes is fully confirmed.

7. CONCLUSION

With a proper research methodology, we have come to the conclusion that it confirmed our assumption about the state of inter-organizational integration and the existence of the unified methodology through the study and verification of obtained variances. We have found out that it is necessary to prepare a unified methodology of inter-organizational integration and management of logistics processes and also to standardize the forms and procedures for the acquisition, implementation, and coordination of transport for the success of the inter-organizational integration of logistics. We were aware that, on the condition that

we interviewed transport organizations from entire Slovenia, the survey could not cover the entire population and all the logistics and transport organizations, but we realized that we covered an adequate sample that maps a common problem to others, which was also confirmed by the bankruptcy of large transport organizations such as Viator & Vektor, Intereuropa, etc., who participated in the survey.

We were aware of the importance of the role of the country and its organs to build a unified model, which would legal regulation facilitate transport flows. A unified model of
inter-organizational management of logistics processes should include standards of the association, the requirement for a unified form of organizing and a unified form of logistic processes, unified criteria for the type and form of freight agents, unified access for all transports, a unified inter-organizational integration, coordination and complementarity, a unified search of solution, at least roughly comparable prices and transport requirements of clients.

We have estimated that a model of inter-organizational management of logistics processes should be called "The Modern Paradigm of Inter-organizational Management of Logistics Processes". However, there also other denominations and other forms of inter-organizational integration possible.

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MANAGEMENT OF CONNECTION OF RAILWAY INFRASTRUCTURE WITH INDUSTRY

Abstract:
The research matter: Methodology management introduces those values in logistics that tie up separate forms of infrastructure and transport systematically. Simultaneously, it creates conditions for suitable utilization and connection of individual forms of transport with industrial production in a local place.

The research purpose: Synergies of business processes enable the integration of railway into transport flow and industrial production which ties up wider forms of economic processes systematically, in a country and wider. The goal is to find out methodologically, how management cares about the infrastructure and transport integration into the mutual connection of railway and industry systematically and with a sufficient degree of responsibility.

The research methods: gathering, examination, analysis, measuring, data research and judgment and time examination of treated data for past periods.

The research results: They will indicate how management organizes singletons in transport and industry methodologically and what the effects of the interrelationship are. The economic indicators, that are base for the continuation of mutual connections, are important as well.

The research organization: the inventory of arrived railway compositions, transport kilometres, amounts of transport cargo and admissible railway strains. We have obtained many data from the manager of railways Slovenske železnice and industry in the region. Also, we gained data with a direct connection with some organizations, companies, and individuals that are engaged in the transport and are connected with industry and railway.

The research limitations: Methodologically, we have limited ourselves to data of transport connections that are intended to industrial production directly and those data that have been given by the railway and industry in the region because of the protection of business secrets. We have restricted our research to the area of the railway and industry in the region that covers the industry of south-eastern Slovenia directly.

Keywords: *management, railway transport, industry, connection.*

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1 INTRODUCTORY THOUGHT

The methodology of the study has given us the findings that the railway has been offering transport and transportation advantages from the very fitting into a place and the beginning of its enforcement, which has provided the transportation possibilities of people, cargo, mail and everything that has to be brought from ports to the interior or from a place to another place of each country. It depends on each country, the international connection and the importance of single railway corridors in the space how the railway is active and what capacities are used to help the industry. The data in the research period 2015-2019 have shown that in Slovenia, Europe, and the wider world it is time to renew and update the railway infrastructure, to deploy modern compositions and to find modern solutions for new and fast railway connections. Different views are disclosed in the field of passenger transport, the transport of freight, mail, liquids, gases, petroleum products, food distribution and much wider. It makes sense to understand that European countries and beyond have seen advantages in the railway which has been enabling a greater flow of goods and reducing congestion. Slovenian industry and economy, which has shifted the transport of goods onto the railway, have appropriately restructured to the railway requirements (*Strategija razvoja prometa v Sloveniji*, 2015). The synergy of management, interconnection, and support has reached a commendable degree of interconnection and trust. The methodological review of the railway operation gives us insight and explanations that the railway has got a certain inflexibility, particularly in the inability to bring cargo to all industrial, commercial and manufacturing buildings. However, it is clear that some sectors of industry, through its own development, have adapted the railway infrastructure to their needs and they have brought the railway to the courtyard of industrial facilities. Industrialization and the associated need for effective delivery of materials for production, trade in goods, trade between towns, areas, and regions, migration and labour migration have led to the development of industry management and expansion of cities and the strengthening of mutual cooperation. Already at this developing stage of the industry, the synergy of management interconnection and support in production, transport, and execution of various logistic processes, which enable industrial production and transportation of goods, occurred.

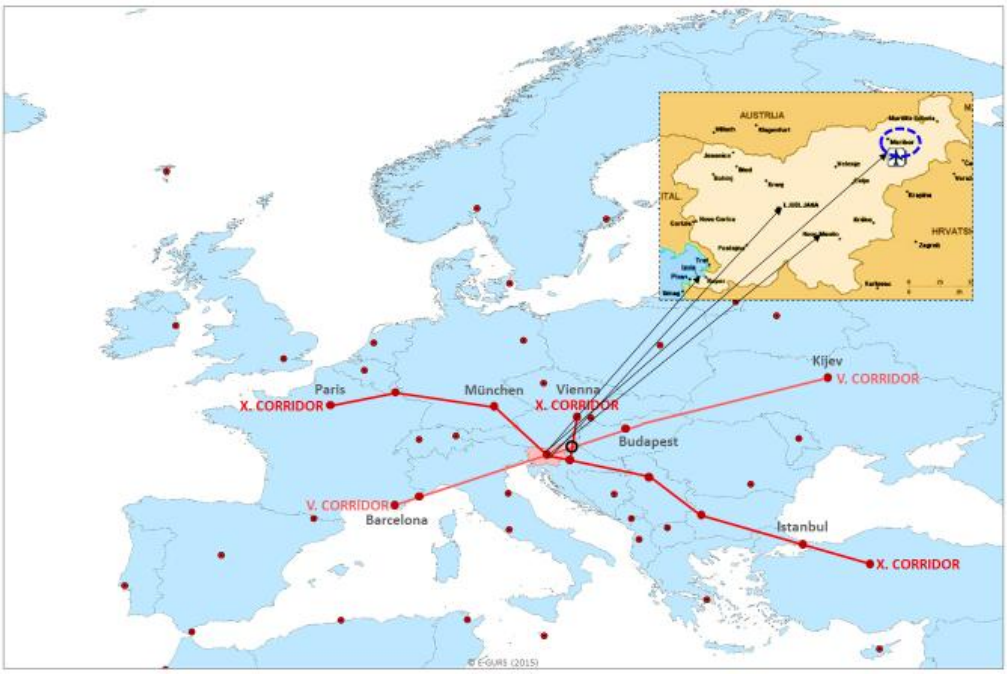
The research has shown that globalization affected the industry and its development in the past. Globalization caused migrations and production to move to countries with cheaper manpower and to the countries with less demanding environmental legislation. After the market stabilization, the renewed proportion of inquiry and offer and division into interest regions: economical, commercial, industrial and distributive, etc. the demands for railway traffic and its revival and expansion reappeared, as it was perceived at all levels (Stigliz, 2002). On the level of the European Union, the encouraging transport policy linked to the development of transnational European transport corridors within which Regulation (EU-LEX 32013R1315, no. 1315/2013) was also adopted concerning EU guidelines for the

development of trans-European transport network. Methodologically, it was about legal facts, which explain that the cited regulation on the EU level and across Europe introduces coordinated development of the transport network, which predicted modernization and upgrading of existing railway systems, the construction of the missing parts of the network, elimination of interchange crossing with the simultaneous introduction of new logistics and logistics processes, which will enable maximum efficiency of individual systems and their connectivity into a single efficient system. Therefore, the system of interconnection of the Member States of the European Union, Eastern Europe and beyond, also in Slovenia, was established mainly due to its geographical position. It allowed updating, renovation and construction of new railway lines (Damijan, 2001).

A historical overview shows that Slovenia gained the first railway link with the EU Member States or Europe in 1846 when economic development was being strengthened within the Austro-Hungarian monarchy. Its first connection with the railway was established between Celje and Graz, until World War I. the connection with Trieste, Zagreb, Rijeka, Klagenfurt, Villach, and Tarvisio was constructed, which is still the basis for the railway network operating nowadays. In terms of connectivity of the Slovenian territory with the rest of Europe, it is certainly one of the most important, so-called Southern Railway Vienna-Trieste (starting point of the todays Corridor V.), which was completed in 1857 (Wikipedia, March 2016). The development of Slovenian railways experienced a fresh revival in the common state of Yugoslavia (formerly Kingdom of Serbs, Croatians and Slovenians) when the connection between eastern and western Europe and the Middle East was established over Slovenian territory - the very beginning of Corridor X. The regular link between Paris, Ljubljana, Zagreb, Belgrade, and Istanbul is known to older readers, which made passengers possible to travel quickly and it allowed fast transportation of goods (Orient Express).

However, the changed geopolitical situation also affected railway traffic since the creation of the European Union and the disintegration of Yugoslavia. The traffic flows were changed which brought the development of railways in Slovenia and abroad to a halt for some time. Consequently, the emphasis on the development of road transportation was placed, which significantly hindered the development of railways. It was causally connected to the abolishment of particular railway lines because of the decline in traffic and the uneconomic part of railways. From the point of view of straight and sustainable development in the area of Slovenia irreparable damage was done since the special development of certain places built up certain corridors of existing railways and the valuable space was permanently lost.

The sketch represents transport links and predicted MMLC (multimodal logistics centres) in the area of Slovenia.



Source: found on the internet – EU portal, 2020

Slovenia and Slovenian railway network is not considered to be an important backbone network of Europe, but it is sufficient for the needs of the Slovenian economy, Slovenian industry, market, and transit through the country (Nacionalni program razvoja železniške infrastrukture, 1996, *National Programme for Railway Infrastructure Development*, 1996).

It should be noted that the central European location and strategic position of Slovenia is a space where many road, railway, and air routes cross and connect world economies and industries. At the same time, the centre of the existing infrastructure allows access to the sea. Therefore, Slovenia and its space possess unimaginable development opportunities for itself and economies of other counties. It is crucial that Slovenia follows the development objectives of the European Union in its strategy and facilitate the development and updating of transnational networks of transportation corridors.

2. THE ROLE OF MANAGEMENT IN THE INTERCONNECTIONS WITHIN THE LOGISTIC PLATFORM

The methodology of the research matter has shown that efforts to integrate Slovenia into the European and international economic flows date back many decades, the story of the integration started with the sustainable development of Slovenia. The findings confirm that Slovenia strove in the early development of industries 4.0 in the seventies and eighties for the links with many countries from the developed Western and Northern Europe, which enabled industrial integration in the automotive (Revoz Novo mesto, Adria, TPV), electronics (Iskra), pharmacy

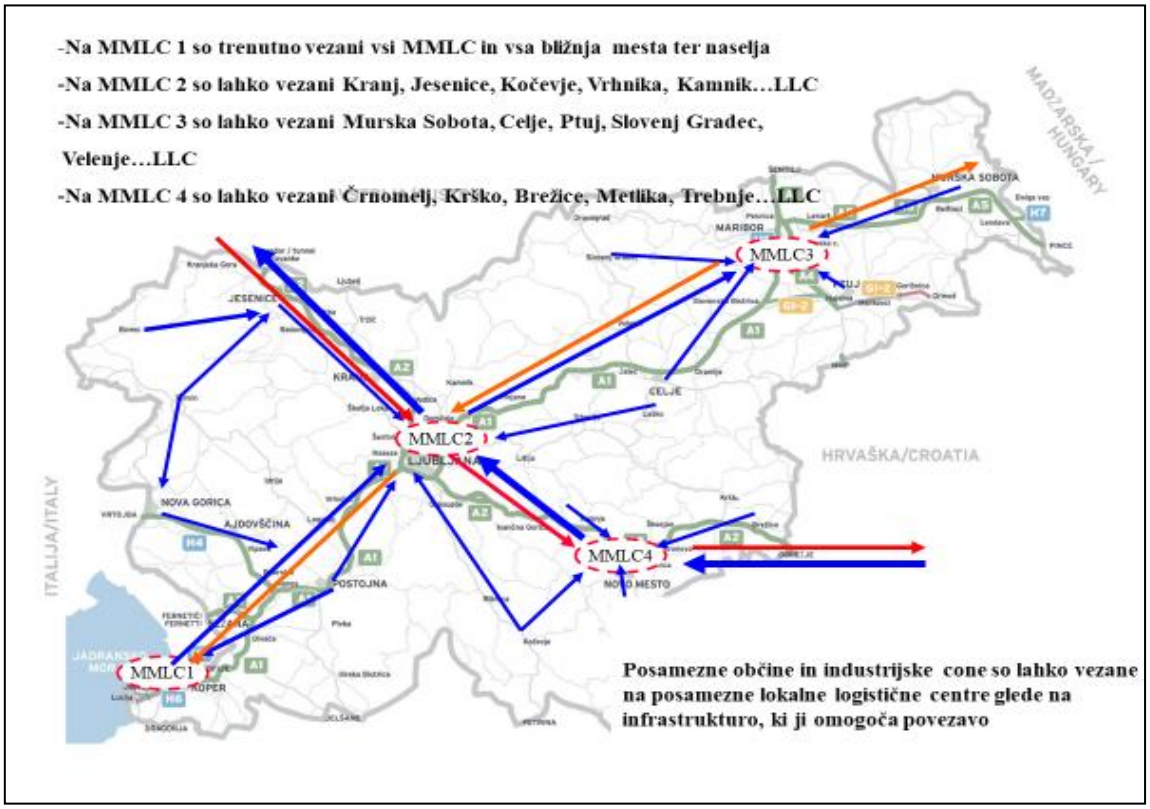
(Krka and LEK), telecommunications, media and many other areas, which at the time was economically viable (Čizman, 2008).

It should be understood that today the question is put: how and to what extent is Slovenia to follow changing Europe, the emergence of the European Union and what economic and political decisions are. Most importantly, what does the Slovenian policy as manager of planning and state property (particularly infrastructure) wants to achieve in the future, what is the vision of the development of the Republic Slovenia and its enforcement in a wider area. The survey has shown that Europe realized soon that to raise the competitiveness in the world good infrastructure links, quick access to ports and airports are also needed (Gajšek, 2007). Thus, many European countries recognized their own transportation potentials and developed road and railway infrastructure, built parking lots and airports within which large and functional logistics centres appeared. There were new global challenges, in particular the recognition that sustainable development is the key for the future which led to new paradigms in terms of transportation, so it is not surprising that the new European perspective for the period 2013- 2020 major emphasis was placed on low-carbon forms of transportation (railways), the integration of different transport modes (multimodality), the entire transport strategy and smart specialization within which the creation of smart cities is emphasised (Jakomin and others, 2002). The overall aim is to maintain a clean environment, provide clean water and air and also ensure sustainable development and preserve the capacity of energy for future generations.

By checking the source data, we have established that the Slovenian economy and politics responded too slowly to these changes, which was also being reflected in the regulation of infrastructure. Our neighbouring countries reacted differently to the changes. Croatia developed ports of Rijeka and Zadar rapidly with the construction of roads and railway networks. Italy rapidly modernized railway lines, highways, ports, and airports and built large multimodal logistics centres (MMLC) nearby Slovenian borders. By doing this Italy took over many trade flows. (Logožar, 2002). The same source data show that Slovenia is involved in several international infrastructure projects, but we conclude that Slovenia does not have any elaborated strategy for infrastructure development, which would link the existing rail, road, water, and air infrastructure, thus enabling major economic shifts. The promising projects were ready, like the project "*Slovenija logistična platforma za osrednjo in jugovzhodno Evropo« (Slovenia the logistic platform for Central and South-Eastern Europe)*, but the policy distanced from this project (Jakomin, 2009). The Ministry of Transport organised some scientific and professional conferences in Maribor, Ljubljana, and Portorož on infrastructure development and MMLC in connection with highway and railway network, investments were carried out, particularly in the road infrastructure (Novice, 27.11.2009 – Hotel Kranjska Gora, News 27/11/2009 – Hotel Krajnska Gora) which aroused the interest of foreign investors. The ministry records show that the delegation came from Shanghai,

Honk Kong, Malaysia, and other economically developed countries, thereby several political and economic links took place. From the data collected, it can be seen that the development and foreign investment into Slovenia were promising.

The sketch of Slovenia with MMLC



Source: E-GRUS, basis: RPE-GB limit, SMA 2015

After the envisaged project of foreign investment, Slovenia steered in four overall and economically rounded areas, which were placed in the space in a way that they are associated with the corridors of railways, highways, air, and sea, namely: Coast area (Luka Koper, the port Koper), Ljubljana with its surroundings (Zalog-Polje-Barje), Styria with Maribor (Letališče Edvarda Rusjana, The Edvard Rusjan Airport) and South-east Slovenia with the town Novo Mesto. The methodology of area identification required that the determination of logistic centres is based on the identification of existing infrastructure and links with rail and motorway network and industrialized areas in Slovenia, which were still active and which have the potentials to restart and integrate into sustainable development. The existing motorway and rail cross in the area of Slovenia (speaking on the corridors V and X) are connected to international backbone corridors and by integrating improvements it provides real opportunities for the movement of goods, people and capital. Slovenian Port of Koper, The Jože Pučnik Airport of Ljubljana and The Edvard Rusjan Airport of Maribor, conditionally The Airport of Portorož as well, are suitable and useful areas for the MMLC operation.

The methodology of the study requested a sample format, which would be the basis for determining the shape of the logistics centre. Following its function, the scope of work, infrastructure integration, and openness in the international transport corridors and as a sample form of regulated MMCL in Slovenia was Luka Koper. A national special plan for the overall spatial arrangement of the Port of Koper was also adopted, which was adopted in 2011 in the form of development (Ur.L.RS, no.48/11). It is envisaged that the Republic of Slovenia with the national spatial plan, hereinafter referred to as NSP, plans and placed still MMLC in Ljubljana with surroundings, in Maribor with surroundings and Novo mesto, which is to cover the southeast of Slovenia. By placing MMLC the country is also planning its infrastructure of dependence on the public transport network, which should be followed by the European backbone corridor. The MMLC development would enable a greater flow of goods, people and capital, resulting in Slovenia, as part of the plans of modernization and expansion of the Port of Koper and arrangements provided by MMLC in 2005, placed the second track railroad between Divača and Koper by a decree to functionally increase the railway flow in this section. At the same time would make it possible to transport large quantities primarily of containerized cargo from the port in the direction of Europe, mainly to provide competitive services in the central part of Europe.

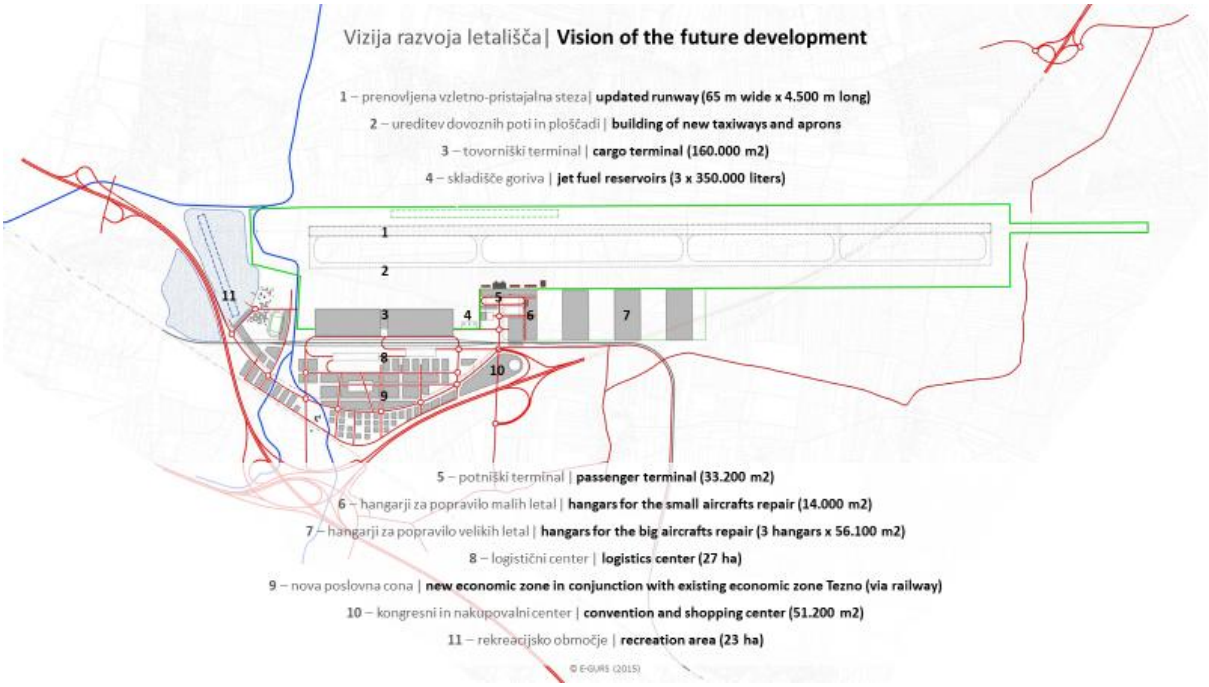
The transfer of transport goods to the railway would relieve the motorway between Koper and Ljubljana and actively involve the rail into the international freight rail route. The data from the Ministry of Infrastructure stated that all the conditions for this were met, there were also projects and knowledge, the funds in the budget were provided (the state would finance only the production of material, the investors would ensure investments). The reason for the project not being realized lied in the substitution of the Government of the Republic of Slovenia and the change of authority in 2012, which made the project "Slovenia as a logistics platform" stop and the activities for the establishment and development of railways and MMLC disappeared. According to the development potential and adopted spatial planning documents some of the activities for the development of MMLC were continued by the Municipality of Ljubljana, Maribor and Novo mesto. In the interest of the development of MMLC, the Municipality of Ljubljana carried out several studies on the movement of road and rail traffic through Ljubljana, transport of goods, transport of people and capital by road, rail, and air transport, in agreement with the management of BTC Ljubljana the design for the organization existing rail freight terminals in Zalog and Polje was prepared and their upgrade in MMLC.

The scientific basis for the development and the development plans of the Municipality of Ljubljana was presented at the conference Transborder Integrated Platforms, which took place on 5th June 2014 in Ljubljana, by the Head of the Department of Urban Planning at the Municipality of Ljubljana methodologically. The project MMLC of the Municipality of Ljubljana, besides the rail freight

terminal and marshalling station Ljubljana-Zalog was predicted to cover the whole Ljubljana, in the framework of the motorway ring. In the framework of the programme the project predicted the construction of a new high-speed railway line Ljubljana, Kranj, Jesenice, which was to take place after the brand new route and would be attached to the Ljubljana Airport (Archive: affiliation was in 2016, because of the costs, abandoned). The methodology of MMLC placement supposed to link the new railroad with the motorway ring and the Airport of Ljubljana within the framework of which the initiative for NSP predicts the extension of existing volumes of the airport extends the existing runway from 3200 to 3500 meters, books a room for the construction of the second runway, edits the airport road and the link to the motorway and fast railway. Interesting data of the Municipality of Ljubljana, showing that the municipality in the period 2010 - 2014 as a national center and capital of the country, already recognized the importance of this role also in the logistics field and focused the management of logistics management, infrastructure, construction and wider on development of a large MMLC, which in turn shows that Ljubljana is a large logistical town, where many service activities are carried out, as well as numerous transactions of global significance. Within Ljubljana and its MMLC, many companies and many global corporations, serving Ljubljana and the Slovenian population, industry and other branches of the economy and society do the business and trade. Within Ljubljana and within the functioning of a large MMLC the meaning of the interconnection and management in business processes is shown. Ljubljana, as the capital city of the Republic of Slovenia and as a municipality, where intersect infrastructure corridors (corridors V and X), recognized the need for the development of logistics and management of each service sector, which requires a sophisticated form of management in the past (MURTIĆ and others, 2016). Its willingness was reflected in the organization of the stock market Center (hereinafter BTC), but not in a form and manner that the municipality of the capital city had control over the operation of the BTS (except when it comes to spatial arrangement), as the company BTC operates as a commercial company and has its own interests, which are not fully harmonized with the interests of the municipality of Ljubljana and the country. The aim of business companies and also the trading centre BTC is the development of the activities that are marketable and profitable, which means that in this case, there is no space for the public good or operations of the public benefit. In the framework of MMLC Ljubljana would have to develop those activities that operate in the public interest and at the same time support the development of economic activities, which cannot be expected from the private sector, as BTC wants roads and existing rail on behalf of the country, to put them into the place so that could have a direct influence and that it can be used without any direct competition. Despite the findings, we have established that the activities for the MMLC development in Ljubljana are necessary, as they would ensure the development of the capital city and economic growth of Slovenia in general.

The methodology of comparing the capital city to the connecting towns and economies of Slovenia on the existing infrastructure corridors is urgent. If we found out that MMLC of Ljubljana is interesting for the economic development because of its strategic location at the hub of important transport corridors of Europe, it should be noted that the MMLC of Koper is of great importance for its the seaside location and direct links to railway and motorway network. MMLC of Maribor is also interesting for its airport and direct connection to the motorway and railway. Regionally and economically, MMLC of Maribor is interesting because the possibilities for airport development and economic zones are open due to spatial conditions. A comparison needs to be executed to submit an explanation to us that the Airport of Ljubljana development is due to its location somewhat limited (the Alps, settlement, forest fire, natural value ...), on the other hand, the development prospects of the Edvard Rusjan Airport are almost limitless. If we take into account the fact that the airport has got a direct possibility of connection to the railway and motorway network, and it is in proximity to the navigable river Drava (river transport), it appears the MMLC development within the mentioned airports are absolutely logical. In order to develop MMLC or logistic platforms the country restored and increased the existing passenger terminal (Terminal renovated in 2014) and the accompanying facilities and the existing hangar were renovated (work completed in 2015). The MMLC development also provides Initiative for the National Spatial Plan for the Edvard Rusjan Airport in Maribor, which is in accordance with the Ministry of infrastructure in the phase of change of the initiative and analysis guidelines. There are business interests exhibited by investors from the Far East who would like to establish economic links with Europe. The data from the Ministry of Infrastructure state that is an extension and expansion of existing runways planned as part of the airport, as well as the walkway "a taxi-way", the construction of airport infrastructure and other cargo terminal, arrangements for additional parking spaces and car parks and construction of additional hangars. The ministry data show that the national spatial plan envisages the construction of cargo terminal and a greater logistics centre in its framework intended for airport operations and freight support. The area is well maintained by its infrastructure and interconnections, in the future, the deepening of the highway is predicted due to the extension of the runway provided that would take place under the runway.

The sketch represents a conceptual solution for the Edvard Rusjan Airport.



Source: E-Grus d.o.o. Ljubljana, 2015

Due to the interlinkages within MMLC, Maribor and its surroundings, as well as in Ljubljana, is predicted for interconnection and coordination of logistics management and infrastructure links. The urban development of the city of Maribor envisages the construction of a new double-track railway connection past airport with connections to existing railway stations in Hoče and Rače, which would allow a connecting transport of persons and cargo. The airport with its development orientation represents a good starting point that Maribor, following the example of Ljubljana becomes an important economic centre, most importantly air the hub for Central and South-Eastern Europe. The Industrial Zone of Tezno and the commercial trading zone Pobrežje are constructed in the axis of the rail between the airport and the river Drava, which together with the airport form a single MMLC. The peculiarity of MMLC Maribor is also in close relation to motorways, railways, and airports, where natural conditions provide the best chance for the organizational management of logistics processes (MURTIĆ, 2012). This feature is mainly reflected in the possibilities of combined transport from airplanes to rail and highway, and vice versa from the motorway and rail to the aircraft. The data collected of wider interest suggest that no other MMLC in Slovenia has such options, nor elsewhere in the airspace 500 km around MMLC of Maribor.

These natural resources the Edvard Rusjan Airport in Maribor allow take-offs and landings of the largest aircraft in the world (attributes justifying these arguments are that there are no hills or settlements that would preclude taking off or landing and causing noise does not affect the health or well-being of the population at the airport). There is a special feature also in connection with the motorway and rail corridors, which are directly linked to MMLC Maribor and allow transportation of goods and people in all directions of Europe and beyond (MURTIĆ, Lisec, 2015).

The sketch represents the design development of the Edvard Rusjan Airport of Maribor7

Source: Picture E-GRUS d.o.o., 2015

In terms of the development of logistics platforms and MMLC in the framework of the project “Slovenia logistics platform for Central and South-Eastern Europe," an interesting center of Novo mesto and Bela Krajina area along the Sava River is also interesting. The obtained data show that Novo mesto was through historical events an important commercial, economic, military and another node because it is located halfway between Ljubljana and Zagreb, the city with almost a million of inhabitants. In the Slovenian economic importance, Novo mesto is regarded as one of the most economically developed municipalities in Slovenia. It has a direct connection to the motorway network and the adopted planning documents, enabling the construction of the third development axis linking with the motorway with Bela Krajina and arrangement of the ring road around the city. The data of Slovenian railways show that the second-longest railway line runs through Novo mesto, which connects Ljubljana with Croatia, where two major marshalling stations were built: in Bršljin and the lobby of the car plant Revoz. Within the rail

network, there is also 10 km railway track that connects the logistics center marginal reserve of Slovenia, the wood centre Staža, the sports business airport Novo mesto in the south, against the guards and Dolenjske Toplice connects wood center guard, the Customs Center of the Ministry of Finance, The Sports Center of the Municipality of Novo mesto, the factory Adria dd, Krka dd and the factory of insulating materials. A combination of road and rail connections with existing logistic potentials represents an ideal opportunity for the development of MMLC, which is possible due to its special features to include the barracks of Novo mesto, which is through the Ministry of Defense and the active participation of the Slovenian Armed Forces linked to NATO. Within it would be possible to build an Olympic ordered trainer centre at the request of NATO, which would have global significance.

3 MANAGEMENT AND RAILWAY REALISTIC POSSIBILITIES

Examining the realistic possibilities of the infrastructure impacts certain areas, on individual parts of Slovenia, they give us relevant data that a harmonious and balanced development of transport infrastructure at all levels is important for Slovenian further economic development. In recent years of the development of Slovenia, the motorway (Corridor V and X), which connects Slovenia with Hungary in the east, Italy in the west and Austria in the north and Croatia in the south, was built. A majority of expressways and main roads, which will connect with the network of motorways and expressways roads all major and important cities and economic zones are placed into the spatial acts of the Slovenian area except for a part of the expressway of 3rd development axis between the border with Austria and Slovenj Gradec, Velenje and the A1 motorway and A2 motorway (Ogorevc, 2004). The data obtained show that the country, with the view to increase economic development, successfully installed the key organization for the development of Luka Koper, the country also acceded to the modernization of the national airports. the Slovenian Government adopted a decision to initiate the preparation of the NSP, which is in progress for the Jože Pučnik Airport in Ljubljana, for the Edvard Rusjan Airport in Maribor, the Ministry of Infrastructure developed the Initiatives of development, which envisages the development of the airport and airport in Portorož, the Government adopted a decision on the preparation of the national spatial plan. The military airport Cerklje ob Krki is an exception, which was modernized in accordance with the adopted national spatial plan for Cerklje Airport (Ur. L. RS, 73/08) and the national spatial plan for the economic center Feniks in Posavje (Ur. L. RS, 23/12) by the country, and is one of the 10 priority projects of the Republic of Slovenia. We cannot ignore the fact that in the development of infrastructure the rail was neglected and represents a sort of bottleneck that hinders economic development (the second track between Divača and Koper), at least as far as the railway as an economic activity and railway that connects Europe is concerned. The review of data shows that European safety regulations for the provision of rail transport for the needs of passenger and freight

transport showed that the Slovenian railway lines are still outdated and that they are dangerous on certain sections and do not provide adequate traffic flow on a major interstate and international transports. The main problem lies in the low-speed and low potential axial loads, resulting in less flow of traffic. This is confirmed by Department of the Ministry of Infrastructure and DRSI (Directorate of Republic Slovenia for Infrastructure), who concluded in the framework of the National Program for Development of Slovenian railway infrastructure (Ur. L. RS, 13/96 with amendments) that the Slovenian railway infrastructure is worn out, it has too many curves and level crossings (27%) so that their parameters and the current capacity does not meet modern transport needs imposed by the European regime. This is also confirmed by the fact that on the routes high speed cannot be developed sufficiently, the axle load on certain parts are too low to allow transport of large quantities of goods. The fact that on a large part of the rail network two trains can't meet in length (excluding passenger trains) represents a huge problem. Therefore, modernization is urgently needed for the railway network and the construction of additional tracks, in particular in connection with MMLC. Also, the fact that the railway network is underdeveloped is the reason that the number of kilometers travelled and the volume of transported goods and passengers, according to international criteria on Slovenian railways is negligible and that is why a large part of transportation that could take place on the railways (foreign carriers are to avoid Slovenia and benefit from better and more powerful railway lines in Italy and Austria) is routed on the road network, which is an additional burden on the roads that present additional pollution and increases environmental risk. Because of poor rail network, the traffic on Slovenian roads increased over the predicted volume. Due to Slovenia's market share, if compared with the 10 countries of Western Europe, we establish that Slovenia belongs to the very tail of capacity and quality of transport by rail, therefore, the Western countries avoid Slovenia justifiably, at least in terms of freight traffic. The data obtained show that the Slovenian railway lines, according to the international regulations, are listed among the minimum standard line. European Agreement on Main International Railway - AGC, adopted by the United Nations Economic Commission (UNECE 1985), included in their documents also for Slovenia important railway lines, namely: E-65, which connects Jesenice, Ljubljana, Pivka and Rijeka, E-67, which connects Šentilj and Zidani most, E-69, which connects Pragersko, Zidani most, Ljubljana and Koper, and E-70, which connects Trieste, Ljubljana, and Zagreb. It is about important railway lines that connect the countries of Europe to the East and the Middle East through Slovenia. This raises the key question; has our country recognized the potential and to what extent the further development of the railway network can follow the required standards and international regulations and thus allow normal functioning and development of the Port of Koper and other predicted MMLC.

We are confident that Slovenia and its economy wants to be an active participant in international trade of goods and services, therefore, the country must take care of

the reconstruction of all existing lines shortly, which would connect Ljubljana, as the main hub in this part of Europe, with the world. The modernization programme of the rail network predicts reconstruction and modernization and upgrading of existing lines, where this is not sufficient, for which the state or the Ministry of Infrastructure and the Directorate of the Republic of Slovenia for the infrastructure already developed and adopted appropriate spatial documentation.

Even though the existing rail network is gradually being renewed and with much delay, the issue of the high-speed railway remains vague and unresolved (whatever the country wants to understand under the term "high-speed rail"), since the state in this regard has no clear strategy. Legal basis and regulations covering the field of railways already talk on high-speed railways and their classification within the country and the involvement in international corridors. The question is whether the legal basis is sufficient to meet international requirements in the field of development and modernization of infrastructure, and even more when it comes to high-speed railways and we think of modern high-speed railways that develop high-speed and overcome long distance in a very short time. Already today it is quite clear that the modernization of the existing railways, despite the huge financial input, will not be possible to achieve the desired effects in terms of speed and quantity of goods. Our railways possess 3 high-speed trains Pendolino ETR 460 type, known as ICS (Intercity Slovenia). ICS has been running on the route Maribor-Ljubljana since 2000. The journey takes about 1h45min, which is 25 minutes less than if you drove by the following fastest train. The trains themselves are very comfortable. They have three classes: Class 2, Class 2 plus and Class 1. There are three wagons in each train and accepts for about 160 passengers. The problem lies in the Slovenian rail infrastructure because we have quite obsolete railway lines.

The picture shows a fast train that reaches speeds of 270 km/h

Source: https://www.slo-zeleznice.si/sl/potniki/vozni-redi/vrste-vlakov

The trains ICS are otherwise able to drive up to 250 km / h, but due to poor track do not exceed 145 km / h (and even then for a short time when running past Zalog pri Ljubljani). The record speed that the train has reached on the Slovenian rails is 207 km / h and has been achieved on the track Pragersko and Maribor, but trains in this piece of the track may not be driven more than 120 km / h. The reason lies in the lack of secured railroad crossing. For higher speeds, there is still much updating of the tracks to do, especially the number of level crossings with roads must be reduced greatly and many sharp bends must be resolved.

In the light of the new European Union strategy, which seeks a more durable and environmentally-friendly form of transport, it is essential that to start to locate high-speed railway following the example of the highway programme into space. While doing so it is essential to establish links between key regional centres and areas that are industry organizations MMLC and other major cities. The country has in the meantime prepared a project to build a second rail track between Divača and Koper, but because of political pressures and the procedures of obtaining funds for the construction procedures tow, which is diligently exploited by neighbouring countries, which increasingly build their own high-speed railway. Due to the slowness and indecision, there is even fear that we will be in terms of rail bypassed by Europe. In the process of preparing documentation NSP for the fast railway line between Ljubljana and Jesenice the connection to Italy and Austria is predicted. According to DRSI, the Ministry of Infrastructure (2019) NSP predicts a new route along the highway, which should be an additional track attached to the Jože Pučnik Airport of Ljubljana, but in 2016, due to the sale of the airport to Fraport, the German company, this part of the plan was recognized as unnecessary. Data from the Ministry of Infrastructure stated that the NSP - spatial documentation for the construction of a detour double-track railway line is in preparations, which would allow a direct continuation of the routes of trains from Koper towards Ljubljana-Siška and then towards Kranj. This corridor would serve for the purposes of transit transport to relieve the main railway station Ljubljana and marshalling yards in Ljubljana-Zalog, Ljubljana-Polje. The budgetary funds are guaranteed, the business impact will be known later.

Unfortunately, the collected data on management development and integration of logistics and infrastructure show that new investment plans of the country for the development of Slovenian railways do not show anything new or supportive. In terms of investments, it is mainly about technical improvements and the elimination of level crossings and bends thereby traffic safety in passenger traffic is notably improved. The gained statistics of passenger and freight transport is negligible and is available at the portal of the Slovenian Railways, therefore, it was not reasonable to repeat it. Despite anticipated improvements remains an unresolved issue of the capacity of Slovenian railways.

The new programming and development documents on the renewal, upgrading and improving the Slovenian railways in many ways reflect the only mapping of

previous older policies, as there are no new proposals seen in the documents but above all, there cannot be made out new integrations into new international trade flows. As for the regulation of MMLC, the country also delays with the regulation of modern high-speed rail links, their construction is put off to a later, more favorable time and thereby inadvertently departs from the vision for the development of such infrastructure as seen by Europe. There is a relative danger that Slovenia becomes a forgotten pocket in the heart of Europe. Therefore, it is important that the country follows the development trends, analyzes the situation, predicts traffic flows and takes part in joint development. The country needs professional personnel, a comprehensive approach to modernize Slovenian railways not only in terms of providing better road safety, improving electrification and signaling but also in terms of construction of modern railway transport, which can improve the transport of people and cargo by at least 20-30% and thereby significantly contribute to greater prosperity and a better living environment of people.

4. CONCLUSION OF MANAGEMENT CONNECTION OF RAILWAYS WITH INDUSTRY

If we look at the scientific point of view as if we examine the profession and if we do a professional review of the state of transport infrastructure in the Republic of Slovenia we establish that Slovenia has made visible steps in the development of infrastructure in recent decades, but these steps are too small in the science and profession. Slovenia has built a modern highway network, edited the main and the only international seaport, adopted appropriate provisions to regulate the Slovenian state airports and slowly tackles the updating antiquated rail network, but it should be understood that Slovenia could follow, at least partially, the development of international infrastructure, especially rail infrastructure of the European Union and the rest of Europe and the world, it must build a second track from Divača to Koper and ensure the smooth flow of goods from the Port of Koper in the direction of Europe. The existing studies and planning indicate that the project is of national importance, of which realization would mean, merely based on the increase in traffic in the Port of Koper, a 5% rise in the country's GDP (J.P. Damijan, Blog – 22nd June 2015). Beside the second track, Slovenia has to build a railway line between Ljubljana and Jesenice and connect it to the Jože Pučnik Airport of Ljubljana as soon as possible. It is also urgent to renovate the railway line from Ljubljana to Zagreb and Dobova, as it is a key link in the corridor where the high-speed railway Zagreb-Belgrade-Istanbul is planned. The improvement respectively emplacement of a high-speed railway between Ljubljana and Dobova will certainly represent one of the biggest challenges, due to space limitations and types of terrain there are no options for technical improvements to the existing railway line. Therefore, it is urgent to find alternative solutions that will probably be offered of hydropower plants on the Sava River and their planned construction. The development of Slovenia and the predicted MMLC modernization of the railway Zidani most towards Pregarsko, Maribor, and Austria is also important.

The European Union and Europe have been warning Slovenia for some time that the projects in the development of high-speed railways are necessary because they provide quick and safe transportation of people and a wide range of goods. Slovenia does not implement the EU regulatory requirements, the person responsible, competent ministers and their state secretaries could do far too little to include Slovenia in the international development of infrastructure projects. The professor Dr. Jože P. Damijan warned in one of his articles (Endless Spasms construction of a second Track Koper - Divača, 6th July, 2015) about the high-speed railway lines and the large MMLC in countries bordering with Slovenia, which pointed to some meaningless steps of our competent ministries. In this troubled situation of the organization, interconnection, it is shown how the state management in the process of managing infrastructure is. Even though they were committed certain mistakes and that certain key projects delayed, a way forward should be looked for as stated Dr. JP Damijan and connect the project of placing high-speed railway between Vienna and Rome as soon as possible, and to obtain the connection to the fast trains between Vienna and Rome with the planned route Ljubljana-Jesenice and to involve in international currents. It would also be necessary to continue discussions with the Republic of Croatia and the Republic of Serbia, in order to connect the high-speed railway line from Belgrade via Zagreb to Ljubljana. This would make sense to also consider the direct connection of Zagreb, Maribor, and Vienna, by doing so the circle of high-speed railways in this part of Europe would be concluded. The new high-speed rail line from Ljubljana to Zagreb should take place in the corridor of the existing highway and would, as such, serve mainly for a swift transport of cargo and goods and the international transport of passengers in order to establish high-speed connections between regional centers and larger towns ... Salzburg-Villach-Jesenice -Kranj-Ljubljana-Novo mesto-Brežice-Zagreb ... several lecturers and representatives of various institutions warned on the absurdity of performance and lightheadedness of mind of the state of Slovenia at the logistics conference TIP - Transborder integrated Platform, which took place on 6th May, 2014 in the premises of the Slovenian railways in Ljubljana and organized by SDAG, Comune di Goricia, Municipality of Šempeter Vrtojba, DARS, the Cross Border Co-operation Programme between Italy and Slovenia, del Ministero Economia e Delle Finance, Ministry of infrastructure and the Ministry of economic development and technology, and others. The representative of Italy and the President of the Friuli Venezia Giulia (Italy) in her speech called and asked the competent authority in the Republic of Slovenia, who unfortunately did not attend the Conference, that Slovenia start talking with its neighbors about the placement of high-speed railway line from the direction of Belgrade, Zagreb and Ljubljana to Trieste.

In the final part of the debate, it should be clarified that the problem of infrastructure management and integration of Slovenian railways in the international trade of goods lies in poor organization and management of the railways, the outdated techniques, and technology, which is used by the railways,

the poor infrastructure, and inadequate hardware. If Slovenia wants to be included in international flows of rapid rail transport the missing railway line will be built, thus facilitating the rapid movement of goods, people and capital between Western and Central Europe and the Middle East. If this is not done in a very short time, it will be eliminated from major international flows, which will certainly harm its further development. The survey topics and questions that talk about the management and integration of the railway with industry could not be fully discovered by us because we have established that we have already a built and somehow regulated rail system, which is completely outdated and at the same time, we have concluded that by adequate management and integrating the existing situation can be restored and the railway infrastructure can be included in active use. We believe that by placing MMLC in Ljubljana, Maribor and Novo mesto we would actively participate in international trade work and be involved in wider infrastructure activities. Research interests in developing an impact on industrial development 4.0, international trade, update, robotics, digitalisation and many other elements that constitute progress and development.

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MATERIALS INPUT MANAGEMENT IN A MANUFACTURING COMPANY

Abstract

Research question: How to modernize individual production processes is a constant question of all forms of entrepreneurship, economy, industry, politics and everyone in society. Management of regulating the movement of goods from supply to storage or directly to preparation for production is of key importance. Proper management can eliminate waste of time, ensure fast and accurate production preparation and relieve workforce. Administrative management has been focused on seeking an update on the supply of raw materials or production materials into production, from entry, take-over, inspection to storage and monitoring of materials into production. The question is crucial, as it involves a number of interconnected activities, which can also be done by smart devices or robots, computer programs and linkages.

Purpose of the research: Production represents an important area of the economy where it is necessary to rationally and functionally reallocate

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[12] **Author's biographical notes and affiliation see pp 31.**

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individual roles of humans and machines, and to manage procedures and processes in a way that enables faster development. Management of raw-material takeover is an ongoing issue in entrepreneurship, where a lot of work and tasks are a part of preliminary preparation and can cause unnecessary costs and waste of time and space. There is fierce competition in the market, which means that companies have to rationally and quickly take care of production, logistics and processes related to individual stages of work and keep them technologically updated. It is a realization that production processes are changing, are being robotized, programs are managed by digital equipment and are connected by logistical information systems. The purpose of the research was how and in what way to manage modern processes of input of materials into production.

Research Method: We were looking for forms of management that would allow modernization and rapid flow of materials from supply to production. Throughout the management, the information collected can be interpreted differently. The goal is classic and is looking for solutions that justify the use of modern technology. We studied the observable phenomenon in metal production and tried to come up with new management insights that could be used to improve individual stages and processes of work. We have collected observable, empirical and measurable data that can be compared with certain thinking, while reflecting the potential for progress that can be seen in improvement of processes, time unit or financial relief.

Results of the research: These are attempts to introduce modern management and the introduction of processes that cannot be verified in nature. Therefore, through our data, through virtual review and numerous experiments, we sought the possibilities of improving the processes of receiving and manipulating materials. Virtual simulation has fully justified our ideas, as we have come to new understandings, which explain that it is possible, with appropriate management and technology, to update individual procedures, completely eliminate physical work, and introduce coding of input materials and monitor materials throughout the whole phase of production.

Organization of the research: We conducted monitoring of the management of material entry into production, organization of inspection, mowing of materials, preparation, coding, weighing, labelling and monitoring of materials from acceptance to the final product. In these forms of management, we looked for possible solutions to improve the whole system. Work is the scientific process of releasing knowledge and finding management solutions that are intended to improve internal logistics, expedite individual phases of work, eliminate unnecessary waste of time, and relieve workers.

Limitations of the research: In the research area, we first limited ourselves to recognizable forms of production management and to procedures and technologies that can be used to improve the processes and procedures of material entry into production. We focused on the research area of material input into production flows, and sought technical and technological improvements that would enable planned modifications in internal logistics. It should be understood that this research involves a number of processes and procedures that are considered a business secret, so we restricted ourselves to virtual simulations and then tested them on the enterprise.

Key words: *management, enterprise, technology, logistics.*

1 INTRODUCTION

Production and related processes in metal or other production is constantly focused on the search for technical, technological, professional, scientific and other solutions that would allow improving the processes in the preparation of raw materials for production and in the final part, which should improve the production processes, eliminated wasted time and reduce the burden on workforce. In a brief overview and search for solutions that manufacturing organizations should already be aware of, we backed up or validated our research bases, conducted a historical overview of production development, and looked for levers to incorporate new technologies that would assist production. A brief insight into the Industry 1.0 was needed, where no sufficient elements could be found to indicate the search for a solution (covering the period from the end of the 18th century), since it was of interest to organize a wider range of production. Only later came the question of how to introduce mechanical forms of production and how to take advantage of water power and steam. Even in the development of Industry 2.0, there are no indications of finding better solutions for production (includes the 20th century), since electricity was already an advance and an important factor that allowed for fast cutting, sawing, lifting, pushing, transporting, illuminating the premises, thus enabling wider production and organization of work in multiple shifts. The development of the conveyor belt has been a major step forward in manufacturing and meeting market needs. Later in the development of Industry 3.0, initiatives were taken to upgrade and locate reserves internally that would allow cheaper production, maximize the use of mechanical machinery, and organize production in one place. During this industrial era, the development of information systems (modelled on the military), which quickly transmitted information between different production lines (an example of the first espionage), and the producers of raw materials, between manufacturers and the market, had already begun [1]. This 3.0 industrial period is known for the development of the metal industry, which enabled the development of the market and consequently raise of the standards. The development of home appliances, audio-visual devices,

and telecommunications began, allowing information to flow faster than before. This was also the period when rail, road and water transport began to develop, leading to economic growth [2]. Rapid progress has been made in Industrial Period 4.0, which is still ongoing and is trying to reduce energy consumption, workforce consumption, wasting of space and time, and finding forms and ways to reduce production costs.

International organizations have shown the importance of protecting employees' health, protecting the environment and the living space of the overall population, which has overshadowed all previous developmental periods. The need for technological updating of processes, the introduction of smart and automatically controlled machines, the introduction of computer programs and the use of robots is increasing in production. It is becoming more autonomous and computer-controlled. It is a revolutionary leap in manufacturing that has changed the world. A transition from the analogue production system to the projection of digital production is made. A virtual study simulation for the needs of industry has been developed, and as a result, manufacturing technology is driven by software and hardware. This are in the processes of industry and outside called robots and through their work, they create smart factories. This leads to virtual production and management of turnover costs [2].

Given that found, the question today is whether we can talk about Industry 5.0. It is impossible to find an answer to that, as there are many shifts in this direction. High technology is in use, development is moving forward and it is impossible to predict what might happen in the future. We are following developments of the 21st century, where most car, electronic, medical and other forms of manufacturing have already introduced robotic manufacturing, automated supply and withdrawal of the processes, which are wasting workforce. All arguments are in favour of development where technology would be personalized or would fully cooperate with a human or a machine, where both equipment and a worker would work together with the system, machine and robot as to increase efficiency in production or anywhere else [3]. Thus, production is being improved and technologically advancing it increasingly uses internet, information technology, computing, digitalization, a more modern production method, the introduction of robots and smart technologies, driven by information systems and robots that are faster and more accurate than humans. In this way, the costs of production can be reduced and quality in all production forms can increase.

We found out that the processes of production through development had to be updated, as they presented a challenge and a starting point for introduction of an appropriate management. Introduction of a new technology meant that an appropriate education and training of employees was needed, especially management or administration of production. We tried to focus our research on finding appropriate management that will influence the introduction and use of new technology while leading development departments to look for new updates of

individual production processes, stages or procedures. In this particular case, we were looking for improvements in the material management for receiving, counting, weighing, inspecting, cutting and preparation of metals for production, marking of individual parts (coding) and carrying out internal transport. Through logistics and logistic processes within the production, we tried to regulate the use of working time and space with individual improvements, and to find possible changes that would enable faster flow of materials from the entrance to the warehouse. It is a reasonable use of technology and management procedures, which, in combination, should technologically connect several individual works as a whole, and with the help of techniques increase sufficiency while receiving and transporting materials, while also ensuring safety, punctuality and tracking of raw materials during the process of production. In the developed world, modern technology and technological equipment enable faster production, economic, industrial and commercial competition, which requires greater investment in newer equipment, programs, computer networks and digitalization. The newest form of production, however, is investing in the robotisation of individual processes and requires more and more investment in technology development. These are factors that require ongoing monitoring of market changes, the development of modern technologies, production and demand for modern items, which is encouraged by researchers in management and operation of individual processes [4].

1.1 The research area

Economic development is mainly influenced by international competition, strong similarity between products on the market, quality of individual products, purpose, usefulness, sustainability, durability, information, tracking products, protection of the environment, preserving healthy living environment, modern technology, internet, digitalization or the world and many other factors. These are identifiable circumstances that require production organizations and management to identify the positive and negative factors and require appropriate training and use of acquired knowledge in development. If science and the profession find that Industry 4.0 has reached its peak in its late development period (2010-2020), we can expect more frequent changes in forms and methods of production. It is therefore important that production organizations and its management adapt as closely as possible to the emerging technologies and forms of controlling individual production processes [5]. Monitoring the development requires that management also adapts and organizes in a way that would eliminate all burdensome production elements and speed up the process of introducing of modern autonomous technology. Certain shifts in economy, industry and production were intentionally made, because production was organized in a way that would focus on their own products. All service activities that weren't directly connected with production were left to companies, which were qualified for specific forms of work, like outsourcing. Management realized that by eliminating certain processes or procedures, allows improvement of specific processes and reduces the costs. The

findings indicate that the decision to exclude individual transactions was not entirely appropriate, as they neglected services that were necessary for production and were added to the price of the product. The initial cost-benefit ration of industrial production and logistics was 50-50 %, later the industry with various interventions reached the current lowest ratio of 62-38%. In addition to the costs associated with transport, the organization of transport and the implementation of procedures related to the preparation and implementation of transport, the costs related to individual logistical processes within the industry and related to the acquisition and inspection of raw materials, handling of raw materials, internal transport and preparation of finished products. With the help of changes in introduction of technology, management could study processes in production, transport, procedures which are directly linked with specific production stages and look for a solution. They soon realised that in-process procedure of internal logistics and internal transport could be updated with use of certain technology, automatization and system management, which would also reduce the costs [6].

By examining individual processes, we looked for solutions in the transportation of raw materials or intermediate goods from a warehouse to conveyor belts. We then searched for reserves in the final part of production and modernized the procedures for pallet stacking and storage in the rack warehouse where preparation for transport was carried out [7]. The methodology of examining individual processes has shown that at the input of materials in preparation for production, there is a loss of space and time, that the procedures are still physical, which represented a wrong use of workforce and existing technology. Recognizing existing technology, we began to look for technical and technological solutions that would provide a faster and improved way of moving raw materials from the yard or warehouse into production.

Picture 1: Combination of machines when metal tubes are received in industry

1.2 Fundamental hypothesis

With a system overview of individual parts and individual tasks in order, we were looking for answers, which would reveal correct solutions in each specific stage when materials enter into production. We have taken into consideration those stages of work that we felt were not given enough attention by the production or company, or they looked over importance of all tasks, which represent production organization. We focused on the processes of picking up materials, which included inspection, counting, weighing, and marking, preparation for transport, storage and delivery to the production line. In collaboration with a manufacturing company, we have in previous research sought solutions for the transportation of raw materials from a warehouse to the production line, where we have successfully used AGV [3] as a transport vehicle, company corridors as infrastructure and magnetic tape as guidance for supplying materials to production. In the new research area, concerning material input into production, we sought solutions for the introduction of new technologies, the use of information systems and the form of infrastructure that would allow the introduction of new and improved processes and procedures, which would allow introduction on new and improved procedures and processes. This would allow material take over to include counting, weighing, coding or labelling, cutting, stacking in crates, transport to warehouse and tracking materials inside of the production.

After testing the complexity of individual tasks and weighing different options, we decided on improvements that would give us at least theoretical starting points for the hypothesis: "Technological modernization of the input of materials into production is a fundamental solution, which allows lean production." It also offered us a theoretical answer that provided all the necessary attributes and assumptions that technological modernization of material input into production would reduce production costs, allow faster and coherent flow of materials, raising the question of how and by what technology the process of receiving materials eliminates unnecessary waste of time, space and workforce. We were looking for answers in the processes of modern technology of industry 4.0 (FoF Factories of the Future), which require a rapid response to changes, fast delivery of materials, reduction of stocks in the preparation or in the final part of production, regular commercial advantages, increased competitiveness, etc., which led to the need for a swift reaction to economic change. Since we did not have a specific research opportunity in the production company because we could disrupt the production process, we obtained the data from the research using virtual simulations on computers. With that, we studied, combined and look for technical and technological solution which would allow improvement in taking over the materials into production. Simulation mode led to combinations that required multiple functions in one device to allow materials to be taken over, counted, measured by thickness, weight and length, and picking it up after a specific groove

with handles that would allow movement in the direction of cutting metallic material on certain length and weight and would count, label, etc. The goal was to, with a help of virtual simulation, determine a type of a device, which would recognize input materials based on tread, a type of metal, thickness, weight, etc. It would then push the materials (for example, metal tubes) into the metal cutter box, which would cut the tubes to specified lengths. The system would print or paste a number or tracking code identifying the individual piece, and then place the material into crates. It would make sense to connect the transport and the infrastructure to the device, which would transport AGV crates into warehouse, where it would wait for transport to production. Management, operators in production, corporate leadership and others (suppliers and buyers too) would be able to track in what stage an individual piece is for the entire duration of the process. The goal of virtual simulations was to find technical and technological options (levers) for assembling a combination machine capable of performing (receiving, counting, weighing, moving, cutting, marking, pushing, stacking and preparing for transport) several consecutive operations in a stage of raw materials going into production. At the same time, the goal was to find a solutions, which would reduce the number of workers, reduce a waste of time and space and would recognize procedures and work, which would allow better business effects in production.

1.3 The vision of virtual simulations

The vision of the research was in the first stage and through virtual simulations to come up with useful solutions that would justify the positioning of the combined device in the material take-over processes for the manufacturing company. The next stage of the research was the preparation of useful documentation, sketches and calculations, and the construction of a device with the placement of cradles, work-benches, cutters, readers and other components that would be able to receive materials into production. We were constantly looking for solutions and data underpinnings that would at least theoretically justify the use of technically complicated and sophisticated equipment and technology. At the same time, we were preparing financial calculations to try to prove that despite a relatively high investment, the manufacturing company would have sufficient savings in a short amount of time. We have also prepared comparable data from the pre-existing method of receiving production materials and compared them with new ones, obtaining acceptable confirmations. While we were looking at current situation of material input into manufacturing company, we found out that in the process, a higher number of employees are ensuring that materials are moved in time from vehicle to fork-lift and smaller trailers, which take materials to warehouse. This is time consuming, waste of space and hired workforce. All processes are sequentially physical, slow and time consuming, and the supply of production is not fully guaranteed. This by itself, was good enough reason to find solutions that would allow the introduction of a modern form of receiving materials. In this finding, it

should be emphasized that the reception, cutting, weighing, coding, tracking, transport and storage of materials could be minimized and thus save costs, time, space and workforce for the manufacturing company. Virtual simulations showed that a combined device could perform all stages of work in a row, in a smaller space, with less workforce and smaller costs. At the same time, the new technologically sophisticated device would achieve international production standards that would ensure fast JIT "Just in Time" performance, reduce costs, and ensure safety of employees and the competitiveness of the manufacturing company.

2 UNDERSTANDABLE THEORY OF CHANGE

Due to the form of business of a manufacturing company in which we wanted to conduct research and collaborate with them in the process of finding modern solutions, our research was based on virtual simulations, through which we looked for theoretical solutions to improve the way materials are received into a manufacturing company. We encountered similar cases on the internet, in works of other authors and other researches, but due to their design and type of production, we haven't been able to fully use them. Therefore, we cite some researchers who are more concerned with the processes of service activity in logistics rather than simulation research. We refer to the world renowned author Zeleniko and some associates who, in the process of production describe individual logistic stages inside of internal logistics in a company or production. They describe stages, procedures and processes in a way that represents achievement of knowledge or research and don’t add new baselines for creating added value [2]. Also, the existing literature, the internal rules of business of manufacturing companies, did not provide useful data that could be used or compared in our research. Manufacturing companies have a number of guidelines, rules, instructions, regulations and legal requirements that they apply to the processes of production work, ensuring safety and protection of environment and health, but there are no regulations that require improvements to individual processes. It is more a business policy of a company that is tied to individual knowledge of production, procurement, finance, materials, etc. Through the research, we had the opportunity to look into production data from the car industry, which educationally presented us the processes of physical delivery of raw materials in the yard of the industry, where tubes were transported from the truck to a warehouse. This helped us with our research, but it was impossible to compare the individual processes, phases or procedures of a large industry with the production of a medium-sized company, so we based our research solely on virtual simulations. Although the manufacturing company produces components for the car industry, it is not an integral part of the industry, so its manufacturing processes are carried out separately.

2.1 Acceptable guidelines of changes

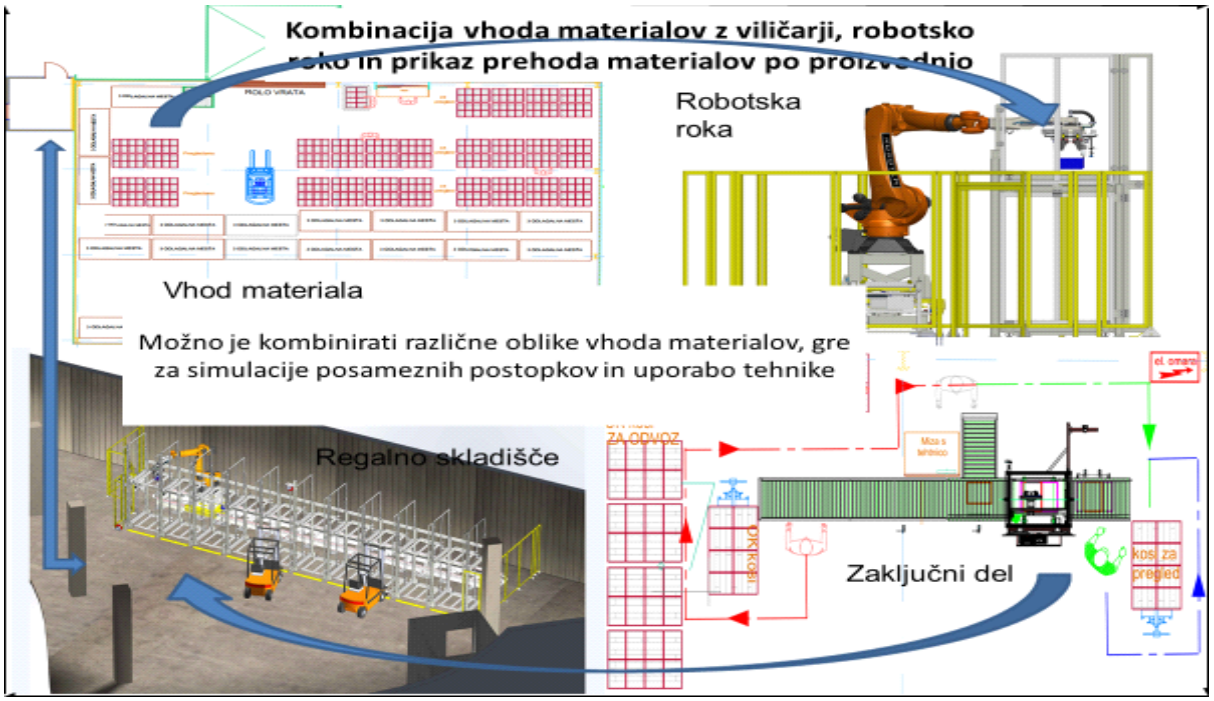
Recognizing the importance of the car industry in Europe is important for manufacturing companies that are linked by their production to products or intermediate goods they are preparing to assemble. The car industry is in the process of changing, developing and seeking advanced technological, information, logistics and other enhancements that make it possible to quickly identify changes in the market and customer requirements that affect production. These improvements are meant to lower the costs of production, increase competitiveness, preserve the market and help them keep their customers. For these reasons, the industry spends large sums of money on research, on improvements and on new and useful products. The guidelines on modification of car industry are in designing newer vehicle models, better exhaust system, introducing modern computer and digital equipment and developing of electric vehicles. To achieve these goals, the car industry is seeking for domestic reserves and trying to reduce the cost of individual operations and to introduce as much technologically sophisticated equipment into production and preparation as possible to eliminate waste of time, space and workforce. Production companies that prepare their products or intermediate goods for the motor vehicles are also being adapted to the development guidelines. Unlike production companies that adapt to production methods and processes, industrial production has for a long time been introducing new autonomous processes of pre-production with raw materials. But recently, production companies that are working for them under their rules, have also started using similar method. After changes of industrial development, production organizations have been thinking about changing some of the pre-processes of production, which are wasting their money [8]. Through the process learning of industry interests, the study methodology followed the development of manufacturing companies. Through the review of individual stages and individual service actions in internal logistics, where we identified a number of needs for updating the input of materials into production. We were systematically looking for changes in the process of taking metal materials into production, where we saw the possibility of updating the process of accepting in counting, weighing, assessing, cutting, marking, transport, internal infrastructure and tracking of individual pieces of materials in production. Since these changes are necessary and have a great impact on the development of production and, consequently, of the entire industry, we decided to find solutions for the needs of the production company and test the processes in the virtual world and only after successful runs try to introduce the actual preparation and installation of new devices. Overall opinion of many countries is that industry 4.0 is ending and it's time for changes. It should be understood that the car and other industries, much less manufacturing companies, have not begun to look for solutions on how to modernize the input processes of production materials. It is a concept that is not a constant factor in the industry or in production companies and is constantly changing, complementing and improving. These are forms of work that are necessary but, at least in production companies, are carried out occasionally when

it is necessary to fill the warehouse with materials and provide the quantity of raw materials for production purposes. In the case of industry, raw materials are prepared by external contractor, which does this as a part of industries internal logistic. For production companies, the process can be completely different as they have to take care of the entry, preparation, production and delivery of products or intermediate goods to the industry themselves. However, if they want to keep up with industry trends, changes and adapt to new models, they have to keep up with industry developments, otherwise they won't be in the system. We propose to the manufacturing company to prepare a device that would improve the performance at the material entry into production by installing an autonomous device that would receive, sort, count, cut, weigh, mark and stack individual pieces into crates. This would be connected to technology and infrastructure that is doing internal transport, storage or direct delivery to production. The aim of the research was to provide a completely autonomous system of taking-over, inspection, organization of sorting, cutting, coding and tracking of individual pieces of material, which realizes the combination of mathematical optimization of data intelligence with production knowledge and experience for the development of IT equipment for production planning and functioning of industrial production systems. It is the scientific phenomenon of studying and acquiring new knowledge to improve production in wither a company or industry. Through virtual simulations, it was possible to create noticeable and measurable data that could be subjected to certain criteria of understanding in individual processes and procedures, thus providing a starting point for improving production. It was also our goal for guidelines to follow the development of Industry 4.0, which is reflected in the modern controlling of certain logistic processes or procedures that provide lean manufacturing or fast adapting production [9]. This helps to improve overall value of key indicators (KPI Key Performance Indicator), all procedures and processes in production [10]. The changes represent a set of useful strategies and tools for detecting and permanently eliminating company losses, improving the quality of individual processes or work, shortening production time, reducing production costs (lean production – Toyota Production System - Toyota's philosophy of improving processes and procedures in production), including services within the company, which impact the timing of relations between suppliers, buyers and other operators involved [11]. According to the Small Business Strategy, Beganović explains that the system is supported by various tools, of which best-known examples are continues improvement of process (kaizen) and repairing the failures (poka-yoke), which are also used by author Jurejevčič [12]. Virtual simulation shows that updating processes at material input would greatly accelerate the flow of materials, and the improvement can also be reflected in technologically improved material cutting, weighing, labelling, coding and tracking of materials from entry to production. Beganović and Jurejevčič believe that the system could strategically be organized in a way that would allow the process of tracking products, intermediate goods or materials to include raw material suppliers and buyers, with the supplier knowing beforehand what raw materials the industry

needs and the buyer could follow production process and know exactly at what stage an individual piece or product is.

2.2 The importance of technologically accelerating development

Many economic, industrial and social surveys can be found on the Internet, which confirm that the general industry is the driving force of the economic development of a country, which strategically combines society, monetary policy, development strategy and strategic objectives. Based on this assumption, we searched for key elements that could be used as a base for confirming or refuting research conducted through virtual simulations and assumptions that would confirm or refute our findings. Since this is a search for technological updates to facilitate individual service actions in production, we have relied on logistics, logistics management and the organization of a manufacturing company. We have found that logistics with its processes, activities, services, processes and numerous parallel activities is crucial for production, as it is a series of prepared, carried out and finished activities in production, without which production cannot function or ensure the production process. Taking into consideration the need for technological update and acceleration of production processes and through virtual simulations, we looked for knowledge that would confirm to us that by placing new devices in production, we can speed up many processes, procedures, tasks and activities that are very important for production. Logistics is a subject and theory, a part of industry and production in large and small sized companies. As such, it has participated and monitored the development of the industry throughout all its stages, adapting itself technologically and technically to both development processes and procedures. Methodologically, in the research process, we were interested in the development and activities of logistics during the Industrial Development of Industry 4.0, in which we studied individual processes that are connected to ensuring of production materials and finding a possibility for upgrading and improving related individual procedures. In this specific case, through virtual simulations, we looked for the specifics use of logistics for the inputs of materials into production. The search for solutions included various techniques and technologies, programs and systems that could be used for trying out individual movements, motions, use of devices, machines, systems, etc. Because of the simulation, we used a well-known system Kanban, which in a systemic sense means the distribution of tasks for supplying jobs, while keeping in mind already systematized jobs at the input of materials [13].



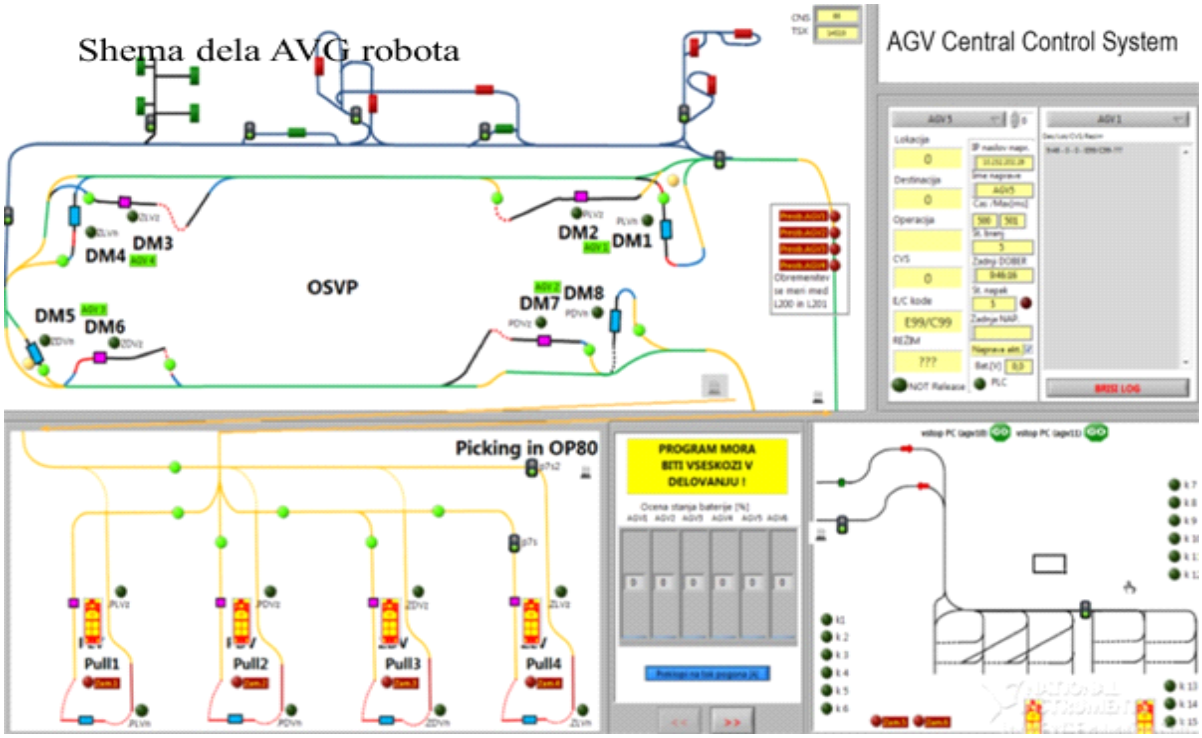
Picture 2: Combination system of receiving material and their way through production

Kanban system works in principle by pulling (»pull«), where there are no predictions, since the operation of the system works by recalling quantities in production. The simulation indicates that the tube is detected inside of the croze, which pulls the tube to the cutters, where it cuts them to the required lengths, then tags them with a number or code and places them in crates which are then taken by AGV into warehouse. The updated system responds to the timely need for material supply, which is received as a signal through a card, empty crate or empty space (it's connected to a number, weight or printed code).In system research and simulations, we sought and identified the possibility of technologically updating material entry, which the system would recognize by material type, number of pieces, weight of pieces, or a certain imprinted mark or a code, which needs to be marked and followed into warehouse and from there it needs to be taken to production. The procedures are systematically recorded on a Kanban card that is adapted to synchronized production processes, which could be set up at the input of materials into production. The decision was that a Kanban card system could be created to properly encode and monitor individual pieces of input material, which would mean that the existing program could be storing materials or could request materials for production.

2.3 Conceptual technological support

With the help of virtual simulation, we came to establish a baseline for positioning techniques and technological improvements of procedures when receiving material into the production company, but we also realised that this is simulation and is only assumption or conceptual technological support We looked for an insight into factual situation in the production company, but we couldn't directly investigate, because we would interrupt production processes and company could suffer financial damage. Therefore, we studied technology and techniques that could be useful for finding improvements, through methodical studying of inner logistics inside of production organization or industry. We have relied on already known technologies that have been recognized or in use in the industry, and on the basis of known facts, have determined how they systematically manage individual processes, procedures or services in internal logistics, which also includes the passage of materials from entry to finished product. We were looking for direct evidence to confirm that technology is the future of an individual manufacturing or industry branch. At the same time, we looked for an answer to questions like whit what industry or production ensures numerous benefits, greater accuracy, protection of health and environment, economic efficiency and financial advantages. Based on this, we recognized the meaning of updating individual processes. This procedures were an introduction for us to recognize techniques and technological support, which would allow modernization of individual processes, procedures and tasks. This review explains that technology is present at all times (appropriate to the developmental period) in industrial development and follows the introduction of hardware into manufacturing and later on in logistics processes. Empirical data shows that technological interventions in production can be recognized in earlier forms of using different machines for pulling, pushing, lifting, handling, loading of materials in warehouses and production. We are in a modern industrial development where logistics and its processes, its processes and tasks have a distinctive meaning, so logistics and logistics process providers are increasingly inclined to use modern technology, smart machines, robots and software to perform individual ongoing tasks, which is understandable since research data have shown that using smaller devices (automatically controlled devices) can achieve much better results, save energy, time, space and workforce. We focused on modern devices that are used for receiving and sending materials to the company premises and preforming some of the preparation tasks for storage or preparation and transport in production. In connection with the data on autonomous devices already studied [7], we systematically limited ourselves to AGV robot, when it comes to transport work, inner logistics and internal transport. We have already stated that the AGV SMARTCART 100TT (Automated guided vehicle) is useful for picking up and transporting materials from the pickup device at entry of raw material or yard to production. It is an AGV, defined as a new generation smart device that is able to decide, by means of certain computer programs, which tasks it will perform in sequence [14]. In the case of research,

AGV would be used by fixed-line or on course method, which are coded inside of the programme. AGV follows magnetic tape, which is its infrastructure, uses RFID technology and is connected to production system that supervises multiple robots. At all times, autonomous devices are connected to computer equipment and carry out the task of transportation by transporting carts from a pickup device to a warehouse or from warehouse to industrial production. Systemically interesting part is its flexibility, performance, functionality and energy saving. In a common research area, it is of key importance to save time, energy and workforce, with which, losses can be abolished and time and energy can be saved. At the same time, it is crucial to ensure the accuracy of procedures, protect human health and the environment.



Picture 3: Manipulation of autonomous device in production

3 METHODS OF RESEARCH

We adapted the research to our research needs and research area. Through various methods we tried to study the individual elements of logistics and through them find answers to effective technology in process of material entry into production. We were interested in finding measurable data that was visible in activities related to the number of employees, the number of machines or mechanical devices used, the number of hours worked, the usable space by size, etc. In this data, we looked

for elements to confirm our assumptions about unnecessary use of time, space, and workforce and system inefficiency. The data or results collected can be interpreted methodologically in several ways, find a solution that would excused use of technology in the research field. It is a scientific method of studying individual phenomena in production, which can be represented positively or negatively by numerical statements. At the same time this information can be used to acquire new knowledge, for innovations, technological updates, etc. We systemically adjusted the method to our research needs, because it is based on the collection of observable, empirical and measurable data, which could be subjected to certain criteria of thinking and could be reflected in time or price unit and in improving procedures. The same method was used in one of the well-known companies, which has several different forms of production, that are combined in one final product and they all have problems with material entry in production (due to trade secrets, the company didn't give consent to be named in the article).

3.1 A reference point for research

We justified our search for research baseline on a claim that areas of production, economy, industry and overall development are always in need of solutions that would allow improvement of systems. The claim was based on the fact that the economy, industry, manufacturing and society in general is in constant technical and technological development and in the constant search for technological updates, both in production itself and in service and service activities. All this has to be understood as the fact that the economy, industry and production realised how important logistics is in all areas, and lately places particular emphasis on the importance of preparation and material entry into production, with science pointing out that systematically and sequentially, all the processes and operations of material flow can be regulated by hardware to save considerable time, space, energy and workforce. Numerical data obtained from three locations of the same manufacturing company, were used in virtual simulations and we came to interesting conclusions that suggest that significant improvements done by improving procedure can save material and financial resources in all three locations. It is about identifying individual procedures and processes or phases of a service or production activity, where improvements can be made to eliminate waste of time and space and to ensure a smooth entry of materials into production. The starting point of our research is based on virtual simulations, which has given us a baseline for identifying individual processes, procedures and services that can be machine-upgraded, by which we save time, reduce use of space and energy consumption. As a reference point for the research, we carried out a data analysis and the current state in the manufacturing company at three different locations, confirming our assumption or thesis that most logistics work, tasks or operations in the process of receiving raw materials are logistically performed [15]. This finding was the starting point to finding options for updating and machine-retrieving of the materials, as the current state indicates Industrial Development

4.0, as it is merely about physically pushing, carrying, repositioning, cutting, counting of pieces and manual stacking into crates. Unfortunately, we have to confirm that in this specific case, even though it's about using the machines that are directly controlled by a worker, it's not possible to speak of advanced technology, mainly because the work is done by numerous workers. But if machines or devices are in the process, a worker still has to control them. We have also found out, that all production processes are defined by regulations, instructions or policies of the company management, which ensures minimum safety of employees and procedures, but taking into account of the human factor, this means a bigger burden is put on operators and production workers for production. The consequences are often mistakes in management, business or product, which result in the return of raw materials or materials from production and their re-examination, preparation and labelling, which in turn leads to time and space losses, and can lead to production downtime. It was this analysis that was the starting point for finding processes and technological updates for a quick and accurate pickup of materials using autonomous devices and modern technology.

3.2 Where we see concrete solutions?

The need for the introduction of technology in the field of logistics, especially in those service areas where heavy physical work is required, has been present for many years, especially in the process of storing raw materials and preparation of materials for production. It depends on the size and development interests of each company whether it will solely or with a help of science, seek professional solutions, update processes and try to keep up with industrial development. Modern equipment or autonomous devices work on the basis of identification of computer programs or program codes and numbers, which are recognized by computer programs with reader that give commands for various activities. Following the example of the industry developed in Slovenia, it can be seen that in the last ten years production organizations have recognized the need for technological use of the AGV AMRTCART 100TT (found on the website TPV Novo mesto), in the movement of materials in production, which is something new for them. Initial use has been recognized in manufacturing, and more recently, these devices are becoming more frequent in logistics. The data collected shows that, in addition to the car industry, AGV is also used in the pharmaceutical, food and some other industries where precise, coordinated and continuous work is required. In this particular case, we have presented a robot that independently supplies materials for production purposes to production, raw material storage or finished goods warehouse, but most of them are in the process of preparing raw material and transferring things to conveyor belts. The original designs of the robots were installed between production processes, which means they are located in the folding, sorting, labelling and preparation of finished products for transport area. Also interesting for our research, were solutions in the process of packaging,

palletizing and storage in warehouses and preparation for transport [2]. The introduction of AGV, robotic arm and conveyor belts into logistics meant lowering the cost of the service activity, reducing staffing and increasing productivity [9]. From a technological point of view, the introduction of AGV meant accurate and safe processes, achieving good quality services without errors and complaints and at the same time easier control. Through the study of three different locations of the same manufacturing company and the virtual simulation of individual production processes, we got observable and measurable data that gave us the starting points for possible useful solutions. We found out that if they wanted the materials to remain in the condition required for production they needed to be loaded physically or mechanically with forklifts. Through virtual simulation, we also arranged internal transport and infrastructure and connect it to the existing one with AGV, which was already researched in previous research [7]. We were looking for a concrete solution in the very process of picking up, preparing, cutting and marking of individual pieces of metal tubes and their preparation for internal transport, which also succeeded in virtual simulation. The next step is to look for solutions that will work in the actual manufacturing world.

3.2.1 Optimization

Virtual simulation of logistics procedures for moving materials (for example, we used thin metal tubes) from a transport vehicle, which can be a truck, a railway wagon, a vessel or any other mean of transportation, using a forklift to transfers the material to the vestibule for production preparation. Forklift leaves the pipes on an upholstered metal counter where the worker must cut the plastic clamps and bring each pipe to the cutter. In the production materials preparation system, at least five workers are required in each shift, each in charge of a specific stage of takeover. Such processes result in time, space, energy and work losses. Through virtual simulations, we sought technological solutions that would reduce the number of employees, introduce machine-cutting, automatic coding, machine stacking and transportation into production. We came to the realization that it can be possible to use a smaller space for working with forklifts by installing a robotic arm which would transfer the bale of metal pipes into the preparation process. This seemed like a good solution at first, but due to damage done to the materials, we abandoned it and looked for other possibilities. We looked for solutions in sorting, preparation, pipe cutting, marking, weighing and inland transportation. The simulations have shown the potential to be carried out much faster and more reliably with appropriate technological equipment, reception and preparation of materials. We focused our research on finding the right solutions and we systematically divided and evaluated the individual procedures and looked for improvements in each shift.

4 RESEARCH RESULTS

Methodological study of individual processes, movements, motions, infrastructure, equipment and other forms of performing individual services, required a search for scientific, observable, empirical and measurable data that would offer us relevant and useful solutions, tested in industry or in any other form of production. Due to the business secrets of the manufacturing company, we restricted ourselves to the tests that were executed in virtual simulations, which followed an actual workflow, and at the same time gave us a base for finding suitable solutions. We received answers from this particular production that confirmed our thesis: "Technological modernization of material input into production is a fundamental solution for the entry of materials into production, which enables lean production." This was the baseline for collaboration with production and the search for modern technological solutions.

4.1 Model of technological development

In order to find the right model or suitable solutions, it was necessary to study the production of the manufacturing company, compare it with the production of other similar companies or industry and based on the data obtained, prepare a model of the technological improvement. We found out that five workers are needed to complete the existing form of taking over the materials in the studied company. The first one is stacking materials with the forklift and doing any work involving it, like transferring the materials to the work bench or preparation rack and from there back to work bench.

The second worker cuts the clamps and hands over the material to the third worker. The latter then takes each tube and pushes it to the prepared spacer, which shoes how long the tube needs to and cuts it to a length of 30 cm. According to the work programme, he makes 20 smaller tubes out of 6 meter long tube, which are then numbered by the fourth worker and passed along to the next one. The fifth worker places each tube individually in a crate and then transports them to a warehouse. With the help of virtual simulations, we developed each movement and each process individually, connected them and realized that in the process of receiving materials we could use a hardware that would receive, sort, mark, cut, weigh, count, track, and stack and prepare materials for internal transport. Technological updates have eliminated waste of time in the process of cutting, passing along, receiving, marking and stacking of tubes into crates. An adjustable cylinder with grooves for different tube profiles would be installed in the receiving part of production, which would receive the tubes, and then rotate them to the position when the tube feeder grips and adjusts it for cutting. Several cutters could be set up on the device, which could then cut 20 tubes in one movement.

If an employee is able to cut 10 tubes in one hour, the device could cut 2 pipes in one minute and at the same time mark, clean and stacked them into the prepared

crates. We can conclude that the device is in minimal service capable of cutting the entire bale of 120 tubes, while also marking, folding and preparing them for internal transport.

4.2 Useful technology

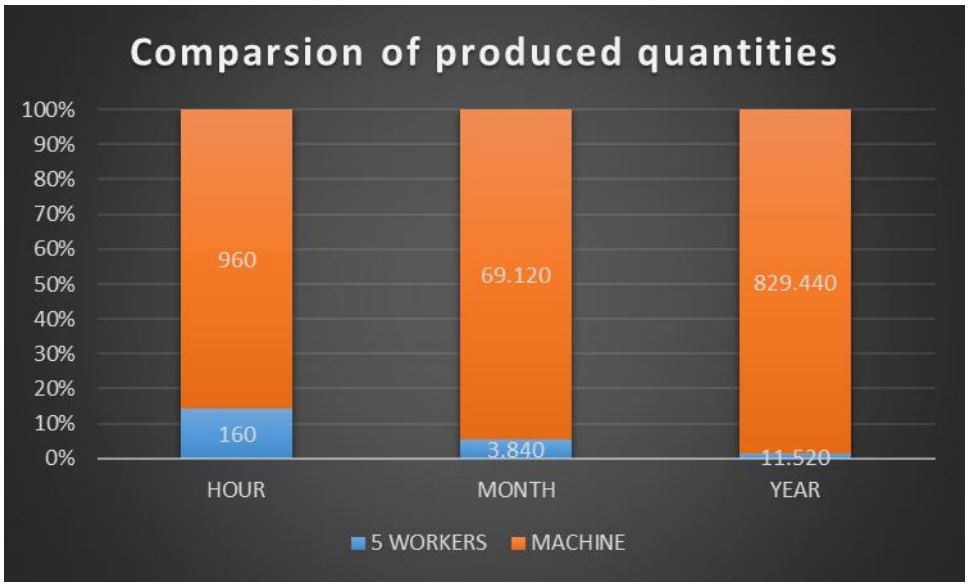
With the help of technology and computer equipment, we sought solutions that would modernize the process of receiving materials into production while improving logistics processes in the company. In the first part of automation, we tried to introduce some of the pre-existing technology, which would eliminate the unnecessary waste of time, space and workforce. We found out multiple problems and errors that were present while performing manual work. Our goal was to find useful technology that would accelerate the flow of materials, eliminate losses, and inform management of the company about the possibilities for development. The general theory of industrial development shows that industry and other manufacturing organizations are an area where the development and use of all the modern technology 4.0 needs to be monitored. The technological possibility of incorporating new developments in development technology 5.0 is increasingly evident. Possibilities for using the simulated model of technology are shown in a combined receiving machine, which contains a material entry area, a cylinder with grooves for receiving individual tubes, cutters, markers, guides for movement of cut tubes, stacking of materials into crates and transport. With the placement of useful technologies, the combination of receiving materials allows for a number of changes. What is useful technology and whether it exists is a question that needs answers. Unfortunately, manufacturing companies and industry are a fairly closed area, which doesn't allow outsiders to collaborate or sufficient use their achievements.

4.3 What are the expectations of the new technology?

The general introduction of technology in logistics and the updating of individual processes to increase production capacity in a given field have several meanings, namely to accelerate production, simplify logistics and production processes, reduce energy consumption, eliminate waste of time and space, increase productivity and optimize material costs of the finished product. In this particular case, due to the policy of the manufacturing company, we conducted a search for solutions at three locations of the same production, which led us to find suitable technology that would enable faster material flows and lower costs. Virtual simulation could be a starting point for the preparation of a device that would represent the intended improvements. With technological modernization, the company would achieve greater and faster production. Virtual simulations are a part of the starting point for introduction of new technology, and it is up to manufacturing companies to decide whether to make financial and technological changes.

5 DISCUSSION

In this particular research case, result were found by cooperating of science and profession from the manufacturing company, as well as years of management experience, backed by methods of improving production processes. We have come to the realization that everything is relative in science and everything can be technologically upgraded, supplemented, refined, modified, innovated, updated, replaced, etc. This means that the research is far from over. Science is infinite and has its own space and time, so we have used fact-based methods that describe occurrences and are studying hypotheses, occurrences in material flow from the entrance to the production cycle, labelling, sorting, inspection, cutting, internal transport to a warehouse, determining individual signs, numbers, codes and alike, ordering of individual materials for specific production belts and preparation for internal transport to production. It is the observation and experimentation of individual processes, processes and phenomena that give results and confirm or refute the hypothesis. The aim was to collect observable as well as empirical and measurable data that could be measured by methods of measuring and evaluating and based on those, we could collaborate on the development of new technology that would help to quickly control logistics in production. We also found out that, at the input of raw materials, unnecessary work was carried out by five workers who only do 10% of the work that an automated machine can do (all five workers can in one hour process and prepare 10 metal tubes and only 80 in eight hours, this makes it a sufficient reason for automation if the survey data tells us that the machine is able to process 960 identical tubes in the same amount of time and provide the industry with greater precision, better raw materials and greater savings.). We hypothesized: "Technological modernization of the input of materials into production is a fundamental solution of material entry into production, which enables lean production," with which we wanted to confirm that technology is crucial in the development of production and all processes that accompany production. We have reinforced our claim using appropriate methods in industry, such as Kaizen, Poka Yoke, Kanban, Pull, JT, and tested it all through virtual processes. At least in this specific case, where we were dealing with the process of roller picking of metal tubes, pushing and cutting, code marking, weighing and stacking. Through virtual simulation research, we estimated that we have achieved our goals, as we have shown the logistical and economic effects seen in automatic pick-up of raw material and in preparation under the VMS (Warehouse Management System) program. We confirmed our hypothesis and encouraged management to look for new solutions in the field of logistics and services. In agreement with the manufacturing company, the research is not completed and will continued in terms of finding new opportunities, better solutions and competitive advantages.



Graph 1: Comparison of produced quantities

6 CONCLUSION

Through the study of individual areas of logistics and approach to the research question, we came to the recognition that production, especially industrial production, is the social and economic element that regulates the world market. It also regulates inter-organizational, inter-corporate, economic and similar relations, while motor vehicle industry is often an element between national and political relations. Aware of the demanding responsibilities of the state, community, business and industry, they are looking for sustainable solutions for production, infrastructure and systems. It is an economic issue of existence, development, production, protection of nature and the environment. Therefore, the introduction of newer and smarter technology, is an ideological module for the development and technological modernization of any production or industry. In the pre-existing researches [3,7], we have studied individual procedures and processes of internal logistics in the industry, and looked for theoretical and professional solutions for the internal transport of raw materials, the internal transport in production stages and the internal transport of intermediate goods or finished products to rack warehouses for further external transport. The automation of individual processes meant reducing labour costs, preventing waste of time and space, and introduction of new technologies, which is better for human health and environmental protection. The introduction of an AGV robot (smart machine) has inspired many manufacturers (pharmacy, food manufacturers, metal industry, etc.) to innovate their processes and by doing this save on energy, personnel, security, environmental protection and much more. Systematic introduction of new systems, new technologies, robots such as AGV, machines for

receiving raw materials, palletizing machines, introduction of smart forklifts that work without human assistance, introduction of smart, self-supplying warehouses, machines that perform various physical work represent industrial development and at the same time mean the development of science, systems, the economy and society. In this specific case of business production, we have shown how it is possible to systematically update the entry or arrival of materials into production, where a number of losses in terms of working time, space, energy and more can be eliminated with one combined autonomous device. Through the use of different methods and virtual analyzation, we have come to find new discoveries and new smart machines that could of use for the whole production. The presented technology and smart machines (robots) are proof that the Slovenian economy is keeping up with the developments of global industry, in some cases even overtaking it, which the research centres of individual industries, as well as schools, colleges, universities, institutes and all us who are involved in development processes can be proud of. In the specific case where we have shown the system integration and use of smart machines in manufacturing companies in Slovenia, we are in the phase of virtual verification of the simulation and the use of smart machines for broader purposes, which we will show in the future. Virtual display of the system for the use of autonomous devices for collecting metal tubes, roller picking of tubes and cutting, marking and stacking them into crates, represents a possibility for introduction of smart technologies that would mean progress for the manufacturing company, shortening the time of production, better flow of raw materials and competitiveness on the market. Calculations for labour at material entry into production and the use of a modernized takeover form, show a noticeable ratio costs, time and space losses, and many other deviation processes that can be replaced by a professional and automatic machine. We confirmed the hypothesis and opened the way to new researches and improvements of individual processes in logistics. We are aware that our researches are always based on a starting point, and that scientific knowledge about individual equipment can only provide a baseline for further research, thus we fully confirmed the hypothesis and gave the reader an opportunity to become acquainted with innovations in the industry development, knowing that we could only describe and present the part of the smart hardware development that is not a trade secret of any manufacturer. For this reason, the paper does not mention where the scientific research was conducted and where presented information was obtained.

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Drago Cvijanović[15]
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SUSTAINABILITY OF TOURISM AS THE FACTOR OF ECONOMIC DEVELOPMENT[17]

Abstract
Tourism and economic development are closely connected. In the past decades and in recent years, the awareness of its necessity has been growing, because it has multiplied effects on all spheres of economic and social life in general. The subject of this paper is the analysis of its achieved level of development. The categories taken into consideration refer to the average consumption on one tourist trip as well as the price of accommodation in the member states of the European Union. Only tourists resident in the member states of the European Union in the member states were taken into consideration. Also, by analyzing the number of tourists by months, we will make a conclusion about the dominant tourist activity. The geographical position, but also the developed traffic infrastructure determine the type of tourist transport. The development of transport infrastructure is strongly related to capital investment activity, which on the other hand depends on the state and its measures of adopted and implemented policies.

Keywords: *tourism, expenditure, transport*

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[17] The paper is part of the research at the project III-46006 "*Sustainable agriculture and rural development in terms of the Republic of Serbia strategic goals realization within the Danube region*", financed by the Ministry of Education, Science and Technological Development of the Republic of Serbia.

1 INTRODUCTION

The impact of tourism on economic development has led to the emergence of a concept called "tourism-driven development" [1]. The achieved level of tourism development of a society largely determines the development of tourism [2]. In rural areas, this is especially pronounced [3]. Tourism is an activity that is a necessity for modern man. The reasons for this can be numerous. The great stress that today's system of functioning brings with it, requires a modern man to dedicate a period to himself and his family. On the other hand, the standard of living and the amount of personal income largely define the possibilities of each individual [4]. Therefore, different conclusions can be drawn by considering developed versus underdeveloped countries or parts of the world. The subject of this paper is the member states of the European Union as well as the trips of its residents to other members of this union. Having in mind the wide range of tourist services and economic consequences that this activity has, several aspects were considered. In addition to the average consumption of one tourist trip, the price of overnight stays by country was also taken into consideration. Tourist consumption is a very important economic stimulus in a country, especially if we are talking about foreign tourists whose consumption is economically more significant than the consumption of domestic tourists [5]. Consumption of domestic tourists practically achieves the circulation of already created value, which also has its positive consequences [6]. However, the money of a foreign tourist represents the inflow of additional money into the economy of one country, which has a multiplied effect, which has multiple effects on economic growth and development of the entire economy [7]. The money spent at the micro level has long-term positive consequences at the macro level as well [8].

Also a precondition for the development of tourism is the transport infrastructure and its development [9]. A good locality with all its cultural and historical heritage in itself is nothing without its accessibility. The geographical position of the country largely defines the mode of transport, but also the places that tourists visit in a certain tourist activity [10]. Going to sea or accessibility to the mountains and developed winter tourism determine the dominant type of tourism in a country. On the other hand, this can be concluded by looking at the monthly distribution of tourists, where it will be noticed that in some countries more than 50% of tourists visit a certain country in the summer months.

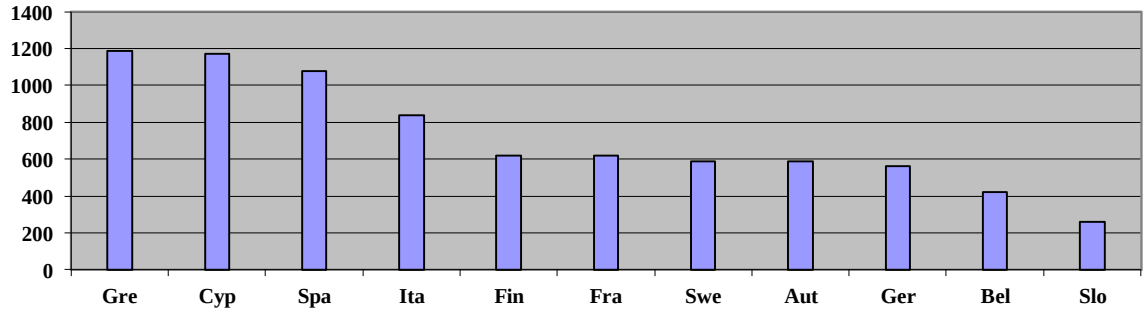
The importance of practical and theoretical review of tourism is especially evident in the last two decades, especially in recent years. The development of an economy and its economy is almost inconceivable without the development of this activity, ie the tertiary sector [11]. In all developed countries, members of the European Union, tourism is a significant generator of GDP, but also an activity that records a constantly growing number of employees. This employment refers both to the one that is directly related to the activity of the tourist economy, and to the indirect one

in the activities that are not related to tourism [12]. Tourism development is key to sustainable development [13]. The development of ecotourism in recent years has made a special contribution to the sustainable development of [14]. It is only with the development of these categories that tourism is placed in an enviable competitive position [15]. For all these reasons, it is necessary to give a special, primarily theoretical review of the development of tourism, which with an adequate practical approach will give satisfactory results, which are reflected in the adoption of reasonable measures. Their implementation will show both positive and negative effects. Perception of the overall picture and effects will be much faster and more effective in the case of harmonization of all policies at the supranational level. This phase is still in its infancy, the obstacles to it are numerous and this may be the subject of some other analyzes.

2 THE SITUATION OF TOURISM IN THE EUROPEAN UNION

The first analysis we will consider refers to the average consumption per trip. In order to define the analysis more precisely, it must be noted that Graph 1 shows the average costs of one trip in some EU member states.

Graph 1. Average expendiure per trip made by some EU residents to other EU countries, by destination country in 2019 (EUR)



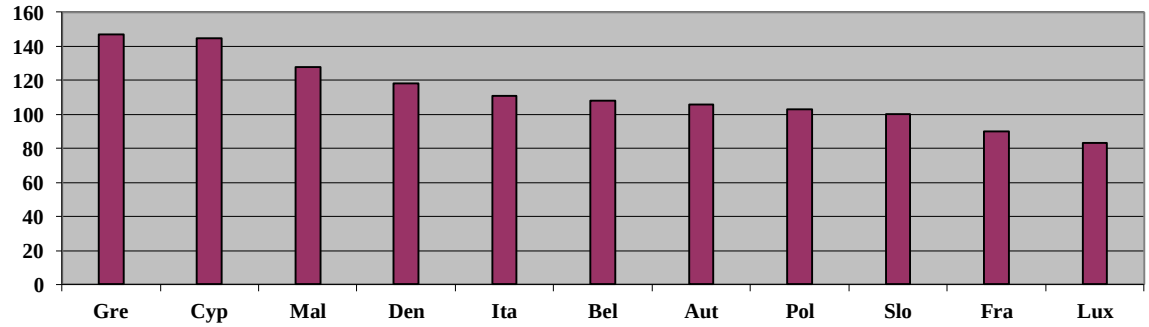
Source: Eurostat

Graph 1 shows the average consumption of foreign tourists in the countries they visit as their tourist destinations. The origin of tourists, ie the countries they come from, are not the subject of this analysis, so we will leave that out. Only some EU member states are included in the analysis in order to get a clearer picture. Greece, Cyprus and Spain lead in terms of consumption, followed by Italy. Such data are expected because they are countries that go to sea and the majority of tourist consumption and tourists is based on this type of tourism. Consumption per tourist trip is highest in Greece with about 1200 Euros per person, the same as in Cyprus. This data does not speak de facto about the developed economy because tourist consumption is a revenue for the state, which also has its own expenditures.

On the example of Greece, a completely wrong conclusion could be obtained by considering only this category, because Greece is one of the countries with the largest GDP deficit and very large amounts of public debt. Slovenia is also an excellent example of such a statement. Slovenia's geographical position does not provide so many opportunities for income at the level of Greece, but Slovenia is an economically more developed country than almost everyone on the list ahead of it. In general, consideration of the category of tourist consumption can be a good but not a sufficient indicator for drawing unique and reliable conclusions of both tourism development and economic development in general.

The analysis continues by considering the prices of overnight stays so that we can have a more precise picture of tourism in these countries. The data can be found in Graph 2.

Graph 2. Average expendiure per night made of some EU residents' to other EU countries, by destination country in 2019 (EUR)



Source: Eurostat

Unlike the first graph, here the structure is more homogeneous. Differences in the price of accommodation vary, but not to such an extent. What is noticeable is that Greece is in the first place, just like in the previous chart. However, the price of overnight stays is perhaps a more authoritative indicator of tourism development than tourist consumption, because if a high tourist price achieves significant tourist consumption, it means that the number of tourists is large and that tourist capacities and performance meet tourists' expectations. In the first five places are the countries, as well as in the previous schedule, which go to sea and which realize the influx of tourists mostly during the summer months. The exception is Denmark, which achieves a high price per night thanks to a very high standard that accompanies the prices of accommodation facilities. Slovenia is also highly ranked on this list for similar reasons as Denmark.

One of the determinants of tourism development can be considered the development of transport infrastructure. The following table shows the ways of tourist arrival, which is determined both by the infrastructure and the position of the country that tourists visit.

Table 1. Share of means of transport of EU residents' trips to other EU countries, by destination country, 2019 (%)

Dest	Air	Waterway	Railway	Bus	Motor	Other
Bel	21	-	12	5	61	-
Bul	78	-	-	4	8	-
Cze	19	-	10	18	52	-
Den	29	7	8	2	52	-
Ger	34	1	7	8	50	1
Est	14	70	-	4	10	-
Ire	80	-	-	4	12	-
Gre	88	3	-	2	7	-
Spa	76	2	1	4	17	-
Fra	28	1	8	6	54	3
Cro	19	2	-	8	68	2
Ita	41	2	3	9	44	1
Cyp	95	-	-	-	-	-
Lat	47	-	-	13	34	-
Lit	38	-	-	21	40	-
Lux	17	-	-	-	75	-
Hun	48	-	3	7	41	-
Mal	95	-	-	-	-	-
Ned	22	1	7	8	57	3
Aut	11	-	7	7	73	2
Pol	33	1	3	7	54	-
Por	70	-	-	3	24	-
Rom	47	-	-	7	39	-
Slov	20	-	-	9	68	-
Svk	5	-	9	7	76	4
Fin	37	38	-	3	20	-
Swe	36	27	-	1	26	-

Source: Eurostat

The dominant mode of transport is motor transport in almost all countries. Slovenia belongs to this group of countries because as many as 68% of tourists come this way. In Slovakia, the percentage is as high as 76. Austria and Luxembourg belong to the group of countries where the percentage is above 70. Croatia is at the level of Slovenia, while in Belgium the percentage is slightly lower and amounts to 61. It is interesting to mention the example of Bulgaria. by air with a share of as much as 78%, while the share of transport by motor vehicles is only 8%. The reason for this distribution of transport should be sought in the nature and reasons for visiting a particular destination. In Ireland and Greece, the share of this mode of transport is even more pronounced and amounts to 80 and 88% respectively. Malta's geographical position in itself defines air transport as dominant because as many as 95% of tourists come this way. The underdevelopment of the railway infrastructure has put this type of transport on a marginal place for decades in terms of its importance in the

overall transport. It is most represented in Belgium and the Czech Republic with a share of 12 and 10% respectively. The reason for such a higher participation compared to other countries is due to higher infrastructure investments in this type of transport in the past decade. In most other countries, there is almost no data or the participation is so small that it should not be stated because it has no practical significance. The situation is similar when it comes to water transport. However, the data in the three countries are strongly in favor of this type of traffic (Estonia, Finland and Sweden). In Estonia, as many as 70% of tourists come by this mode of transport. Also, in the last decade, the share of bus traffic has been decreasing and in only three countries is it above 10% (Czech Republic, Latvia and Lithuania). In addition to the mode of transport, it is important to consider the monthly distribution of tourists in selected countries. The data are in the following table.

Table 2. Distribution over the year of EU-27 residents' trips to other EU countries, by destination country, 2019 (%)

Dest	Ja	Fe	Ma	Ap	May	Ju	Jul	Au	Se	Oct	No	Dec
Bel	5.9	6.0	10.	9.0	10.9	12.1	6.8	9.2	8.1	11.0	5.2	5.9
Bul	1.4	1.8	5.7	4.4	11.6	11.8	21.1	23.	7.3	5.8	2.2	3.5
Cze	5.0	7.0	8.7	7.3	7.7	9.8	6.8	10.	6.9	10.7	8.6	11.3
Den	2.8	2.4	9.1	7.6	10.3	10.	13.	13.	9.1	9.8	7.1	5.3
Ger	4.3	6.2	7.7	8.1	11.5	10.	10.1	10.	8.1	7.5	6.3	9.8
Est	3.2	5.7	5.4	10.	9.5	11.9	14.	9.6	7.5	7.9	7.2	6.5
Ire	3.0	5.7	9.0	7.0	13.9	9.2	11.8	9.0	5.9	6.7	11.2	7.6
Gre	1.1	1.2	1.5	5.8	10.4	14.	18.	17.3	16.	8.8	2.3	1.7
Spa	4.1	5.4	8.6	9.3	9.8	11.1	10.	12.	10.	8.1	4.7	5.2
Fra	3.5	4.2	7.3	7.2	11.0	11.6	14.	14.	8.	6.3	4,5	6.8
Cro	0.9	0.9	2.3	4.3	6.1	13.	27.	24.	11.	3.4	1.1	4.6
Ita	3.4	5.2	7.0	7.8	11.5	11.7	11.5	14.	11.	9.5	3.5	3.1
Pol	5.2	5.9	6.7	7.1	7.8	11.1	11.7	7.7	15.	6.1	6.7	8.0
Por	2.8	5.6	7.2	8.4	11.8	9.1	10.	14.1	12.	7.3	4.4	5.7
Rom	2.8	2.6	3.9	4.3	13.0	15.1	13.1	11.2	8.	12.7	4.1	8.6
Slo	-	2.8	6.2	7.4	6.1	13.	11.6	9.1	11.	13.4	4.6	7.7
Svk	4.7	5.1	7.0	6.9	7.3	8.6	16.	13.1	11.	7.7	4.2	7.7
Fin	4.1	4.5	7.9	6.8	5.7	8.3	15.	10.	7.7	6.5	9.4	13.5
Swe	3.3	6.9	5.4	7.6	8.4	10.	15.	10.	6.9	7.2	6.5	11.8

Source: Eurostat

By looking at the monthly distribution of tourists, we can define the dominant type of tourism in each country individually. The example of Bulgaria shows that as many as 45% of all tourists visit it in July and August, which clearly indicates the attractiveness of Bulgaria as a summer destination, but also a significant level of

investment in development tourism. This should be kept in mind if we are talking about the winter months and the ski season, because Bulgaria has natural capacities for the development of this type of tourism. However, the attendance of foreign tourists is very small because the price-quality ratio is not representative, so it does not make this destination so attractive. An even more drastic example is Croatia, which is visited by almost 55% of all tourists in the summer months (June, July, August). It is also noticeable that the month of January is the period when the lowest number of tourists is in almost all countries and ranges from 0.9 to 5.9, and in most countries it is at the level of 2 to 3%. It is the same in February. The situation is somewhat better in the last month of the year when the number of tourist visits increases compared to other winter months. That percentage is above 10 in three countries (Czech Republic, Finland, Sweden). The following table shows the sites that tourists visit in the countries.

Table 3. Holiday trips of EU-27 residents to other EU countries, by tipe of destination and by destination country, 2019 (%)

Dest	City	Seaside	Countryside	Mountains	Cruiseship	Other
Bel	48	16	21	14	-	16
Bul	33	85	10	4	-	4
Cze	84	1	15	12	-	4
Den	37	60	36	-	3	10
Ger	53	3	18	25	1	8
Est	86	34	17	-	42	3
Ire	68	33	38	17	-	18
Gre	28	80	15	7	3	10
Spa	35	71	14	8	3	11
Fra	44	33	28	24	1	10
Cro	28	88	10	5	3	5
Ita	44	35	32	27	3	14
Cyp	23	79	18	-	-	17
Lat	77	31	25	-	-	12
Lit	64	22	17	-	-	24
Lux	36	-	26	37	-	-
Hun	73	4	25	8	-	14
Mal	55	77	8	-	-	13
Ned	50	41	34	2	3	13
Aut	31	3	36	74	-	7
Pol	74	28	31	10	-	13
Por	54	61	20	10	-	12
Rom	77	32	43	36	-	10
Slo	36	28	28	30	-	10
Svk	54	-	23	44	-	3
Fin	34	19	29	-	38	7
Swe	54	25	27	5	28	14

Source: Eurostat

It is obvious that tourists in a number of countries visit cities and this is especially pronounced in the case of Estonia (86%) and the Czech Republic (84%). Unlike these countries, those in which the motive for visiting cities is very small or significantly less than the motive for visiting other mentioned localities should also be mentioned. In this context, we should mention Greece, Cyprus and Bulgaria, where less than 30% of tourists come with this motive.

As already mentioned, one of the main motives for visiting a certain country is its geographical position. It can be either an outing to the sea, a mountain or an orientation around rural tourism. For example, as many as 88% of tourists visit the Croatian coast, which can be linked to the previous table where it was stated that more than 60% of tourists visit this location in the summer months. The situation is similar in Greece, where the percentage is at the level of 80 and analogous to the example of Croatia, and over 50% of tourists visit Greece in the summer months (June, July and August). Also, the Bulgarian coast is visited by as many as 85% of all tourists, or over 50% of all in the summer months. If we extend the analysis to rural tourism, the situation is more uniform and varies less than in the case of cities and the sea. Underdeveloped rural tourism and a small number of tourists is noticeable in Malta, where only 8% of tourists visit this country on this occasion. In Romania, that percentage is very high because 43% of tourists visit this country on that occasion. When it comes to visiting the mountains, great disparities can be noticed, which is again conditioned by the geographical characteristics of each country. Since Austria does not go to the sea, but the accessibility to the mountains is pronounced, as many as 74% of tourists visit it on this occasion. In some countries, there is no data in the columns because they do not exist or are so small that they are not statistically significant and are therefore ignored.

3 CONCLUSION

Behind every state activity there is an unambiguous and clear goal - economic growth and development. With the progress of civilization and the change in the structures of the social needs of each individual, and thus of society as a whole, the instruments for the same have been constantly changing. Today, those changes are more dynamic than ever. Overburdening the daily obligations of modern man makes them much more tense and does not leave enough space for dedication to their family. When the time for rest and relaxation appears, each individual wants to use his free time in the most economical and efficient way and in accordance with his income. For this reason, tourism has grown significantly throughout the twentieth century. Tourist demand and supply must be balanced in order for the tourist to be satisfied with the entire arrangement, which includes the moment of departure to a certain destination until the return to the same. That is why economic entities are on the side of offering tourist services in front of a very big challenge - how to satisfy all the needs of tourists and motivate them to come again. The problem may arise between states and tourism service providers. If the

state does not have enough hearing, or enough funds to invest in the development of tourism and the tertiary sector, then the private initiative and desire of individuals does not have much significance. It is good that the level of education and thus awareness has improved in recent decades, realizing that with the development of tourism, the economy of a country is progressing in many ways. This was discussed in the previous part of the paper by stating that the money of a foreign tourist represents an inflow of additional money, ie money that was not created in the economy of the domicile state. Therefore, this paper analyzes the categories of foreign tourists to countries that are members of the European Union. The average costs and price of overnight stays in some of the countries considered speak of the level of economic development of the countries from which tourists come, but also of the tourist offer. Of course, it should be borne in mind that the development of tourism is a continuous and not an ongoing process whose results are seen with a time delay. The accessibility of tourist locations, but also the geographical position of the country, largely determine the dominant tourist activity. In some, as can be seen in the tables above, based on the number of tourists per month, a dominant type of tourism can be seen. In most developed countries of the European Union, more than 50% of tourists come in the summer months, especially in countries that go to sea. The example of Slovenia shows that the tourist season can last throughout the year, which is again conditioned by its geographical position but also by its order, since it belongs to the group of countries that invest the most in ecology. Last but not least, we should mention investment activity or capital investments. Developed road infrastructure is a prerequisite for tourism development. Attractiveness without accessibility has no meaning. In that sense, the support and activity of the state is of crucial importance. Without it, private initiative would be sterile and not overly successful. Earlier views, both theoretically and practically, neglected the necessity of tourism development. Today, however, there have been changes in the way of thinking in that sense, because it is understood that investing in infrastructure and indirectly in tourism has a multiple positive effect on the overall economic development.

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WATER IN FOCUS OF DEVELOPMENT OF ENVIRONMENT, NATURE, MAN AND HIS GOODS

Abstract
Research question:

Earth is a living planet inhabited by billions of living beings, plants, minerals, rocks, liquids and other elements that make up the earth as an organism. The fluid that connects all these elements, all animate and inanimate beings, plants, minerals, rocks, fossils and everything on earth, is water. Just as a human needs blood, Earth needs water to sustain itself, which enables it to exist, develop, change and continue life on our planet with all its elements. The role of water on earth has been described many times, but the science of it is infinite. Water has never been and never will be completed as it lasts for millions of years and will continue to do so in the future. The research question, is: What is the role of water on Earth in restoring the ecosystem, and who has a duty to protect and care for its pureness?

Purpose of the research:

Water is a source of life for man, for all living and non-living organisms, plants, minerals and all other elements on Earth, which are systemic and natural regulators of the flow, purification, cooling, heating, evaporation and gasification of water from creation to life. The purpose of the research was to determine how man and other living beings treat water, how the Earth responds

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to human interventions, natural events and what role water plays in restoring the environment, nature, human and its goods in reverse.

Research Methods:

We systematically collected, reviewed, analysed, studied, assessed and reviewed timeline data for chronological periods, and with empirical insight tried to make a brief overview of the past. With the help of numerical representations, we tried to confirm our assumption that the Earth is a living organism that preserves its existence in the form as it is with water. Human, as a rational being, can help or harm the earth, nature, the environment, living and non-living organisms. We can only guess, what the results from misconduct will be.

Results of the research:

Water is a source of life, it is energy, infrastructure and a tourist challenge, the bearer of many functions of the planet Earth, so its importance is so great that it can in no way be described and explained in its infinity. The idea was to remind people to use water appropriately in an exemplary and sustainable manner, to protect and care for sustainable development. The aim was also to guide the country, local communities, schools and all organizations to find appropriate solutions for environment, nature and water protection. Research has shown that humanity has by actions and inappropriate interventions, already endangered the water content in the part which is necessary for the existence of humans and other living organisms. The results of the research show that there is less and less drinking water and so the irrational behaviour and the quantity of water reducing, continues.

Organization of the research:

We made an extensive review of the records on earth, water, human, and living organisms that are available, which were also an inspiration for the organization of the research. We visited many museums about water and looked for data that would allow us to obtain the best possible records for new genera. It was necessary for us to review statistical data from the Statistical Office of Slovenia for waters, rivers, streams, rainwater and other forms of water flow in Slovenia and we decided to focus on the South-Eastern part of Slovenia and water system of this region.

Limitations of the research:

The research is focused on finding appropriate solutions for water in the area of Lower Carniola, White Carniola and region of Posavje, but also thematically includes a wider area and research matter. Our limit was to find an appropriate solution for setting up an organization, society, institution or similar form that would systematically, methodologically, scientifically, pedagogically and much

more broadly, raise awareness of the need to protect water, land, nature and our environment to present and future generations.

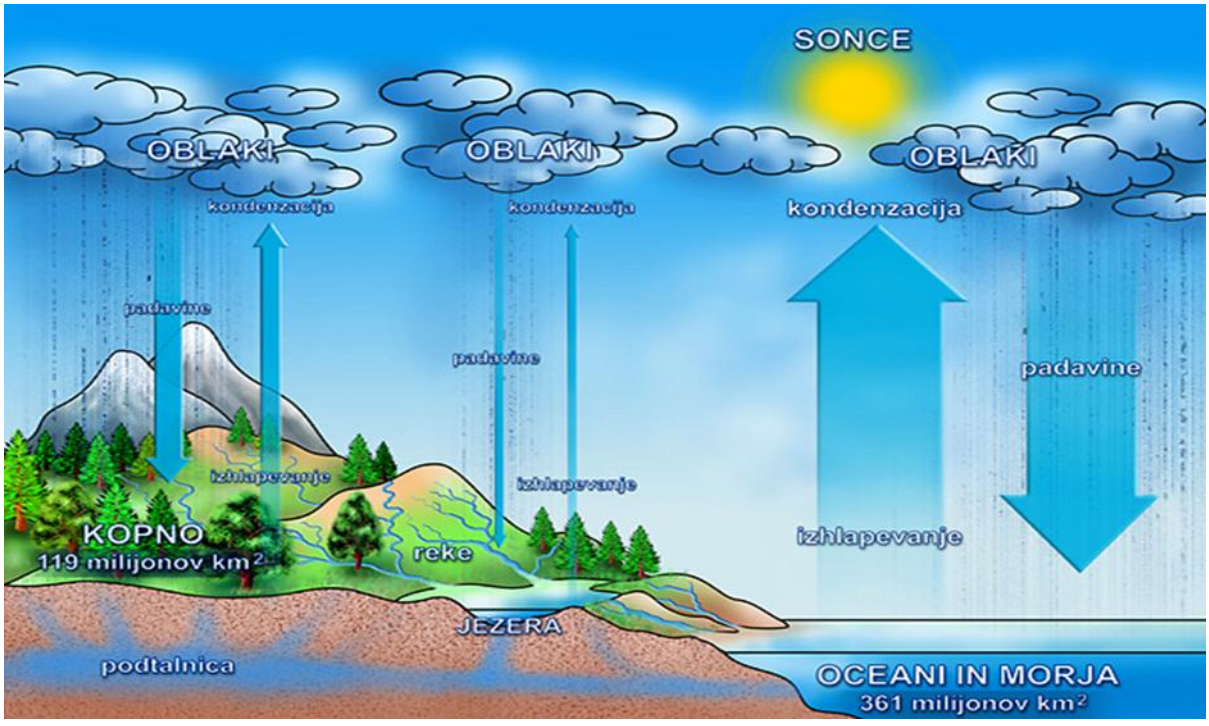
Key words: *water, earth, human, environment, nature, organisation.*

1 INTRODUCTION

In the introductory part, we consider water as the fundamental and main source of life for all living beings on earth (Wikipedia, 2020). In the past, it was a base for the organization and establishment of human society, as the first civilizations, settlements, castles and later cities that still function today, emerged by surface waters. Water is recorded as the first form of infrastructure, while today, it is the most widespread form of infrastructure, on which extensive navigation is carried out for the needs of the economy, industry, development companies, tourism, trade and much more. Throughout the human evolution, there have been multiple records, which testify that ignorance and inadequate hygiene had led to diseases that often destroyed entire civilizations, which led to greater use of water for hygiene, nature conservation and protection of water and water resources. In recent times, water has become a value that is important for the entire existence of all living beings, that's why many international organizations have organized international conferences to propose to countries the adoption of legal norms that would protect and limit the use of water and water resources. There are records in history museums, which testify that through human evolution, many civilizations were extinguished due to diseases. Numerous health organizations and institutes have conducted research to explain that civilizations disappeared because of water-related issues or that water was a carrier of disease due to unsuitable water usage. Therefore, the World Health Organizations have demanded that, in order to ensure the health of civilizations, regulations must be adopted, which will ensure clean drinking water and introduce sanitary systems. Slovenia followed, supplemented and changed world regulations, thus protecting nature, the environment, water and other natural assets. More recently, Slovenia has adopted a Resolution on the National Program for Protection against Natural and Other Disasters from 2016 to 2022 (Official Gazette of the Republic of Slovenia, No. 75/16). From a pedagogical or educational point of view, it should be clarified that water in nature is a pure, colourless, translucent, odourless and tasteless, which by its natural movement, evaporation, flow and fall, creates seas, lakes, rivers, streams and other forms, supporting the ecosystem of our planet (European Parliament resolution of 8 September 2015 on the follow-up to the European Citizens' Initiative "Right to Water" (2014/2239 (INI)). The basic form of water flow in its ecosystem is evaporation, which changes and returns in the process as precipitation (rain, snow), which is the basic fluid of all living organisms on Earth. Picture 1 illustrates this unique and natural process that repeats, renews, and changes cyclically over seasons. The methodology of our study guides us to learn more about individual processes related to the formation, use, filtration, evaporation and creation of a

natural water cycle. Water as a living being circulates, renews, changes and provides life to millions of organisms, minerals and to everything that exists on planet Earth. Just as a reminder, we mention the synthesis of water, where two hydrogen atoms and one oxygen atom combine into water, namely $H_2 + O = H_2O$, where hydrogen and oxygen are reactants and water is a product.

In addition to the basic properties of water, it should be understood that water has an interesting economic, industrial, market and tourist point of view, and its role has been important for millennia, as it was the first infrastructure to enable navigation and movement of people, transportation of goods, humans and capital. It allowed trading and integration of different civilizations, industrial development and technological progress. Due to its properties, content and mobility, water also has power, which is the driving force for performing various works, like producing electricity. In modern times, it is increasingly seen as a green earth resource, which isn't interfering with earth, air or space around us and is without pollution, obtaining the necessary energy for the functioning and existence of humans, society, economy, industry, market, tourism and much more.



Picture 1: The water cycle

Source: https://sc-s.si/joomla/images/2-2-2-REK-Ekosis.-Kro%C5%BE.sn.-2015-2016.pdf

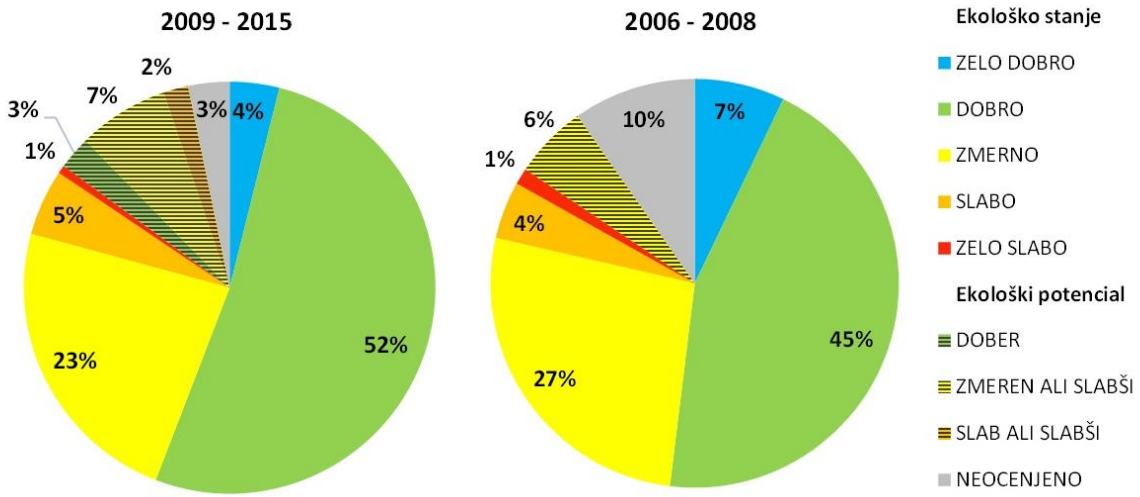
More recently, scientific institutions have discovered that part of the water on Earth is older the planet itself. It is said to be even older than our solar system (we didn't list the sources, because data about water is recorded and available in many encyclopaedias, books, professional articles).

We are realizing how important water is, so we are increasingly aware of the need for its protection and appropriate use, and even in civil circles and NGOs, ideas are spreading about its protection in order for it to remain clean and accessible to all people and all living beings. The found records clearly indicate that even the basic human community (in the prehistory) took care of drinking water as the primary social activity of every organized community of people. In order to exist and develop, social communities (in the first forms of local communities and later countries, unions, etc.) began to introduce a certain legal order by adopting legal norms that through services and institutions in charge of drinking water supply ensured clean drinking water for everyone under the same conditions. This is ensured by sanitary systems, which are responsible for supervising and controlling the preservation of clean water and thus the health and life of people and the entire system of living beings. Unfortunately, empirical data shows that through human evolution (most of the world even today), seas, lakes, rivers and streams have served as natural ecosystems or treatment systems (today treatment plants) that carried all the dirt away from human society (this is the utopia of society, as all the dirt lands somewhere). Such treatment actually meant that sewage was only dispersed, which nature then absorbed and occasionally returned (e.g. the sea returns garbage), but it cannot do so indefinitely. The development of civilization, science, school and other forms of education, have led to awareness and recognition of the importance of water and the need for its protection. Science, industry and social structure have dictated the development of technology that enables the renewal of water and water resources, and that same technology enables the purification of used water. This system at least tries to help nature and humanity in its existence.

Picture 2: A drop of water is a drop of life

Source: https://twitter.com/uberfacts/status/516766135778557952

Through social and especially through industrial development, there has been a realization that water is the basic source of life and is next to food, the liquid or energy that is essential for the existence of civilizations, people and their communities. It has also been realized that water is the liquid that enables the preservation of the green planet Earth and everything must be done to keep it properly clean and usable in sufficient quantities. Of particular importance in the human life is drinking water, which is intended for drinking, cooking, food preparation or use for domestic, industrial and other purposes that enable the existence of society. It is very important to constantly monitor the quality of water, which services and institutes for the protection of human health and life divide through parameters into microbiological, chemical and physical. In practice, due to the most common acute consequences, it is important to pay attention to microbiological parameters and tests that show what are the permissible values of interference with water and what kind of water can be used for cooking, drinking, hygiene and the like.



Graph 1: Ecological condition of surface waters

Source: http://kazalci.arso.gov.si/sl/content/kemijsko-ekolosko-stanje-povrsinskih-voda-0

Through laboratory tests and other examinations, it is possible to obtain data showing how chemicals are normally present in water and whether there are higher or lower concentrations present that may be related to various diseases, health effects or possible chronic effects. In the interests of health protection, any detection of micro-organism or substances in addition to any immediate dangers, which are consequences of these, we need to consider the indicators meaning and the time dynamics of its occurrence, so if the accuracy is unique or constant and if the interference with drinking water was higher or lower. With laboratory tests, it

is possible to get an answer as to what kind of water a person drinks and what needs to be done to protect and preserve water in its natural form and cleanliness, so it ca be used. Technological development and technology enable water to be supplied to all parts of the earth, all settlements and all cities, and in the quantities that the people need. The question is how much drinking water is in stock and how much of it will be left if the inappropriate use continues. The technology allows us to bring water from remote places to compact urban settlements, and separate the sewage in an appropriate way by using a sewage system, where its treated and properly separated from clean water. An important factor are extremely favourable social conditions, which enable better living conditions that has led to a sharp increase in the population, and thus the need for clean drinking water. Along with population growth and better living conditions, a faster way of life dismissed the individual's concern for nature. Humans produce large amounts of waste, especially non-degradable, which pollutes the environment, groundwater and aquatic and terrestrial animals. This raises questions of whether the technology is capable of cleaning and whether water is by itself an element that is through the described movement, circulation and the cycle of formation, through its currents, canals, rivers, lakes and seas, capable of restoring and maintaining the entire cycle on earth. This is an area that has been researched a lot and at the same time it is an area where there is still a lot of room for science, profession, people and civilizations to identify, research and care for water.

1.1 The Research Area

The research area was focused on the search for natural, human, economic or industrial phenomena that affect and change the water condition, water flows and thus have benefits or are endangering drinking water and human existence. We searched for the causes of changes in water condition, changes in its content, properties, usability, drinkability, even movement or flows and even for factors that cause unwanted water conditions, while also keeping in mind different factors that pollute water. At the same time, we looked for legal and other similar levers that would, through certain procedures, improve the use and processes of water, determine its importance and define the activities for which water can be used, such as energy. The aim was to determine the causes of harmful behaviour of humans, economies, industry, companies, natural or legal persons who, through their activities, work, use and influence cause unnecessary pollution. At the same time, we tried to find useful data to explain how water can be used for energy, infrastructure, tourism, travel, etc.

In order to acquire necessary knowledge about water, we first defined the term “drinking water”. We started off with the fact that the water we drink is three million years old (Wikipedia, 2020) and we were wondering what needs to be done, so the water will stay usable. The Republic of Slovenia has determined the conditions of use in the Constitution (Official Gazette of the Republic of Slovenia,

No. 33/91-I, 42/97 - UZS68, 66/00 - UZ80, 24/03 - UZ3a, 47, 68, 69/04 - UZ14, 69 / 04 - UZ43, 69/04 - UZ50, 68/06 - UZ121,140,143, 47/13 - UZ148, 47/13 - UZ90,97,99 and 75/16 - UZ70a) and wrote in Article 70a that everyone has the right to drinking water, that water resources are public and managed by the state and serve as a sustainable supply of drinking water for households, it cannot be marketable and that the supply of drinking water and water for household care is provided by the state through self-governing local communities directly and non-profit. From a legal point of view, the state already ensured access to drinking water for all, under equal conditions and at the same time prevented anyone from claiming the right to water and restricting it to anyone. Subsequently, the State wrote in the Rules on Drinking Water (Official Gazette of the Republic of Slovenia, Nos. 19/04, 35/04, 26/06, 92/06, 25/09, 74/15 and 51/17) that water is defined in its original state or after the process of preparation and is intended for drinking, cooking, food preparation or other household purposes, regardless of its origin and regardless of whether it is supplied from the water supply network of a drinking water supply system, cisterns or as packaged water. With that, the state has legally protected itself from unnecessary definitions which could be set by institutions, companies, or individuals. The policy takes into account all water used for drinking, cooking, hygiene, production and marketing of food. We also found records of experts from the Water Institute of the Republic of Slovenia, who stated that in Slovenia there are no legally harmonized definitions regarding certain terms related to drinking water. In the document of the institute, we found records on the preparation of a proposal for definitions of water, which divides water into surface and groundwater sources, water resources, potential and reserved water resources, reservoirs and reserve reservoirs [Water Institute of the Republic of Slovenia, 2015], but no special concerns were written down, so we looked for them in the Constitution and the regulations. Hereinafter, the Water Act (Official Gazette of the Republic of Slovenia, No. 67/02, 2/04 - ZZdrI-A, 41/04 - ZVO-1, 57/08, 57/12, 100/13, 40/14 and 56 / 15), states in its 2nd article that the goal is to manage the water itself and land near water and coast, so good water status and other water-related ecosystems can be achieved, to ensure protection against harmful water effects, to conserve and regulate water quantities and promote sustainable water use, which enables different ways of using water, taking into account the long - term protection of available water resources and their quality. Article 4 defines that the management of waters and water and coastal lands is within the competence of the state, except for those tasks for which the local community is responsible under this law. It is a reasonable use by which local communities commit themselves to providing adequate amounts of drinking water for their use. The use and other interventions in waters, lands near waters, coast and protected and endangered areas, as well as agricultural, forest and building lands, must be professionally programmed, planned and carried out in such a way that water conditions stay the same, while also protecting against water damage, preserve natural processes, natural balance of aquatic and riparian ecosystems, and protection of natural values and areas that are protected under nature

conservation regulations. By doing this, the state primarily requires the appropriate use and handling of water by the constitution and law, and says that everyone is obliged to protect the quality and quantity of water and use it in a way that would minimize the impact on the natural balance of aquatic and riparian ecosystems in line with law and other regulations. We connect water with the environment, where it flows, uses, processes and with its movement restores, changes, and also affects all living and non-living things on the planet. The Environmental Protection Act cannot be ignored (Official Gazette of the Republic of Slovenia, No. 39/06 - official consolidated text, 49/06 - ZMetD, 66/06 - US decision, 33/07 - ZPNačrt, 57/08 - ZFO- 1A, 70/08, 108/09, 108/09 - ZPNačrt-A, 48/12, 57/12, 92/13, 56/15, 102/15, 30/16, 61/17 - GZ, 21 / 18 - ZNOrg and 84/18 - ZIURKOE), by which the State sets out the following requirements. Article 2 of the Act states that the purpose of environmental protection is to promote and guide social development, which enables long-term conditions for human health, well-being and quality of life, as well as the preservation of biodiversity. The law sets goals that include prevention and reduction of environmental pollution, preservation and improvement of environmental quality, sustainable use of natural resources, reduction of energy use and greater use of renewable energy sources, elimination of the consequences of environmental pollution, improvement of disturbed natural balance and restoration of its regenerative capacity, increasing the material efficiency of production and consumption, and abandoning and replacing the use of hazardous substances that interfere with the environment and space.

The research area was focused on defining water, environment and factors that can affect the protection of the environment and drinking water, but for the general identification of the needs for protection of the environment, space and water, we also listed the legal sources that cover this area. This was necessary in order to set the appropriate hypothesis of the research, with which we wanted to direct the research to find appropriate solutions and answers, how man intervenes in water and the environment and what he can do to improve environmental protection and clean water. At the same time, we wanted to encourage a debate on how and to what extent water, nature and the environment can be regenerated on their own and what role water plays in this. We followed the guidelines of sustainable development, which includes the idea of the development of human society, while avoiding the dangers posed by focusing on quantitative material development by depleting natural resources and polluting the environment. Through sustainable development, the present man, the present generations of people, are supposed to preserve biodiversity. We present the definition of the Brundtland Commission (Gro Harlem Brundtland, 1987), which wrote that sustainable development is the development that deliberately and in moderation meets the needs of the present mankind, without compromising the ability of future generations to meet their own needs. In 2005, the United Nations included three key pillars in the Sustainable Development Strategy, which should be a guide for economic and social development and environmental protection. According to some United

Nations forums, in accordance with the Universal Declaration on Cultural Diversity, sustainable development should have a fourth pillar, represented by cultural diversity (Jankovič, 2015, p. 7). In this context, an interesting part is environmental sustainability, as it represents the process by which man ensures that current interactions with the environment are in accordance with the principle of preserving the environment as naturally as possible, constantly striving for ideal conditions. At the same time, the care for the environment and responsible use of natural resources must also be part of the economic development strategy. With consistent care for the environment, economic development must focus on all members of the community and not just some (Jankovič, 2015, p. 8). Being aware that water has a special significance in the entire sustainable development, as the surface and visible part of the planet is covered with 29% of land and 71% of water, we wonder what role water plays in preserving the planet, ecosystem, all living things and organisms. How far will man's actions interfere with the depths of the planet and pollute water, and what can water, as a liquid that sustains the planet, help the planet and its inhabitants?

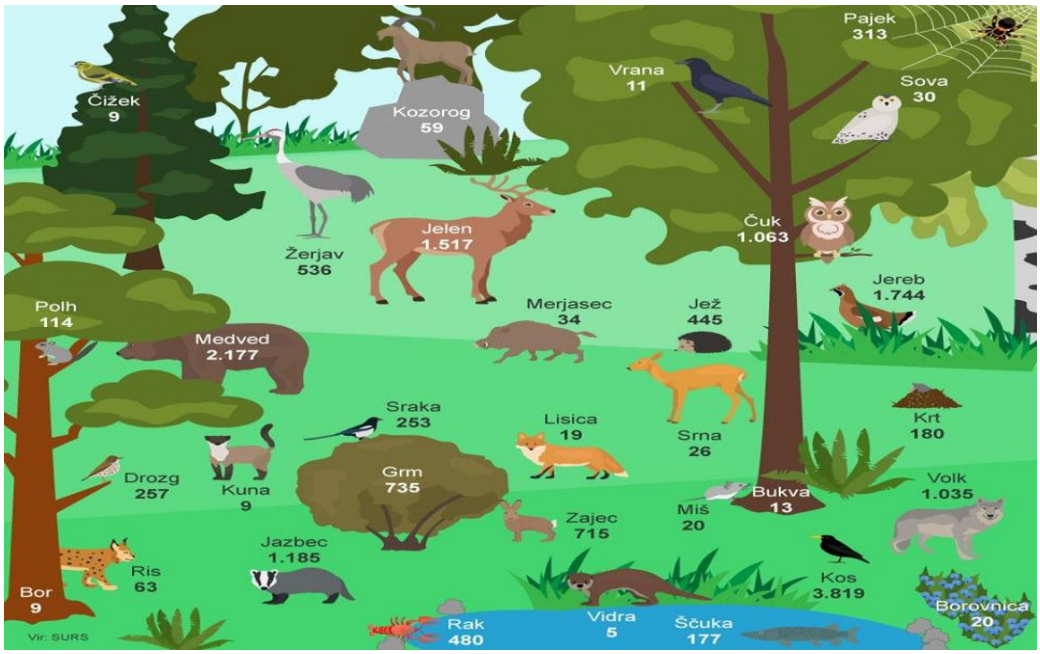
1.2 Fundamental hypothesis

Through various phases of the importance of environmental protection, the importance of water for humans, the economy and industry, we systematically searched for factors that can affect, change, improve or worsen the environment, water and other elements related to human environmental policy. We searched for answers, evidence of already known improvements and guidelines from the past that would broaden our horizons of knowledge and show the right decision about the applicability of the research hypothesis. The mere recognition of the need to protect drinking water, to protect the environment, nature, natural and other resources, was sufficient reason to show interest and the need for activities and measures to promote people's mind set and awareness of the need to protect the environment and water. We see intellectual capital in people, which can be widely used to raise awareness of the importance of water, the importance of preserving the environment, protecting the environment and guidelines for sustainable development. In this connection, we see the importance of management in various fields of economy, industry, tourism and education, which through its operation can promote systems of protecting of the environment, water, society and everything that is important for the preservation of the Earth. If we look at the results of science, profession, educational processes, institutes, governmental and non-governmental institutions, groups and individuals through the study of methodology, we get a lot of data and information that allows us to form our own opinion and scientifically or professionally explain or define the obtained data. In order to avoid describing and citing authors who, through studies of the organization and management of companies, corporations or other organizational forms, through industrial processes, tourism, logistics, robotics, financial flows,

legal basis, etc., have created or analysed different views on water and protecting the environment, we have limited ourselves to studying the area that is interesting and through which we can clarify, confirm or refute theses of what water represents to man and what man can do to maintain water and a clean environment through findings, verification and study of existing data. We put forward a rather abstract thesis: "Water is the liquid of life, and the environment is its preserving vessel." From a scientific point of view, we have studied many theories of different authors whose works are related to water, the environment and sustainable development. Since water is also a form of infrastructure through which transport by watercraft is carried out, or a form of energy that can generate electricity, push or other forms of energy on its way, we also briefly touched upon water transport and mentioned some important authors. We mentioned authors who presented development needs as a strategic resource in the 21st century, such as Pupovac (2003, pp. 1-2), knowledge as a factor in creating is a competitive advantage (Sundać, Fatur, 2004. p. 1- 2), tourism business through 100 questions and 100 answers (Šimić, 1994), Zelenika through development systems of logistics, transport economics, (Zelenika, 2010, pp. 501-527) catering and hotel industry (Zelenika, 2005, pp. 501-511), Innovation (Beganović, 2016, pp. 131-153), etc. In Hoppe (Hoppe, 2012, pp. 43-51) we analysed the course of natural changes in society and the impact on development, and in Kajzer (Kajzer, 1998, pp. 39-54), we looked into the restructuring of companies through intellectual development. Methodologically, the common goal of the study of different authors through the obtained data and information was to explain in general, what environmental protection means for the economy, industry, organization and tourism, how they are interconnected with the environment and natural resources and how water and watercourses can be used through sustainable development for the general progress of mankind. Water also serves as the innovation for the individuals, organizations, companies and society, while intellectual capital is the one that responds appropriately and gives added value.

1.3. Vision of the research

Through the study of individual areas related to the protection of the environment, water and the ecosystem on Earth, we systematically divided the areas and looked for those useful links that give importance to the common research area. We learned that knowledge about a certain field can be presented as a sum of human knowledge, its ability, creativity, skills, innovations, experience, its culture, perhaps motivation, acquired information, available databases, human patents, licenses, intellectual capital, etc., which man, as an individual, unites within himself or within a particular activity.



Picture 3: Living things that needs drinking water and a safe environment

Source: Statistični urad RS – SURS, 03. 03. 2020, najdeno na internetu

How knowledge is useful within science and for the needs of science, often depends on the existence of economic, legal and other interests, released through the need to seek certain confirmations or refutations of the technique and technological potential of an individual, group or wider community, which can be used for research, economic, industrial, social, tourist and other purposes. Altogether, it means mastering individual procedures or processes that enable the development of society and the environment, the safety of people, the preservation of the environment and water and the entire Earth. This humble review of the theory was the basis for finding a vision of development that we relied on water, which is the fluid of life, and the environment is its preservation vessel. Due to the scope, the breadth of the research area and the realization that much has already been written in this field, we decided to study water, watercourses and their effects on the South-Eastern part of Slovenia. Our goal was to come up with appropriate answers that would confirm or refute our hypothesis and at the same time, show us how we handle water in this research area, what are the natural potentials, what is the use of water and water flows, what are the economic, weather and other effects. Consequently, we would be decide whether the obtained data is a sufficient basis for the placement of a special institution, establishment, company, society or non-governmental organization, which would ensure that the obtained data in terms of education is passed on to new generations, pupils, students and the entire population.

2 STARTING POINTS OF THE RESEARCH

To better understand the research area of South-Eastern Slovenia, it is necessary to present the area at NUTS 2 level classified in Eastern Slovenia and with 2,675 km2 it is the largest Slovenian region at NUTS 3 level. It represents 13.19% of Slovenia's territory. More than ¾ of the region is covered in forests. Agricultural land occupies 20%, built-up area 1.8%, and roads and railways 1% of the region's area (Statistical Office of the Republic of Slovenia, Slovenian Regions in Figures, 2012). Geographically and sociologically, South-Eastern Slovenia is divided into Lower Carniola, White Carniola and Kočevsko-ribniško. Spatially, South-Eastern Slovenia is very diverse. With the exception of Novo mesto and some larger urban centres (Kočevje, Ribnica, Trebnje, Črnomelj, Metlika), rural settlements and a diverse traditional cultural landscape and naturally preserved, mostly forest areas predominate in the Kočevje region. The region is characterized by natural potentials (thermal water, agricultural land, wood and landscape diversity and relatively unpolluted environment), as well as a considerable distance of some parts of the region (White Carniola, Kočevsko-ribniška) from the main traffic flows and borders with Croatia. As is the case in the entire country, there is also a shortage of building land in South-Eastern Slovenia. In SE Slovenia, the urban-industrial type of regional development structure predominates, with 47% of the population living in 37% of the territory and the majority of all jobs. This is related to intensive daily migrations (Regionalna zasnova prostorskega razvoja Jugovzhodne Slovenije, Acer, d.o.o., May 2006). Given the special development problems related to demographic problems, high unemployment, accessibility, large Natura 2000 areas and underutilized border location and natural resources, the municipalities of Metlika, Črnomelj, Semič, Kostel, Kočevje, Osilnica and Loški Potok have established a Regional Development Partnership Pokolpje (ORP Pokolpje), in which specific development support measures are implemented (in accordance with the 7th Program for the Promotion of Competitiveness and Development Support Measures for Pokolpje in the period 2011-2016).

We looked for the starting points for our research in the area, facilities, nature, geographical changes, water resources, watercourses, energy potentials, agriculture, the environment, tourism and much more. The covered area of South-Eastern Slovenia is a diverse hilly area, which is overgrown with forests and inhabited by rural settlements, and in between, towns and larger settlements have been formed mainly along rivers. The highest peak is Gorjanci, which has on its southern and northern side numerous springs and streams, which in the north merge into the river Krka and its southern part into the river Kolpa. The rest of the springs, streams and other forms flow into the Sava River. Both the Sava and Krka rivers flow along a varied part of the land, which changes geographically and passes from narrow areas into wide valleys, which together with the rivers form a beautiful environment. It is very similar with the river Kolpa, which along its border line between Slovenia and Croatia forms a beautiful environment and a transparent landscape, which is full of water and is suitable for the development of

tourism. The land between the rivers is cultivated land or meadows, and in the hilly parts, the land is planted with vineyards, among which tourist vineyard cottages that are unique for Slovenia and the world, can be seen.

When we talk about the energy potential of water and the connected environment in South-eastern Slovenia, it should be mentioned that the energy potential was important for the starting point of the research, especially the Sava River, where several hydroelectric power plants are built. All buildings are built as nature-friendly and do not stand out in the sense of looks, size or use. Friendly riverbeds have been built, where the water slows down, settles, stands still and again passes into the rapids at the hydroelectric power plant, where it breaks, cleans and mixes with the air, as in a natural rocky area. This process causes the development of various habitats and living beings that enrich the flora and fauna. In the final part of the Sava River, before crossing the border with the Republic of Croatia, is the Krško Nuclear Power Plant, where water has the task of cooling reactors, which it does not mean water or environmental pollution, as the intervention is short and very natural and there is no change in temperature of the water. This is also evident in the fact that before and after the Nuclear Power Plant, traces of habitats can be seen and living beings are reproducing and enriching the riverbed. The Krka River does not have the same volume of water in its river flow as the Sava River, so more dams have been built along its path and in its riverbed, as to create reservoirs that calm the water, allow it to settle and, similarly to hydroelectric power plants, the water on the dams changes, mixes with the air and thus enables the development of habitats and living beings in and along the riverbed. In its lower part, in the immediate vicinity of the Brežice hydroelectric power plant, the Krka River flows into the Sava River and thus completes its journey. Many settlements and towns have grown up on the banks of the Krka River, such as Žužemberk, Straža near Novo mesto, Kostanjevica and many smaller settlements. There are several towns on the banks of the Sava River, especially Sevnica, Krško and Brežice. In the past, due to industry, faeces and similar impacts, there have been many encroachments on the river, which has had consequences for nature, the environment, habitats and many living things in the water. Today, modern technology and the consciousness of people and industry leaders, has led to the modernization of wastewater treatment processes and today the intervention in the river is minimal and harmless to habitats and living beings. By its nature and importance, the Kolpa River, which borders Slovenia and Croatia, is more interesting for tourists, and its flow, water bed and water are protected by law. Therefore, interventions in it are particularly limited. All three rivers with their tributaries are interesting from an economic, industrial and tourist point of view. There are also thermal waters, which conditioned the creation of health resorts, which were built by the ancient Romans. Today, Dolenjske Toplice, Šmarješke Toplice, Čateške Toplice and many springs operate in the area of South-eastern Slovenia.

When we talk about water, its purpose and especially its use for the needs of tourism, we are always looking for elements that are interesting to study, analyse and search for those things that attract people. Numerous researches say that water in its environment and its form and either surface or underground, is interesting to certain people, who study its content, flow, movement, nature, influences, renewal and attractions. In the field of research, it should also be noted that the water in the South-eastern part of Slovenia, with the mentioned rivers and tributaries, is interesting for many visitors, but it cannot be fully confirmed that all its possibilities have been used for this purpose. When we talk about water, tourism, facilities and staff, we must always ask ourselves what is the intellectual capital of the people involved in the study, management, leadership or organization of tourism. When we talk about tourism as an economic branch or the processes necessary for the development of tourism and the economy, we must look at the processes and authors who have focused their studies on clarifying the concept of intellectual capital as an economic category necessary for tourism development. We decided to cite the author Stewart (1997), who has through research in tourism, economy, industry and beyond, defined intellectual capital as the sum of organizational processes, skills, patents, innovations, abilities and experiences of individuals, including in the tourism process, such as technology and information on suppliers, customers and market demands, and the accumulated knowledge of an individual, acquired during its development. According to him, knowledge that is generated within an individual activity is important for tourism and can be used to prepare or create a competitive advantage in the market, which in practical terms means that intellectual capital is the sum of all knowledge within tourism or other industries, which determines a competitive advantage in the market or an area, either economically or in individual industries. The same definition could be applied to the field of energy or any field of economy, entrepreneurship and the like. Through research, we traced the author Beganović (2016), who saw the potential in larger or smaller companies for tourism development or water and water resources management, nature management, energy and other resources that have an impact on water and water flows. His findings can also be used in a meaningful way through the organization of tourism companies and their activities, which as smaller companies have a great influence and potential in tourism and are important for the organization, management and development of intellectual capital.

The starting point of the research is also the economic category, which is absolutely necessary for the development of the economy, tourism and other areas. It is absolutely necessary while determining the knowledge or knowing the individual areas of society, so we mention Sullivan (1998), who through research brought knowledge and management to the forefront, which he defined as knowledge and skills that can be absolutely marketed and used to make a profit. Here are some other authors who are interested in areas related to our research, namely Mulej, who sees development through innovation (Mulej, 2000), Lauc, who presents methods of social development (Lauc, 2000) and again Mulej, who

presents ways and successes of management in economic development, tourism and beyond (Mulej 2013). At Hoppe, we looked at changes in society and the impact of society on the development of various systems (Hoppe, 2012). We also looked at Kaiser and many other authors, but they were more focused on finding ways of management, governance, intellectual capital, and more broadly, which was not interesting for the starting point of our research. The author Colarič-Jakše, (2017), who mentioned water and wine as a basis for food and tourism in her writings, was also taken as the starting point of our research.

3 RESEARCH METHODOLOGY

As part of the research, we studied and assessed individual elements related to water in the South-Eastern part of Slovenia and looked for measurable and manageable data that would support our hypothesis. We used the method of statistical data, which showed the state of waters in the Republic of Slovenia, how the country presented its rivers, streams and other water sources in terms of cartographic, written and cadastral, geological, catalogue and educational regulations. We studied natural phenomena and time changes during the seasons, and in this way obtained data on the quantities and quality of water flow through riverbeds and facilities located in the river area. We also looked for data on precipitation amounts, type of precipitation, meteoric waters, and changes that affect water flow in its natural or artificial environment. We used the method of studying and evaluating data, which explained the reasons for the deviation of plus or minus, thus obtaining a relevant starting point for learning about individual areas of work in tourism, energy, economy, care and the like. These data was the basis for recognizing the situation and for finding appropriate methods that would teach us what else could be done to improve flood safety in the south-eastern part of Slovenia, ensure a constant supply of drinking water, improve tourism and accelerated the economy. Our goal was also to make a proposal on the basis of the collected data for the establishment of an appropriate institution, institute or company that would teach new generations about water. We also used the empirical method to make a review of the past, which would show what impact water had on the environment, what the interventions in water were, what the supply of the population is and what the economic development opportunities of society were. We also examined the effects of the Slovenian and European economies on watercourses and water, which we compared with the current state of rapid changes in economic and production forces, rapid market changes, digitalization of the world, robotization of production and tourism. In order to verify legal interventions in water and watercourses in South-eastern Slovenia, we also used the legal method, through which we formulated individual statements and relationships in the functioning process of organizations and activities (Murtič, Jankovič 2018). A wide range of research methods and methodologies can

be included in the research, but the field is so broad that it is simply impossible to cover it in one research article, which we left for the next research.

4 THE COURSE OF THE RESEARCH

Due to the scope of the research area, we systematically directed the research to the geographical area of south-eastern Slovenia, being aware that water and water flows from the wider area of Slovenia have a strong impact on the water status in the research region. Slovenia is a Central European country lying below the Alpine world, which is slightly inclined to the south and southeast, which allows all waters, springs, meteors, surface and groundwater, in their natural flow and their natural path to seek a height drop, which allows water flow in the possible direction. In this case, all Slovenian waters flow south and southeast, only a part of the river flows are flowing from the mountains towards the Adriatic Sea. Most of the Slovenian watercourses, if we ignore the Drava and Mura rivers with their tributaries, flow into the Sava, Krka and Kolpa rivers, due to which larger amounts of water flow into the area of south-eastern Slovenia depending on the seasons. Natural watercourses have their own riverbed, which the water has made over the centuries or millennia, to which the land is also geographically adapted. There are also dry periods, especially in the summer, which contribute to soil erosion, which later allows the river bed to expand or change.

If we wanted to obtain real research data that would be measurable and would allow mutual comparisons, we had to take into account the findings of ARSO (Environmental Agency of the Republic of Slovenia, hereinafter: ARSO), which takes care of weather changes and collects measurable data. With their measurable data, we came to the realization that winter as well as autumn or spring periods are the ones that provide enough drinking water, water for electricity processing or for the supply of the economy, industry and population due to snowy or rainy days. During this time, water has large flows, no major industrial or other impacts, and can be with changes, cleansed and regenerated. For the research, we looked for extremes, especially in drought periods, which showed how we handle water, where we need it most, what its composition is, how and to what extent the economy, industry, agriculture and the general population influence the composition of water and its use. Useful ARSO data represent the Hydro meteorological conditions in Slovenia and conditions on 24th of August 2017, when a dry period was detected, which affected the composition, use and flow of water in the research area. ARSO states: “More weather-friendly days have arrived, and the heat has eased a bit in recent days. Last weekend, it rained all over Slovenia. The mornings were fresh at the beginning of the week, the lowest morning air temperatures were from 4 to 10, in Primorska up to 18 ° C. The days after the front crossing, it warmed up to 22 to 27 ° C. There was not enough rain to end the drought. In most parts of Slovenia, the amount of rain was between 20 and 30 mm but on the Coast, in the parts of central, south-eastern Slovenia and the northeast

it only came up to 20 mm. Most rainy area, with more than 40 mm was in the higher lying areas." Through these reports, it was possible to see that in the most drought-affected areas, rain only wetted the surface layer and river levels remained low, with poor quality water in them, which affected habitats and living beings in rivers. All waters in the research area are collected in Čatež, where the level of surface and groundwater flow is measured. During this dry period, the ARSO reports that in Čateško polje and in Šentjernej on Šentjernej field, it records the lowest groundwater levels, due to which Krško and Brežice are endangered by insufficient amount of drinking water. The condition of surface waters is not so endangered due to drought periods, as there are several dams on the Krka River that retain water and enable the survival of habitats and living beings in the river. On the Sava River, hydroelectric power plants have been built in series and at certain distances, with artificial reservoirs and enough water for a longer dry period. The condition, quality and usability of surface waters, which is applicable only to economic activity, industry, entrepreneurship, but is not suitable for wider use, such as drinking and the like, must be stated. The quantitative status of groundwater in the eastern part of the country is important, as it remains very low during dry periods and in some places reaches the lowest measured values of the long-term measurement period. Such an example is monitored by the ARSO in the area of shallow gravelly, sandy aquifers of the Čateško and Šentjernejsko fields. At some measuring points, the quantitative status of the aquifers of the Krško-Brežice basin is gradually improving, which is attributed to the impact of filling the accumulation basin of the Brežice hydroelectric power plant. According to ARSO, due to the flow through gravel lands, this water is purified and usable for drinking, cooking and mass consumption by the population. The ARSO specifically states that the state of the cumulative meteorological water balance deficit in the most endangered areas, which change greatly during precipitation and have a strong impact on surface and groundwater. In the south-eastern part of Slovenia, in the Krško-Brežice area and part of the Posavje region, in August 2017 the deficit in the second decade of August was around 350 mm, which showed an extreme drought. During the same period, a state of extreme drought was recorded in White Carniola, where it was measured that it rained below 20 mm in a few days, and the deficit of the meteorological water balance was 230 mm. In a statement, ARSO said that the drought ratio in the southeast of the country was comparable to 2003, which was considered one of the driest years in the last 50 years. The water in the rivers was polluted, the flow was insufficient and the oxygen levels in the water were very small, the water was contaminated by algae and algal blooms, causing the death of fish and other living things in the rivers. The finding show that water changes in dry times, is of lower quality and is poorly regenerated. Surface waters are the first to severely change (www.arso.gov.si ›news› files). In collaboration with researchers from other countries, we came to the conclusion that the water on its way through the Republic of Croatia and further through the Republic of Serbia is changing and is increasingly more polluted, carrying with it larger amounts of

garbage that people dump into the river, while this could not be detected in South-Eastern Slovenia.

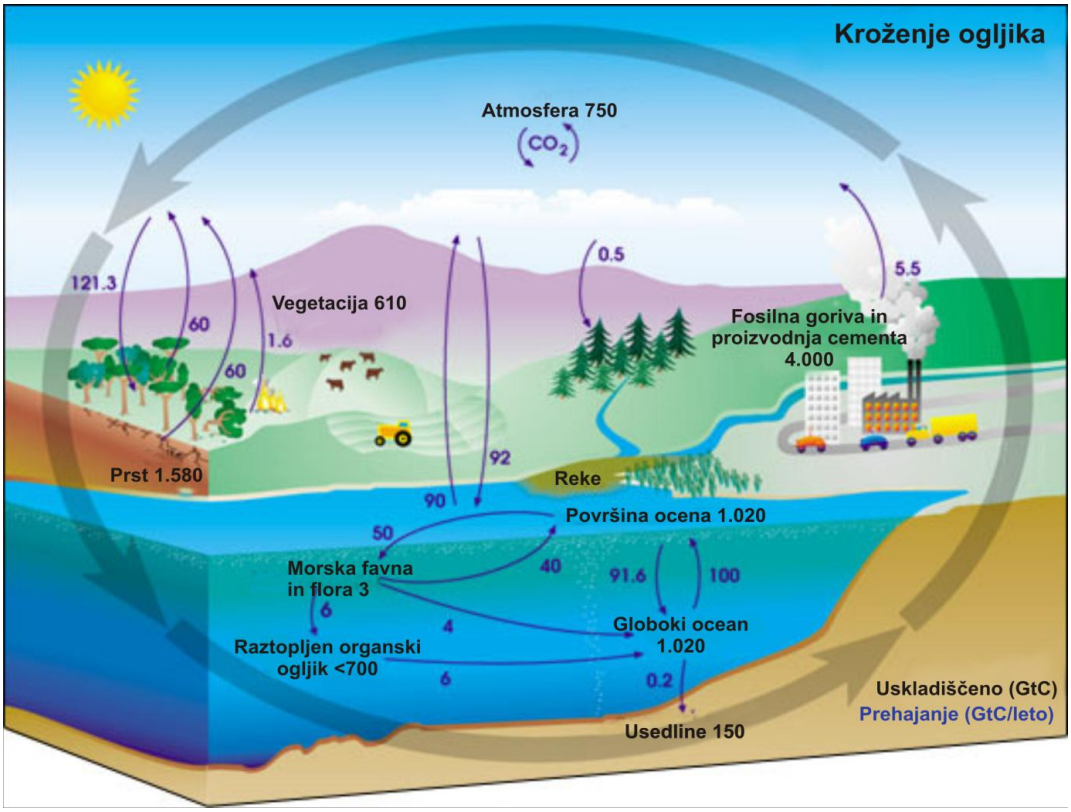
To present the state of water in the most extreme periods, it requires constant scientific research, expert reviews and practical implementation to obtain the most comparable data that would enable to detect any changes that could be an introduction to finding appropriate solutions to protect water, watercourses and the environment. Through a review of the available literature, we came to concrete regional development programs for the needs of environmental protection and thus also water, which were planned for the period 2014-2020 in the development region of South-eastern Slovenia. The drafters of the regional program found the basis for the preparation of the development program in the Decree on Regional Development Programs (Official Gazette of the Republic of Slovenia No. 69/2012), and the guidelines of the Ministry of Economic Development and Technology (MGRT) and the Act on the Promotion of Harmonious Regional Development (Official Gazette of the Republic of Slovenia, No. 20/11 and 57/12), which prescribed and established the strategic-programed framework for regional development, especially at the national and also at the regional level (www.rc-nm.si ›2016/11› RRP_JVSLO_2014-2020_March-2015).

The South-East region was also faced with the task of evaluating the results achieved from the previous program period and harmonizing the goals with the new program in the field of the environment, which also includes surface and groundwater. We also list interesting discussions and proposals for the determination of hydro-eco regions "Natura 2000 and water", which also covered Slovenia and its regions (Smolar et al., 2000). We could also mention many contributions and discussions on water, which is unnecessary, so we only mention Povž and Šumer (2003), who prepared an analysis of biological pressures and impacts on water, an overview and consequences of introductions and migrations of freshwater fish species in Slovenia and the impact on the assessment of the ecological status of water within the framework of the Water Framework Directive. We would also like to mention Urbanič (2004), who wrote about the ecology and distribution of caddisfly (Insecta, Trichoptera) in some watercourses in Slovenia. There are also many interesting authors who, through their works, wanted to give special attention to waters, watercourses and clean water, but their citation is too broad for this research.

4.1 Development of water care

Slovenia has a legally regulated area of water care and is written in the Water Act (Official Gazette of the Republic of Slovenia, No. 67/02, 2/04 - ZZdrI-A, 41/04 - ZVO-1, 57/08, 57/12, 100/13, 40/14 and 56/15), which is the basis for the regulation, use, maintenance and trade of water, watercourses, rivers, lakes and the sea. In Article 4 of the Act, the tasks of the state and local communities are

listed, while also defining that the management of waters, water and coastal lands is within the competence of the state and left the administrative tasks of water protection, water management and decision-making on water use, water and coastal management to the competent ministries and their authorities. It stipulated that the use and other interventions in water, water and coastal land and land in protected and endangered areas, as well as agricultural, forest and building land should be programmed, planned and implemented in such a way that the state of water does not deteriorate, that it enables protection against harmful effects of water, preservation of natural processes, natural balance of aquatic and riparian ecosystems, and protection of natural values and areas protected under nature conservation regulations. We can also find in the Constitution of the Republic of Slovenia (Official Gazette of the Republic of Slovenia, No. 33/91-I, 42/97 - UZS68, 66/00 - UZ80, 24/03 - UZ3a, 47, 68, 69/04 - UZ14, 69/04 - UZ43, 69/04 - UZ50, 68/06 - UZ121,140,143, 47/13 - UZ148, 47/13 - UZ90,97,99 and 75/16 - UZ70a) a request that is written into the law and says that everyone is obliged to protect the quality and quantity of water and to use water in a way that would have the least possible impact on the natural balance of aquatic and riparian ecosystems, in accordance with the conditions laid down by law and sectoral regulations.



Picture 4: Carbon circulation

Source: ARSO, Nacionalni program upravljanja z vodami, najdeno na internetu 2020.

If we extract from the provisions of the Constitution and the Water Act, we find enough reliable provisions that protect water and give users instructions on how to treat water so that it can stay as we need it for human development and sustainable development. We must not forget that the Constitution and the law have ensured that water is a public good and that no one can take it or use it under conditions that are not permissible. The country has adopted a national water management program to provide an overview of all measures and regimes related to water that are in force and are already being implemented, and to determine complementary measures if they are necessary to achieve goals of each planning period. The MOP program of water management measures is reviewed every six years and, if necessary, updated and then the Government of the Republic of Slovenia reviews and adopt it (www.gov.si ›Areas› Environment and Spatial Planning ›Environment› Water). The National Water Management Program is regulated by regulations in the field of water, environment and nature protection in a manner that is comparable to European standards and comprehensively addresses the areas of water protection, use and regulation. The program states that the basis for systemic regulation is, on the one hand, Slovenia's natural resources and, on the other hand, European legal acts, strategies and guidelines for water, especially the Water Framework Directive, good practices for mitigation, flood prevention and marine protection strategy. Their common and main goal is comprehensive and long-term oriented water management in a comparable way for all river basins of the Member States of the European Community and also those countries outside the community with which they share common river basins. The program states that as a basis for water management, the legislation determined territorial and institutional bases, financial resources, quality standards and instruments for the implementation of specific policy regulations. The holder of the preparations is the Ministry of the Environment and Spatial Planning, which is preparing instruments for the implementation of the water management policy. We list the water management program, as part of the NPVO together with operational programs and other activities, water management for the water area flowing into the Danube, which includes most Slovenian rivers, in our case the Sava River, which is also important for the Republic of Croatia and Serbia.

The national program shows the concern of the whole country and also the research area of South-Eastern Slovenia, which is designed to cover individual areas, but we only list the most important ones that have a strong impact on water change and quality. Agriculture has a strong impact on the status and quality of water, so the operational program for the protection of water against nitrate pollution from agricultural production, explains that agricultural land covers 34% of Slovenia's surface, which means that agricultural activity affects the quality of natural resources and biodiversity, while it also changes the landscape. Farmers are heavily burdening the environment, as they use an excessive consumption of mineral fertilizers, which reach values of around 400 kg / ha. Mineral fertilizers are mostly made of nitrogen fertilizers, which reach about 70 kg / ha, resulting in an average nitrogen input from livestock fertilizers of 154 kg / ha of agricultural

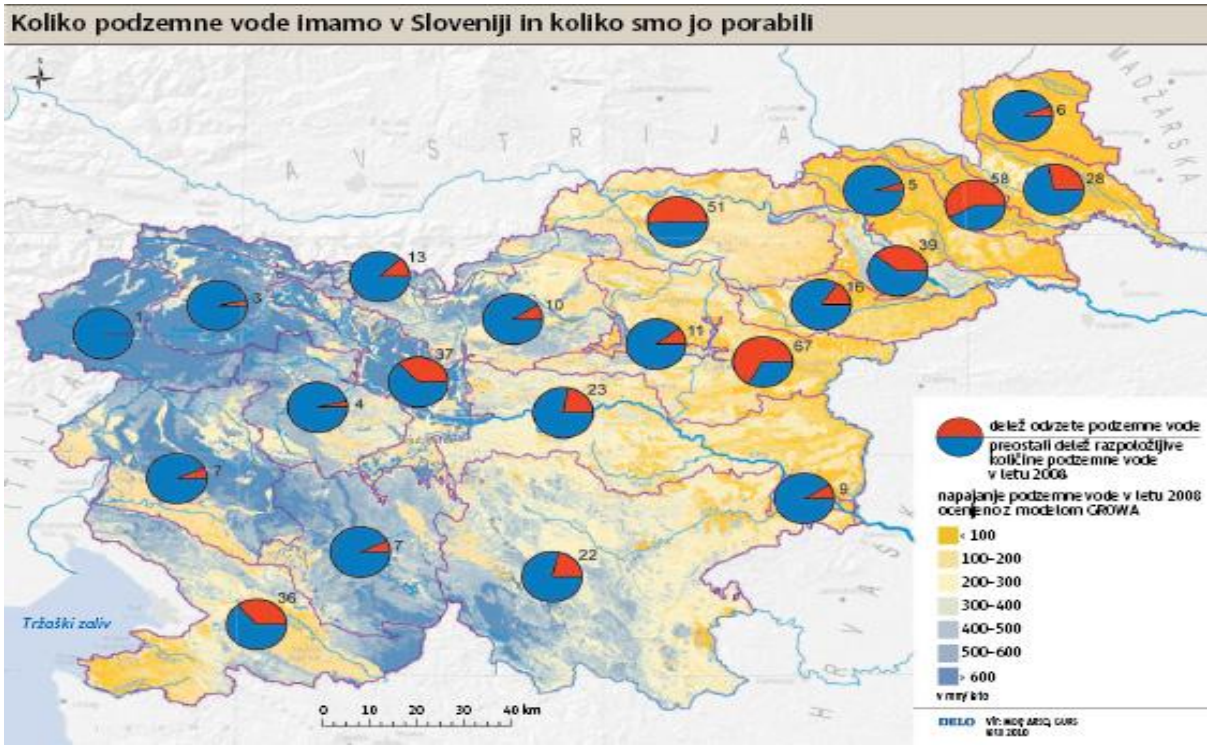
land. The second element of water care is the Program of drainage and treatment of municipal wastewater, which is a program of coordinated measures of the state and local communities to gradually achieve the goals of environmental protection from pollution due to the municipal wastewater. The regulation of municipal wastewater collection and treatment is the largest environmental investment for the Republic of Slovenia in terms of the amount of required investments, which was carried out until 2013 and continued until 2017, with the aim to reduce interventions in natural waters to the maximum level allowed by European regulations. Furthermore, the program predicted that pollution with hazardous substances will be reduced and gradually stop the discharge of liquids that directly or indirectly affect water and the environment. The program is very broad and provides for the protection of surface water, groundwater and other water sources from hazardous interventions and pollution *. The new NPVO 2030 is designed to preserve nature and a healthy environment in Slovenia and to enable quality life for current and future generations. The orientations, goals, tasks and measures of environmental protection are defined, namely the set measures for achieving the goals of the Development Strategy of Slovenia until 2030, which recognizes healthy nature and the environment among the strategic orientations for achieving quality life **.

We were interested in tourism in connection with water and water quality, as we generally know that tourism develops where there is a well-developed economic activity at the levels of economy, industry, agriculture, and spa tourism, the suitability of water for adrenaline sports, annual bathing or sailing on surface waters by vessels. Water is also interesting as an infrastructure that is not comparable in our research part of Slovenia, as rivers are unsuitable for navigation, except for sports and recreational purposes, which is sufficient for certain types of tourism. Otherwise, tourism is an economic activity based on people traveling for leisure, entertainment or business activity. In this context, a tourist can be a visitor from a neighbouring village or a foreigner who visited our place due to natural or cultural attractions, relaxation, entertainment or prestige (eucbeniki.sio.si ›geo9› index3). In comparison with the waters that flow mainly into the Sava River and flow from Slovenia through the Republic of Croatia and Serbia, the data showed that from the city of Sisak in Croatia onwards to Belgrade, it is navigable for larger commercial vessels. There are also organized examples of tourist trips, which purpose is tourist hunting, fishing or sightseeing in certain places along the Sava River. According to research by colleagues from the Republic of Serbia, the Sava River is in its final flow and outflow into the Danube River, heavily polluted by various industrial discharges, the values of chemicals and pesticides used by agriculture are increased. Groundwater then flows into the Sava River, which changes significantly, but it is also useful as an infrastructure, as a driving force for obtaining electricity, and its visible values also allow the implementation of certain tourist activities. Between Zagreb and Belgrade, there are several buildings on the Sava river, which are in the form of ships or rafts and they are mainly tourist facilities, such as inns, accommodations and the like.

5 DISCUSSION

Throughout the research, we looked for elements and evidence that tell us how we handle water, what the situation is in surface waters and groundwater, and what needs to be done to make water renewable. We found that Slovenia is a country rich in water, although water is not evenly distributed spatially and timely, as there are changes in amounts of water everywhere in nature. To compare and obtain measurable data, we also looked for specifics in less favourable periods, especially in dry periods. After reviewing the data over a longer period of time and according to the ARSO data for the periodic water balances 1971-2000, it is understood that more than half of the average precipitation (1579 mm) was runoff (862 mm). The most important process for the supply of drinking water to the population in Slovenia is the renewal of groundwater sources for the supply of aquifers. According to the data of the water balance model, in the period 1971-2000 the average supply of aquifers was 308 mm, which represents an average of more than 3,000 m3 of renewable annual amount of groundwater per capita in Slovenia (www.arso.gov.si-vode). Methodologically, we found that Slovenian rivers are suitable for the production of electricity, for the economy and industry, for tourist purposes, but it is not possible to ensure a stable or general supply of drinking water. Thus, the main source of drinking groundwater, which provides about 97% of the required quantities. This source of groundwater shows great spatial and temporal variability to more or less, which recently reflects the tendency of more frequent and more pronounced hydrological droughts of groundwater. According to world organizations, severe climate change is expected in the future, as well as crises in water supply, which is a clear indicator that much remains to be done in this area to preserve drinking water for future generations. According to ARSO, the state must improve the assessment of groundwater quantitative status, while also forecasting and warning against extreme hydrological phenomena (hydrological droughts in aquifers), identify areas of groundwater with frequent occurrences or trends of hydrological droughts and improve groundwater management in the field of population supply with drinking water and conservation of ecosystems that are connected to or are in contact with groundwater (indicators.arso.gov.si ›content› quantitative-restoration-of-groundwater). In the past, assessments of groundwater status in Slovenia were carried out, which were prepared for individual water bodies and were determined according to hydrogeological criteria and specific strain according to the rules on methodology for determining groundwater bodies (Official Gazette of the RS, No. 65/2003). The territory of Slovenia is divided into 21 water bodies (Official Gazette of the Republic of Slovenia, No. 63/2005). We need to clarify that groundwater bodies represent recognizable and important parts of groundwater in an aquifer or aquifers, which should enable transparent and efficient assessment of water status and management and the achievement of environmental goals. Depending on the effects of artificial (e.g. abstraction from aquifers) and natural abstractions of groundwater (e.g. capture of natural springs), individual water bodies are classified into groups of good or poor quantitative status, as shown in the figure below, which actually illustrates that there is more

water in mountain world (Arsowww.ar, so.si › vode › podzemne vode › Količinsko_stanje_podzemnih voda).



Picture 5: Groundwater in Slovenia

Source: ARSO, Metodologija ocenjevanja količinskega stanja podzemnih voda, internet 2020.

In order to get an understandable and measurable answer to how industry impacts water and water quality in south-eastern Slovenia (see number 9 on the map), we had to find data that explain the impact on the environment and only then the impact on water. The collected data shows that the impact of industry on the environment, due to the very nature of the industry and the form of consumption of raw materials and energy, is greater than the environment can withstand. Industry also needs water, so it is not surprising that most industries have chosen areas where there are sufficient amounts of water for their placement in the environment. Direct effects in the environment are the construction of industrial and associated support facilities, such as warehouses and facilities for the production of electricity, wastewater emissions, various gases and solid particles into the environment. The consequences of industrial operation are the production of smog and acid rain, which causes pollution of water and water resources. Water and water resources are also affected by the construction of infrastructure related to industry, cities and settlements, the construction of roads, railways, ports, airports, the construction of oil pipelines, power lines, cable cars, etc. The Kyoto

Agreement was concluded, which is also respected by the Republic of Slovenia. However, European environmental policy has adopted a number of directives limiting industrial discharges, thus at least partially ensuring the protection of the environment and water ***.

The use of water in industrial processes causes trillions of cubic meters of industrial wastewater per day, which manifests itself as municipal wastewater, but can be more toxic and contain larger amounts of heavy metals and artificial organic compounds (Janežič, 2003).

Due to inadequate processing, improper treatment and uncontrolled discharges into surface waters, industrial wastewater can cause problems that affect the lives of living things in water and habitats. We found that a good part of industry in Slovenia still discharges wastewater into watercourses without treatment, but we also found that the wood industry near the Krka River does not work, resulting in no emissions. Krka Novo mesto Pharmaceuticals Factory, Revoz motor vehicle industry and many other industries are connected to the huge municipal wastewater treatment system in Novo mesto, which prevents industrial discharges. In the area of Šentjernej and Čatež fields, discharges into groundwater are not exceeded, which is why we assume that the water in its normal ecosystem and the permitted quantitative ratio is of good quality and suitable for drinking and supplying the population. We also found that water on agricultural land is closely related to processes that are often carried out on or in arable agricultural land and in the soil. It is therefore understandable that any change in soil properties is reflected in the quantity and quality of water that occurs on agricultural land and flows forward into surface water or seeps into the soil and thus comes into contact with groundwater. Slovenia's agricultural policy is particularly interesting for the research field, as it is focused on finding appropriate solutions for the preservation of clean surface water and especially for the preservation of groundwater ****.

Rainwater and its discharge into rivers could not be ignored. These are waste waters contaminated with oils, fats, cleaners, acids, bacteria, viruses, alkalis, sand, human and animal excrement, kitchen and hygienic waste. Precisely because of the need to review rainwater management, we looked at systems in municipalities in the research area. We found that all the contents of the sewer, by gravity or pumps, are pumped to the treatment plant, which requires larger amounts of electricity and appropriate equipment, but this is irrelevant in the proportion of providing and maintaining clean water. They regularly inspect sewer pipes with modern video surveillance and eliminate problems with special trucks for the breakthrough and cleaning of clogged or closed channels. Municipalities also carry out regular maintenance work on the sewerage network, repair damaged pipelines and ensure uninterrupted flow 24 hours a day*****.

In the research area, tourism is developing and forms of tourist offers are being updated, also in connection with water and water resources. The constant task of tourist organizations is to promote partnerships in tourism (in) directly related

providers, design, promotion and marketing of competitive tourist packages that enrich the offer and reputation of the region of South-Eastern Slovenia as a tourist destination ******.

Through the discussion, we learned about the types and forms of water in the research area, defined watercourses and identified the advantages and disadvantages of South-Eastern Slovenia in protecting the environment and maintaining the quality of surface water and groundwater. The survey covered all the factors that in any way affect the shape, quality and river composition of the waters and gave us at least a partial insight into the identification of the water system and water cycle. Comparable data gave us enough answers and guidance to fully confirm the hypothesis, and we were aware at the beginning of the study that this is just an experiment, among millions of studies on water in the world, so we did not even expect to find any extreme findings. In fact, we have found that a certain level of water management hygiene has been achieved throughout the region and that both political, state and local foundations have been laid for the development and conservation of drinking water, which is reflected in sustainable development in water systems. In the research we mentioned the achievements in the Republic of Croatia and the Republic of Serbia, but only those that we considered important for our research in terms of the quality of water flowing from Slovenia into the Danube River, with the help of colleagues from these countries.

6 CONCLUSION

Water is the life fluid of all living things on earth, which is scientifically, in a chemical sense, represented as a systematic oxidant, chemical compound, or polar molecule, which under standard conditions is a fluid with the chemical molecular formula H2O. The formula shows that one molecule of water is made up of two hydrogen and one oxygen atom. Water can be found almost everywhere on Earth except in climate-altered environments such as deserts and dried troughs of lakes, rivers or seas. Scientific data and educational data on the composition of the planet say that about 70% of the earth's surface is covered with water, which otherwise has different shapes and liquid composition that makes its use different. The seas and oceans are characterized primarily as infrastructure for the transport of large ships and other vessels carrying cargo, people and capital. Rivers and lakes have a similar purpose, but they have a different meaning for supporting the economy, industry, businesses and individuals. All types of waters, with their forms of land and buildings, are also interesting in terms of tourism, as tourism is one of the largest economic sectors in the world, and its importance is still growing. This is due to a number of factors, from the transformation of industry into service activities to the growth of the middle class, which also leads to a change in the habits of users of tourism products in the field of travel and tourism. The development of tourism by tourist areas and countries is different, which will need to be taken into account when achieving the goal of the most successful continues

growth and development of this sector (Colarič-Jakše). Tourism and tourist activities of South-Eastern Slovenia represent a recognizable part of area, people and products that are interesting for users of tourist products, sightseeing and especially sightseeing of watercourses, hydroelectric power plants, habitats and living beings in the water. Through research and an overview of the environment and space, through factors influencing the environment, space and indirectly on surface waters or groundwater, we learned about the impact of the economy, industry, agriculture, entrepreneurship and tourism, where we learnt that in the past there were excessive interventions in water and water resources. Awareness of people, awareness of industry, national and local policies, EU regulations and the international communities have helped to preserve water, its quality and drinkability. A number of legal norms have been adopted regulating and controlling water use and interventions in water and watercourses, thus fulfilling a number of conditions for sustainable development and the provision of drinking water for future generations. The protection of living beings and habitats, the protection of flora and fauna is ensured. By reviewing a lot of literature, measurable data from the Statistical Office of Slovenia, ministries, local communities, companies and many governmental and non-governmental organizations, we came to data that justify our assumptions about water quality in the South-Eastern part of Slovenia and at the same time confirm our thesis that water is regenerating, improving, and providing conservation opportunities for future generations.

The obtained data inspires us to the idea of the necessity of establishing a society, institution or amateur association, which would in an educational way present all knowledge about water and watercourses, its meaning, water forms, formation and renewal of water resources to visitors, youth, students, pupils and pre-schoolers. The research team is leaning towards the establishment of a Water Museum, which would have and present all the data on water, its circulation, pollution, purification and use. The research group was established in 2018 and is preparing appropriate documents and documentation that would enable the creation of new educational institutions for our society.

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MANAGEMENT OF INTELLECTUAL CAPITAL IN THE PROCESS OF PERFORMING TOURISM ACTIVITIES

Abstract

Research question: We have identified how intellectual capital is defined as the capital needed for the development of tourism in the tourist area, what intellectual capital in tourism means and what it serves. We took into account the capacities of other areas that are not directly considered in tourism activity, but in the support of tourism, and without them tourism cannot function as an activity.

Purpose of the research: The purpose of the research was to determine the intellectual capital process in tourism, how the organizational structures take into account intellectual capital in their activities and what role they are devoting to. The main goal was to find out what kind of intellectual capital there is in a particular tourist area in the region.

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Method of the survey: We used a method of statistical data that showed the intellectual potential in the region and the capacities of the tourism industry. With the method of studying and assessing data, we got a starting point for getting to know the areas of work and profile of the personnel in tourism. Data were the basis for the identification of intellectual capital and the search for methods for improvement. Using the empirical method, we made an overview of the past, and with the legal method, we formally formulated relations in the process of functioning of structures and activities.

The results of the research: Tourism must seek the possibilities for personal development of the creators, plan work and allocate resources that will attract the best cadre, which will ensure adequate competition in the tourist market. The survey confirmed that it is imperative to invest in the development of the intellectual area in order to monitor the trends of global development, which is why we confirmed the thesis "Tourism needs skilled and educated people."

Organization of the research: Tourism is an activity that develops with the development of society, the economy and is progressing, as development has brought increased interest in travel and enjoyment in nature and tourism. Tourism needs an appropriate organizational model, intellectual capital, flexibility and flexibility of the market, monitoring the needs of users of tourism products and the operation of destination management.

Limitations of the research: Since tourism is comprehensive, we have limited ourselves to the south-eastern Slovenia - especially Dolenjska, Bela Krajina and Posavje. Restrictions were applied to the use of statistical data that are changing, and we used data that represent organizational structures as business secrets. A large part of the research is covered from the last five-year period, and a part of the empirical research is derived from older sources, since the newer ones only summarize the same sources and do not complement them, at least scientifically.
Key words: Tourism, intellectual capital, governance, organization.

1 INTRODUCTION

Intelligence is as the subject of study defined as the ability of an individual to understand, comprehend, be aware, learn, emotionally recognize, create and solve personal, business, social, collective and other problems, changes and tasks. We recognize it as a logical conclusion or the ability to perceive, discover and use the acquired knowledge in the environment for personal, business or social needs, the needs of the collective and in our case for the needs of tourism and tourism activity. In our study, we did not focus on the field of psychology or psychometric measurements, as there was no need to determine the humanistic intelligence or the intelligence of the individual. We were mainly interested in intellectual capital as an economic category, which for tourism and tourism activity represents

material or immaterial factors important for the preservation and development of tourism and tourism activity. However, if we talk about intellectual capital in general, it should be clarified that its significance as a concept was scientifically explained in the 20th century, when globalization, market expansion, industry and other influences caused a crisis and the need to save the economy and overcome the crisis arose. Technological, economic, digital, political and other changes have taken place that have completely transformed the international economy and thus also the field of tourism and tourism activity. It should be understood that this material aspect of capital value creation (also in tourism) is the result of the use of science, the development of practice and intellectual capital. Defining the intelligence of the individual and intellectual capital as an economic category leads us to find the connection between the two components and it explains that intellectual capital is a set of knowledge of individuals and groups that for the needs of the economy, they form knowledge and science that enables the creation of intellectual capital, which has its function in individual areas of society. We were aware that the determination of intelligence ability, IQ or quotient or the percentage of an individual or group is the responsibility of institutions, institutes, academies, laboratories, schools and faculties, but it must be understood that the acquired knowledge and the acquired intellectual capital need to be extended to other areas and to find levers for understanding intelligent or intellectual capital as a material value, which is also pointed out by many authors in their works.

Mulej (2000) draws attention to the capital strengths of the economy and tourism within the economy, which is also pointed out by Sullivan (1998). This can be in a certain environment, time, and space and in our case the region, for which we had completely justified, both professional and theoretical scientific reasons. We decided to identify, interpret and study intelligent or intellectual capital in the field of tourism on the basis of a study of large and small companies (Beganović, 2016), which are engaged in tourism and based on data collected, we wanted to present the role of intellectual capital in tourism in south-eastern Slovenia. In doing so, we were aware that there would already be various concerns about the title, even more so when dividing the common element into parts that actually represent some tourist intellectual capital, although we are talking about the process of intellectual capital in tourism. We considered many theories of authors who directly or indirectly or even meaningfully represented intellectual capital, mentioning innovations, tourism profiling, management success, various methods of success and development, and therefore we used the findings from the development period from the last century to the present. We put forward the thesis that “Tourism needs skilled and educated people” and through data collection, we wanted to confirm or refute our assumption, which we succeeded in doing.

2 THEORETICAL STARTING POINTS

2.1 The intellectual capital dimension

A review of many definitions of intellectual capital clarifies the need to return to intellectual capital as an economic category and to seek an appropriate explanation that will explain the role and need in individual areas. It needs to be understand that in defining the concept of intellectual capital, we cannot completely limit ourselves to the definitions of individual authors, regardless of whether it is an economic or other field, although these definitions are the guide and path of recognizing the intellectual ability of an individual, group, individual economic industry or any other industries. Nor can we rely on the definitions of authors who from their scientific field, such as mathematics, physics, chemistry, economics, law and other fields, evaluate an individual work or ability of an individual and give a numerical or other assessment or value based on it, and in this way they determine the extent and level of intelligence of an individual or group.

When we talk about tourism, the economy or processes necessary for the development of the economy, we must look at processes and authors who have focused their work on clarifying the concept of intellectual capital as an economic category that is essential for further development. We highlight Stewart (1997), who in his definitions presented intellectual capital as the sum of organizational processes, skills, patents, innovations, abilities and experiences of an individual - also in the tourism process, as technology and information about suppliers, customers and market demands and the accumulated knowledge of the individual acquired during its development. From the translation of Stewart's definition, it is possible to understand its definition, which says that intellectual capital is knowledge that arises within a particular activity and can be used to create a competitive advantage in the market, which in practical terms means that intellectual capital is the sum of all knowledge within tourism or another industry that determines a competitive advantage in a space, market or area, either economically or in an individual industry.

We also found similar research in Beganović (2016), who in his work represented larger or smaller companies and gave them an important role in the economy, industrial development and the construction of intellectual capital. His findings can also be meaningfully used through the organization of tourism companies and their activities, which as smaller companies have a great influence and potential in tourism and are important for the organization, management and development of intellectual capital.

Considering intellectual capital as an economic category necessary for the development of the economy, tourism and other directions, it is impossible to ignore Sullivan (1998), who in his works defined intellectual capital as knowledge

and skills that can be marketed and used to make a profit for themselves or for the organization. It is understood that Sullivan sees in his definition the difference between human capital and intellectual property, emphasizing that human capital is personal, non-transferable, and cannot be divided between shareholders, partners or other forms of ownership, unlike the economic category of intellectual capital, which is the basis for that. If we, from a legal point of view, define the part that we call human capital, it should be clarified that this capital of a person employed in industry, economy, tourism or elsewhere can be developed and used as the property of an organization, association, company, etc., as long as the person and the company or enterprise, as stated by Beganović (2016), are in "an interest relationship" (employment, employment contract, copyright contract, other similar forms - a look through the legal relationship of the parties). Sullivan's unequivocal finding explains that intellectual capital must be understood as knowledge that is a human process and that, in relation to the organization (i.e. through employment, employment contract, copyright contract and other forms of legal relations), represents the value necessary for the economy, companies, enterprises, administrations or organizations to function.

2.2 Intellectual capital in tourism

Recognizing intellectual capital, determining its importance and finding its usefulness in tourism requires recognizing intellectual capital as a material aspect, while also understanding its existence. If we look at the results through science, profession, educational processes, institutes, institutions, groups and individuals, we get a lot of data and information from which we can form our own opinion, and each of us can interpret or define the obtained data differently. We limited ourselves to the study of intelligent capital and learning about tourism and tourism activity in south-eastern Slovenia in order to avoid presenting and citing authors who have analysed various forms of intellectual capital through industrial processes, tourism, logistics, robotics, financial flows, legal basis and other systems analysed in various forms of intellectual capital.

The purpose of our hypothesis "Tourism needs trained and educated people" was to draw attention to the importance of intellectual capital and its function in tourism, without abandoning the opinion and scientific findings of authors representing development and innovation (Mulej, 2000), methods of social development (Lauc, 2000) and the ways and successes of management in economic development (Mulej 2013). In works of Hoppe (2012), we analysed the course of natural changes in society and the impact on development, and in Kajzer (1998) the restructuring of companies through intellectual development. The aim was to explain, through the obtained data and information, what intellectual capital is, what it means for the economy, organization and tourism, how it is interconnected and how it can be put to good use.

We realized that intellectual capital in tourism can be presented as a certain sum of human knowledge, abilities, creativity, skills, innovation, experience, culture, motivation, information, database, patents, licenses and other things that a person combines within an activity - in our case of tourism and for the needs of tourism, as long as there are economic, legal and other interests of the individual, group or wider community. All together it means mastering the necessary processes, in the sense of performing a certain activity or performing a certain service. It is common knowledge that this is intellectual capital that is invisible and often represents a significant trade secret and competitive advantage, which makes it possible to place legal, business or other advantages or assumptions that may limit an individual or organization as long as there are legal ties between them.

2.3 Organizational view of intellectual capital in tourism

If we set the legal, scientific, field, practical or any other level of research, we will find that, unlike human intellectual capital, intellectual capital in tourism has its own structure and organization, which is reflected in tourist facilities, information system, tourist offers, accommodation facilities, infrastructure, organization, ISO standards, copyright, business secrecy, property, people 's patents, licenses and more. It is a structural view that shows what the essence of intellectual capital is in tourism.

The organizational view of intellectual capital in tourism is reflected in the ability of management in the economy (Mulej, 2013), tourism and tourism activity, through the management and coordination of active interactions between all elements of intellectual capital. From an organizational point of view, only with functioning and successfully coordinating intellectual capital can successes in tourism and tourism activities be achieved, and with that track development and overall progress.

In studying the structure and organization of intellectual capital for tourism, we could not ignore the innovation (Štrukelj, 2015), which provides tourism, tourism activity and innovations in existing offerings and tourism products, improvements and new programs that update the entire offer, and add value and new impetus for new and innovative research in tourism. Innovation capital in tourism could be defined as the structural capacity of tourism in the quantitative and qualitative increase of human work and success, as intellectual capital that gives new results to the economy (Zelenika, 2005). This intellectual capital can be measured through the results of human work, which is reflected primarily in operations, innovations, patents, new technology, development programs, copyright, design, know-how, instructions for tourism promotion. This is documented and legally protected knowledge (Murtič, 2009), which is owned by an individual or a tourist organization, when a legal link is established between them. It is the result of the knowledge of a wider range of institutions, which includes education, training,

mentoring, laboratory exercises, professional management, and the use of organizational resources, professional tests, exhibitions, fairs and market promotions. It is also intellectual tourist property (the condition is met if a legal link is established between the individual and industry), which cannot be easily noticed, because this intellectual capital is part of corporate or organizational culture, the importance of industry in space and other intangible factors relevant to competitive position on the market of Slovenia, the European Union or wider.

2.4 Essential elements of the intellectual capital function in tourism

Globally, tourism is a fast-growing and strategic economic activity. It is one of the largest future-oriented industries and represents an economic opportunity for Slovenia (Colarič-Jakše, 2017). They let a simple connoisseur of tourism and tourism activity know that this activity is influenced by time, space, technical, cultural and scientific factors, which directly or indirectly affect the growth of tourism activity and demand for logistics destinations or tourism activity. Essential for our research are those elements that as factors can influence the development of tourism and can be attributed to intellectual capital. These factors can be geo-transport, economic, technical, technological, organizational, historical, religious, sociological, cultural, climatic, and especially in the last development period-intellectual.

Intellectual capital represents a special category of factors that optimally help the development of tourism and tourism activity, which are realized through the organization and direct implementation of individual services or services within the tourism industry. This activity reflects the work of the individual and society, so we can talk about intellectual capital, and at the same time intellectual capital is the foundation of new non-traditional thinking and decision-making that allows added value, sustainable development, change and consequently the strategic goal is to discover new ways and supply procedures and create new levels of professional services. The goal is to increase the offer and improve the service, while reducing the costs of the activity itself, which can have a positive impact on the growth of tourism and lead to higher earnings. This involves creating a fluid tourism organization that is able to change market demands, change market supply trends and adapt to changes. Intellectual capital and financial stability in the tourism industry are the basic preconditions for the success of tourism, market monitoring and successful adaptation to its requirements. This finding reveals that intellectual capital is the only creative and dynamic element in the tourism industry that allows for rapid adaptation to new requirements and the system. To better understand the role of intellectual capital in tourism, we should study the micro and macro level of tourism in the region or in the tourist area and only then we could learn those essential elements that would explain the details of the role of intellectual capital in tourism, which was not our goal.

3 METHODOLOGY

As part of the research, we studied and assessed individual elements of intellectual capital and divided it into areas that are absolutely necessary in order to be able to talk about tourism intellectual capital. We used the method of statistical data, which showed us what the intellectual potential in the region in the period between 2000 and 2017 is and what tourism has at its disposal. Furthermore, we used the method of studying and assessing data, which explained the reasons for the deviation to plus or minus, thus obtaining a relevant starting point for learning about individual areas of work in tourism, while learning what profile of staff tourism needs. These data were the basis for us to identify intellectual capital and find appropriate methods to improve the situation. We also used the empirical method, as we wanted to make an overview of the past, which would show what intellectual capital operated at the time of the independence of the Republic of Slovenia and major tourism activities in Slovenia. At that time, the economy in Slovenia and Europe was at a high level of development, which we compared with today's situation, when changes in economic productive forces, market changes, and digitalization of the world, robotization of production and robotization of tourism led to new standards, requirements and teaching, which also affects intellectual capital. Last but not least, we used the legal method, through which we formulated individual statements and legally formulated relations in the process of operation of organizations and activities (Murtič, Jankovič 2018).

4 Research, research results and discussion

4.1 Man's view of intellectual capital in tourism

If, according to the legal methodology, we move from the general to the individual, from the abstract to the concrete, we get the need to determine the role of an individual in general. This definition tells us that if we summarize or limit ourselves to the tourist area of south-eastern Slovenia, which was the goal of our research, we will meaningfully define the intellectual capital of man (we explain that we did not check the book word intelligent person, which means that a person is gifted in mental work, nor did we state the direction of intelligence, but from a philosophical point of view it is a direction that gives priority in the process of learning intellect over emotions, will, etc.), employed in tourism in the study region. According to the geographical, infrastructural, educational, economic, industrial, commercial, tourist and other areas, the researched area can be considered one of the more economically and industrially represented areas of Slovenia, at least as far as industries in Lower Carniola are concerned, where industry and the market employ more people than there are living in that region. This data explains that in the economy, tourism and beyond, a larger circle of intellectual capital development can be identified, which is produced in space by many secondary and vocational schools, colleges and universities, academies,

institutes and other educational institutions. Research data have given us an explanation that there are several secondary and vocational centres in the region, where young people and adults are also trained for this particular line of work in tourism processes (many secondary schools and universities are focused on cooking, service, work at receptions, tourist guidance, etc.). Following the Bologna change of the education system in the European Union (members of the European Union unified the education system according to the guidelines and instructions of the Union), many colleges and universities were accredited, which provided the economy and tourism with an adequate number of professionals who brought new intellectual capital, creative and innovative knowledge and fresh tourism momentum to the industry. Other institutions, institutes, companies and others also contribute to the development of the intellectual capital of south-eastern Slovenia with internal training, where they raise the professional level of employees according to the needs of the organization and the market. We should not ignore the influence of the University of Ljubljana and the University of Maribor, which through their faculties and departments in the region contribute to the training of the staff that the region does not have organized, namely lawyers, economists, general engineers, masters and doctors of science in a wide range of fields and with that the important new knowledge. For the purposes of the survey, data was obtained from the Statistical Office of Slovenia and the Employment Service of Slovenia, and both show different data. They explained to us that the Employment Service of Slovenia provides data on the unemployed in the region, which is at first sight somewhat insignificant data, as it shows neither statistical nor other applicability, but later we found that these data are also important for reviewing changes and development of intellectual capital, especially in terms of reorientation to a new educational direction, either professionally or in some other direction. The Statistical Office offered us more specific records, which are useful, but we had to use them in a way that would benefit our survey. Unfortunately, most of the data had to be obtained directly from individual organizations within tourism facilities, the education system, public administration, health care and elsewhere. The collected data shows that in 2017, the education system of South-Eastern Slovenia included 533 doctors of science, 148 masters of Science, 88 university graduates and 18 with higher professional education, who in addition to general education also provide education in tourism and tourism activity.

Table 1: Levels of education of participants in tourism in 2000, 2009 and 2017

Comparison / year	PhD	Magister degree	University education	Higher professional education
2000	2	74	53	98
2009	22	512	67	667
2017	15	217	42	880

Source: Personally obtained data and personal simulation of the authors

In 2017, only 15 doctors of science, 217 masters of science, 42 with the university degree (an incomprehensible data, but the master's degree was equated with a university degree, which tells us that most people who are developing tourism and tourism activity are masters) and 880 with a higher educational degree were included in tourism activity and institutions working in the direction of tourism development and tourism activity for the needs of south-eastern Slovenia.

An interesting trend is the decline or growth of intellectual capital over the years. For comparison, we took the year 2009 and found that 22 young doctors of science, 512 masters of Science, 67 people with finished university and 667 with higher professional education were included. The year 2000 is particularly characteristic, when 2 doctors of science, 74 masters of Science, 53 with a university degree and 98 with a higher professional education were involved in the tourism industry. The comparison of the data shows severe discrepancies, which are incomprehensible at first glance, but we managed to clarify them in an interview with the management of tourist organizations. After the independence of Slovenia from the Yugoslavia, a vacuum effect happened in the tourism industry, which was produced with joint ownership and joint work, when catering and tourism providers coincided in the management of the state and its organizations. This was followed by transformation and reorganization, privatization and only then the orientation towards the development of tourism as an industry. Accordingly, 2 doctors of science and 74 masters approached the field of tourism. In all cases, these are areas that are not directly named tourism, but people who have been experts in the field of hospitality, nutritionists, oenologists, etc., as the directions have not yet been developed. The rapid development of the economy and tourism has been directed by educational institutions, faculties and schools in education and the development of appropriate staff who will take over the management and organization of tourism activities. A very interesting data is also in 2009, where we see that 22 doctors of science, 512 masters and 667 with higher professional education worked in tourism and tourism activity. In the period between 2007 and 2010, the economy of Slovenia and the economy of Europe and especially the Member States of the European Union reached its peak, as during this time a lot was earned, a lot was travelled and consumption was almost equal to production. Tourism has reached a level of development that has enabled the employment of people with a high level of education and vice versa, such people have quickly become involved in this activity due to development opportunities. During this period, numerous scientific, research and professional seminars were held, which enabled the dissemination of knowledge, integration between tourism factors, tourism organizations, the offer of tourist facilities, modernization of tourism facilities and infrastructure and connections between organizations from different countries.

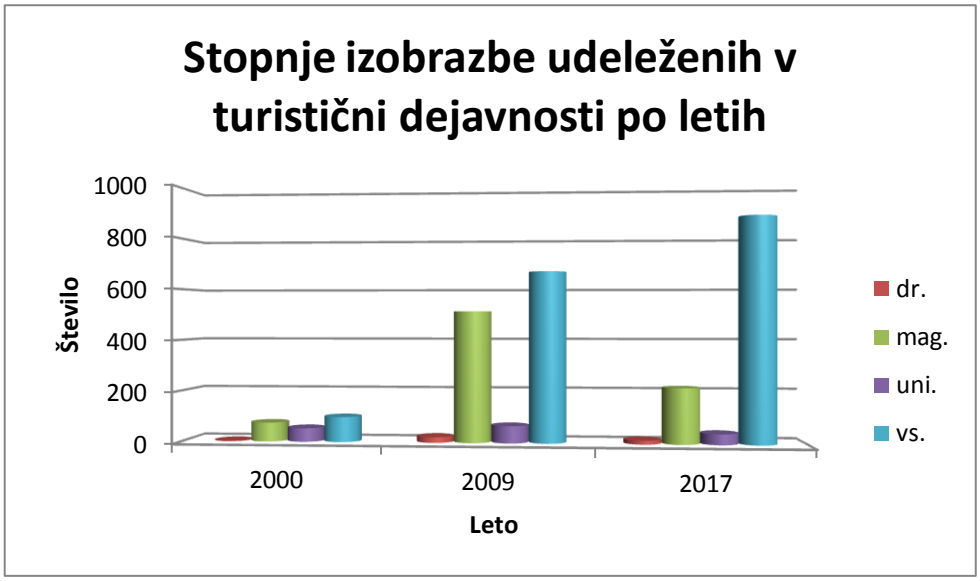
After 2010, there was an economic and market crisis that limited tourism and tourism activity. As the tourist persons from the region were aware of the work and

tourist activity in the rich countries of Europe, a large number of employees left for the organizations and tourist activities in these countries. Accordingly, in 2017, there were fewer doctors of science, fewer masters of science, etc., in the tourism industry of the region. The data is changing, as the University of Maribor and its Faculty of Tourism are in the process of educating new masters of Science who will fill this positions. It is also interesting to note that the number of people with a higher professional education in tourism and tourism activity has been increasing over the years of development. The main focus is that there are several institutions and faculties in Slovenia that educate in this field, and most of these people become involved in tourism and tourism activity after finishing school. In the following, with a graphic presentation, we present the level of education of participants in the tourism industry after the years 2000, 2009 and 2017.

It is by no means negligible for the research that tourism and tourism activity have the largest number of employees with secondary vocational and higher education, which we did not mention in the statistics, but which still form the intellectual capital in the field of tourism. The obtained data are partially adapted to protect the interests of individual tourist factors, tourist institutions, educational systems, etc., as the data represent a business secret, so they were appropriately adapted and used in the explanations for the needs of our research.

Scientifically, human intellectual capital in tourism should be understood as a structure of industrial capital (industry can be understood as the broadest economic concept), which can be classified at the human, tourism, innovation, invisible, market and inter-organizational levels.

Graph 1: Level of education of participants in tourism by years



Source: authors' own simulation

Human intellectual capital is very important and it includes the "know-how" of research capabilities, skills, experience, creativity, innovation, culture and motivation of the individual involved in economic and industrial processes, tourism and tourism activity and other social or capital processes (Zelenika, 2005). If we accept the fact that tourism is established from person to person, we can conclude that human intellectual capital is the driving force behind the development of tourism and tourism activity, which today is considered to be the fastest growing industry. So human intellectual capital is a factory that produces knowledge, ideas, innovations, programs, projects, strategies, theories, solutions, excellence, creativity, laws and legality of individual fields and human interests. This shows the potential and value of human intellectual capital in tourism and tourism activity.

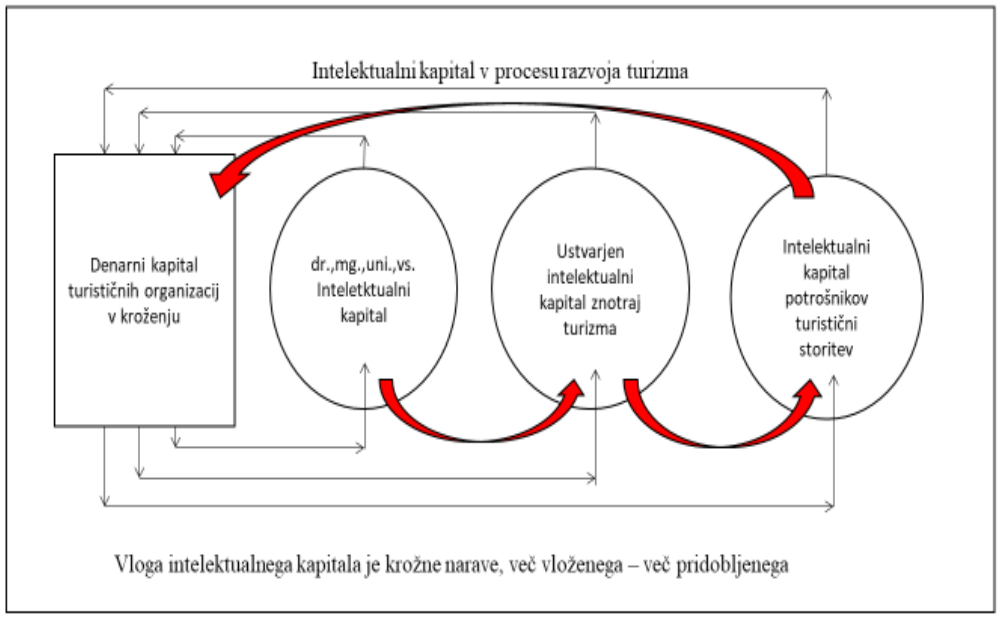
By delving into the core of the research field, we can conclude that human intellectual capital can be framed as the one that generates ideas and represents human knowledge in the economy, tourism and tourism activity and its knowledge affects the development and growth of the economy, industry, tourism or other areas of necessary products for humans. From the point of view of human research, we see human intellectual capital in the preparation, planning, design, organization, implementation and evaluation of tourism products, while man as intellectual capital can be used in production management, group or company management, organization or corporation management, science , in the field of research, in the profession and in the development of the productive forces, in innovation and other fields where man can create intellectual capital with his intelligence, creativity, quality, excellence and exceed oneself. In the second round of intellectual capital we must consider the ability of human management, because man with his intelligence is able to lead, connect with organization (Murtič, 2012), adapt organizational processes, change organizational culture, lead and change business policy in tourism, economy, industry and beyond, monitor the market and market laws, regulate finances and balance sheets in industry and beyond, take care of the market and users of products and other customers, conclude legal transactions, monitor consumer requirements and wishes, follow the needs and expectations of tourism processes, products and more.

4.2 Material view of intellectual capital in tourism

Intellectual capital uses information technology to change society, the economy, industry, tourism, personal, etc. Special emphasis should be placed on the technological information system and digitalisation of the world, which suddenly allows for the transition of these countries from a completely manufactured system (we mean some countries in the world that do not have a developed economy but have telephones, internet, etc.), primitive production and underdevelopment allows such communities and nations to transform into the developed world, unaware of the consequences. It is a severe technological, mental, economic,

market, financial and cultural leap that is changing society and the way it is produced, consumed, connected and inter-ethnically mixed. These are sociological, cultural, economic, political, social and other changes that make it possible to change the entire planet. At the same time, this process allows you to open up and get to know those areas, urban areas, civilizations, places, cultures, customs and other unknowns that attract new curiosities who want to discover, get to know and experience this new world - and that is tourism. In the following, we present the intellectual capital in the process of tourism development.

Figure 2: Demonstration of the benefits of investing in intellectual capital



Source: authors' own simulation

The development of the economy, tourism and tourism activity is in a great development momentum. Therefore, the role of cultural, artistic, historical, folk and other institutions and individuals is all the more important in preserving a particular culture, customs, habits, architecture, monuments, heritage and everything that is characteristic of tourism and tourism activity. Intellectual capital has a special role in this developmentally impressive growth and represents tourism management, organization, flow of information and technologies that enable further development. Thus, the link between intellectual capital and the development of tourism and tourism activity becomes interactive, as training for tourism becomes a need for the development of modern activities and within the system means "conditio sine gua non", which means increasing tourism exchange and international integration. This fact indicates that intellectual capital is very

important for the needs of tourism in the material sense, as it enables the development and expansion of the tourism system, and at the same time intellectual capital in the tourism system undoubtedly means intellectualization of the entire tourism system in municipalities, regions, countries and society, therefore, the need for a substantial use of intellectual capital in tourism can be confirmed through the most compelling evidence.

4.3 Use of intellectual capital in tourism in south - eastern Slovenia

Tourism is an important economic activity in most countries of the European Union and represents an important starting point for regional development. In this regard, it should be noted that tourist activity is becoming important in areas where there is no tourist tradition (Colarič-Jakše, 2017). Summarizing the general definition of tourism, which means a planned trip for entertainment, recreation, fun, recovery, improving the spirit and its accompanying activities, which enriches it all, we can explain that tourism is a web of phenomena and interpersonal relationships associated with human activity, who travel and reside in places outside their domicile (permanent) residence for a certain period of time or, as provided by legal norms, continuously for up to one year for leisure, entertainment and also for business matters (sl.wikipedia.org/ wiki / Tourism). In practice, it is common knowledge that tourism develops in places where the general economic activity, industry, infrastructure, capacities, shops are well developed, where appropriate living conditions are established and activities that provide conditions for offering these goods to others that they want to see, experience, taste and serve. If we summarize the south-eastern region of Slovenia according to this definition, we can conclude that the region has all the conditions for the development of individual and collective tourism, i.e. individual and organized tourism, also unique and authentic, managed by organizations, companies, associations and individuals. All of these need adequate material and intellectual capital, as they cannot achieve complete content without each other. In this paper, we present concrete data on the participation of intellectual capital in these organizations and present the relevant number of qualified staff who care for the growth and development of tourism and tourism activity. By no means can it be argued that this is the limit of the tourist offer that has reached its highest level, but that intellectual capital must be constantly enriched, as well as expanding tourism and tourism activity as the most developmental, promising and growing economic activity.

Science, theory and practice tell us that tourism and tourism activity, although it is the fastest growing development economic activity, is not an end in itself. The task of tourism and tourism activity is to offer integrated tourism products that will be of interest to users, so tourism and tourism organizations at the national and regional level through their developmental, educational, spatial and temporal processes must focus their intellectual work on market verification and research,

products and intention to satisfy consumers. Through tourism activity, processes are developed that can be called the intellectual capital of tourism, which is tied to people, knowledge and products. This capital should be understood as activities, tourism processes and technology that enables tourism activity and successful satisfaction of both domestic and foreign interests of users of tourism products.
When defining the development of tourism and with that the need to use intellectual capital, it should be clarified that consumer intellectual capital of south-eastern Slovenia can be understood as intellectual capital of clientele (tourist consumers), tourist organizations or individual providers, between organizational links and interpersonal relationships (Murtič, 2012), which with its profession and activity enables the development of tourism. We have defined the definition to include all the relationships and connections that exist between tourism, tourism activity and the market, suppliers, business partners, partnerships, shareholders of tourism companies or corporations, the market, etc. Examples can explain the attachment of a certain circle of people to individual products. This is especially true for the area of south-eastern Slovenia, where several tourist activities are located in the area, which offer users entertainment, a break, sports and recreational activities, wellness services, hikes, gastronomic offer, experiences, events, tours, alternative forms of tourism, etc.

If we mention spa tourism, sports tourism, hiking, many cultural heritage sites, natural heritage, experiences on rivers, vineyards with vineyard cottages, tours of various crafts and agriculture, modern technologies, energy resources and many other products, we must clarify that these are activities, which need intellectual capital in their activities in the process of production, processing, supply, promotion and marketing, as this is the only way to ensure sustainability, visibility and further tourist activity. Because only visibility brings or retains users of tourist products, as "satisfied customer or satisfied guest returns", some users of products buy certain tourist products offered in the south-eastern region of Slovenia, other customers buy only specific things like medicines manufactured in a pharmaceutical factory in south-eastern Slovenia, which says that there is a certain connection between product users and tourism, which is manifested through brand, quality, authenticity, uniqueness, form, story, value and other things that attract or connect users through these connections. It is the ability of the tourism industry, which with its positive operation and together with partners and its own intellectual capital, attracts tourists and thus creates its own capital of users.

4.4 Use and management of intellectual capital in tourism

When we talk about use and management, even though it is intellectual capital, we must rely on intellectual, material and managerial support. The very definition (Beganović, 2016) of the management of tourist organizations, perhaps corporations and large or small companies as well as the individuals engaged in tourism tells us that there is a strong link and intertwining of different innovation,

legal, economic, organization and education ties. According to our findings, the fundamental role of intellectual capital in tourism is in management and its transformation of human capital through the tourist offer and tourist products. Tourism activity is organized in such a way that structural intellectual capital is owned by it; tourism organizations, corporations, large or small companies, individuals that are engaged with it and managing tourism can sell it or buy it, appropriate or dispose of it, transfer or sell, where human intellectual capital is the property of the individual, which is especially true for tourism (comparison: we are witnessing a different ratio of human intellectual capital in sports, where sports clubs sell athletes' knowledge, e.g. football, basketball, etc.). Human relationships are usually legally regulated relationships, so we can say that the management of human intellectual capital in tourism is possible through employment contracts, business contracts, copyright contracts and others (Murtič, 2009), where a person has same interests and goals as the tourist activity has, it needs and uses its knowledge and intellectual capital to improve the tourist offers, the tourist products, the growth and development of the tourist activities and the management of the market. Following the same pattern, the tourist activity of south-eastern Slovenia is managed by the intellectual capital of an individual who combines his knowledge for the benefit of tourist organizations in the region. Intellectual capital is bought and sold through a legal relationship, so that this structural capital owned by tourism organizations can also be subject to disposal, sale, change, financing, development, lending, shareholder investor and others, when and if there are interests.

We wanted to clarify that in tourism and tourism activity, through the processes of creating added value through the cooperation of human, structural and industrial intellectual capital, it is possible to use and manage intellectual capital, while tourism management must ensure continuous and dynamic interaction between tourism and its owners in the tourist area. Successful continuity and dynamics can be found in a successful motor vehicle industry, which is reflected in the number of finished products, design and market demand. The pharmaceutical industry and some others also successfully manage their own intellectual capital, which is reflected in their representation on the Slovenian, European and wider markets. With the correct use and proper management of intellectual capital in the studied area, tourism organizations would follow the advanced industry and enable the ideal development of their activity.

4.5 Productive intellectual capital in tourism in south-eastern Slovenia

If we talk about productive intellectual capital in tourism, then we need to clarify that intellectual capital is reflected in the type and scope of tourist products offered, product types and shapes, the width of the tourist market and the number of tourists on an annual or calendar basis. Economic data for Slovenia shows that south-eastern Slovenia is considered to be a more developed region in the country

in terms of the number of employees, the type of industrial production and the representation of the region's product on the Slovenian, European and worldwide markets. Unfortunately, statistical data of Slovenia for the field of tourism and tourist activity shows the tourist activity of the whole country and in order to obtain separate data we should study additional areas, which was not our intention, so in this part we did not present and analyse the number of tourists (overnight stays) and used material for these tourists.

We were looking for productive intellectual capital, which is reflected in the tourist offer, which with its products (spa tourism, cultural tourism, gastronomy, natural and cultural heritage, masonry tourism, experiences on rivers, sports and recreational tourism, complementary tourist activities and more) is present on the European and Asian continents, the market, etc. From the type and quantity of products present on the market, it can be concluded that the tourism industry in south-eastern Slovenia has a strong human intellectual, structural and industrial intellectual capital, which enables research, new needs, and new products and opens a new market that requires managed intellectual capital.

Science is a fundamental factor of intellectual capital in tourism, which can be understood that without science there is neither human nor structural or consumer intellectual capital, neither in tourism, industry or elsewhere. Without knowledge, communication, research, analysis and scientific laws, it is not possible to obtain or manage intellectual capital, it is not possible to develop tourism and it is not possible to develop society and humanity in general. Productive intellectual capital in tourism is based on an interdisciplinary and multidisciplinary science that broadens horizons, enables development and enriches intellectual capital.

4.6 Development possibilities of intellectual capital in tourism

The recapitulation of activities performed in the tourism industry and the annual balance sheets are the basis for the assessment and planning of the activities of individual tourism activities, the tourist association and their owners. The number of visits to the tourist area and the number of products sold are data that, as an indicator of tourism, give tourist organizations inputs for professional orientation or the development of a tourist activity that tells in advance that it will have its basis. At the same time, this data is the indicator for the preparation of business plans for the coming year or for a specific period. Modern technological progress, globalization of the world market, digitalization of the world, modern infrastructure development, rapid movement of people around the world, increasing consumer demands, etc., are factors that strongly influence the planning and financing of all activities and areas within tourism. This data confirms our finding that intellectual capital in tourism, both human and structural and consumer, is the basis for planning and financing tourism (Sullivan, 1998), much of which is intended for investing in intellectual capital for tourism. If

we look at the Slovenian education system, we find that it is focused on the development of much-needed staff in the economy, industry, tourism and beyond, but it is general or specific education that offers a theoretically and formally built and intellectually qualified person, but for tourism or other parts of the economy these educated people urgently need further education, training, licensing and other things that create intellectual capital. These are statements that require tourism and tourism organizations to devote a certain part of their resources to planning and financing internal education and training within the profession and for their own needs. In particular, catering, as a central part of the tourist offer, educates the staff of the higher educational structure and thus allocates a good part of the funds for training, which they plan with their own plan for the development of intellectual capital for tourist purposes. Investing tourism in the enrichment of intellectual capital increases the tourist offer, development, design, beauty and usability of tourist products, thus tourism attract users of products and their interest in further development. As it is an important development branch of the economy, the state is also involved in the operation and development of tourism and tourism activities, mainly due to its promotion and international recognition, which through the Directorate for Tourism and Internationalization at the Ministry of Economic Development and Technology and many tourism organizations and agencies operating in a wider area, especially the Slovenian Tourist Board, provide professional, organizational and financial support to tourism activities. The funds returned to the country through tourist and other taxes are used for education, development and recognition of tourism and tourist activities throughout the country. These are earmarked funds that are coherently planned and mean investment in tourism, development of intellectual capital and development of tourist facilities and products.

5 CONCLUSION

Tourism is one of the largest economic sectors in the world, and its importance is growing. This is due to a number of factors, from the transformation of industry into service activities to the growth of the middle class, which also leads to a change in the habits of users of tourism products in the field of travel and tourism. The impact of new regulations and technologies is also reflected in the change of preferences and the customer market, which forces tourism employees to acquire new competencies, better planning, measuring and monitoring supply and demand, and coordinate imbalances. The development of tourism by tourist areas and countries is different, which will need to be taken into account in achieving the goal of the most successful further growth and development of this sector (Colarič-Jakše). Intellectual capital in tourism and tourist activity in south-eastern Slovenia represents that recognizable part of space, people and products that are interesting for users of tourist products. It is the basis of tourism and economic development, in which we put man first, his knowledge, abilities, will, skills, education and many other factors that help tourism and tourism activities. We are talking about

intangible capital stored in a person or an individual, which is otherwise legally regulated through a diploma, certificate, document or license, and which a person or individual on the basis of a legally regulated relationship (employment contract, company contract, copyright agreement or other legal formal relationship) brings together in tourism that tourism organizations have at their disposal, creates an intellectual structure, adapts organizational and management systems, and controls the tourism market and consumers.

As discussed in connection with intellectual capital by Stevart (1997), Klein (1994), Sullivan (1998) and Zelenika (2005), intellectual capital (the exact same term can be used for logistics, robotics or other processes) of economics and tourism should be defined as the sum of organizational processes, patents, skills, individual experience, technology, information on suppliers and customers, individual accumulation of knowledge and know-how, which as intellectual capital represent knowledge that exists within tourism and tourism activity or the wider area of economy and can be used to create a competitive advantage. Very important is successful management (Mulej, 2013), which allows for organizational coordination, networking and finding solutions, which in turn enables all other processes that give the end result of the use of intellectual capital in tourism.

We can conclude that intellectual capital in tourism and the economy in south-eastern Slovenia is focused on the development of new tourist spaces, new tourist products and new markets, which in a simplified sense means that intellectual capital strengthens and influences trends in tourism in the world. This capital must be enrich, supported and invested in as much as possible by the tourism industry, the economy and the whole of south-eastern Slovenia, which will also enable further tourism development. With our research, we confirmed the thesis that "Tourism needs qualified and educated people."

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APPENDIX

Marko Hrženjak

MEASURES FOR REDUCTION OF ROAD TRAFFIC ACCIDENTS[28]

Nowadays, many traffic accidents happen daily on our roads. The reasons lie in different areas, yet the consequences are in all cases the same even very tragic. Therefore, our main goal should be to finally implement measures with changing behaviour of drivers, especially novice drivers, generally amateur drivers and definitely professional drivers.

Road traffic represents an important share of every society. Studies show that the development of traffic is also an important development indicator of society, since the development of society increases freight as well as passenger traffic. The development of society has along with all advantages brought also severe disadvantages, such as road accidents. When determining consequences of road accidents one can find multiple losses of lives, serious invalidities, and irreparable losses within families, companies and society. Therefore, road traffic safety is an important social question in Slovenia as well as in the European Union.

Since the entire human kind deals with the improvement of road traffic safety, the key question of every modern society is how to assure higher level of road traffic safety, for it is still one of the most undetermined and uncontrolled areas. The statistics clearly show that the highest number of traffic accidents and fatalities are connected with road traffic.

Road traffic safety should be considered as a chain of safety which is as strong as its weakest link. The weakest links of this chain are most definitely people. A person represents the highest level of risk with his/her actions within road traffic. Carrying this in mind road traffic safety becomes an important responsibility of every country, which has with its institutions an insight and power over the road traffic events and can thus implement necessary leverage to influence an individual and as a consequence indirectly or directly affect the safety of road traffic.

Traffic has undoubtedly become a part of our daily life, and it includes us all as drivers, passengers, cyclists or pedestrians. As such we are exposed to hazardous situations in which one can become either a victim of an accident or the person responsible for the accident. Numerous civil initiatives, which usually appear after individual tragic incidents, demand from the state to ensure better road traffic safety. Unfortunately, the state mostly answers to such initiatives by raising fines

[28] *The presented article is not about scientific work but about reflections on professional challenges in the field of traffic accident reduction.*

which are not a guarantee for better traffic safety. Similar measures were taken in the area of employers' responsibility with road transport since their responsibility plays an important part in providing better traffic safety.

Traffic related injuries are global national problem which has been misunderstood for a while now and therefore treated inadequately. The main aims are to explain the role or analysis of risk factors and possibilities for intervention. Both, characteristics of the driver and of the vehicle contribute to the risk of traffic accidents. Young drivers are especially exposed in traffic because of their reckless behaviour, overestimation of abilities and lack of experience. Alcohol, drugs and various medicines influence the drivers' perception, abilities and style of driving which often increases the risk of death casualties or severe injuries in road traffic accidents. Drivers who tend to drive over the speed limit are also more accident prone. Environmental factors, inadequate planning, poor construction and maintenance of road system, and specific weather conditions can have a negative impact on the risk of traffic accidents.

The extent of injuries in a car accident is also related to the use of seat belt which is one of the most important safety measures. The risk of traffic accidents is also related to the general safety of the vehicle, the vehicle's mass and construction, front and side airbags, door stiffness, improved breaking system, etc. Higher level of risk for fatal injuries is present with drivers on two way roads especially in head-on collisions due to high speed, wrong-side driving, unsafe overtaking, hitting trees and other obstacles, cross-road collisions, running red lights and stop signs, and speeding.

Throughout the history of research made in the area of injuries many definitions, models and theories have been created with the sole purpose to explain why accidents and injuries happen and how could they be prevented. All concepts and models share common basic dimensions: time, social level and epidemiologic parameters: host, agent, vector and environment. An accident is usually depicted as something sudden and unexpected, as something which happens first and thus influences further emergence of harmful aftereffects and injuries. Social security is based on determinants that derive from national levels such as government politics, legislation, political stability, welfare, and social economic and technical development.

A list of some parameters for the most effective measures:

- Prevent the emergence of risk source (decreased motorisation).
- Reduce the amount and scale of risk source (speed limits).
- Prevent activation of existing risk source (prevent drunk driving).
- Alter the level of risk activity at its core (road barriers and speed bumps).
- Physically separate risk source from the person in time and space (pavement for separation of pedestrians and vehicles).

- Physically separate risk source from the person by material barrier (airbags).
- Alter the characteristics of risk source (separation of two-way lanes).
- Enforce the immunity of the host for better risk effect resilience (better physical conditions due to healthy food and physical activity).
- Reduce damage caused by risk source (provision of emergency medical assistance).
- Heal, rehabilitate the injured person (provide treatment and rehabilitation programs).

The analysis of reasons for and possibilities of taking measures to prevent any kind of injuries regarding target population clearly shows that the this has to be done in different time phases with the use of various strategies.

Young drivers are especially exposed in traffic due to their risky behaviour e.g. drunk driving, driving under the influence of drugs and unuse of safety belts, which is also very common with professional drivers. Furthermore, they often overestimate their abilities and lack experience. To reduce potential risk within traffic it is crucial to provide wholesome traffic qualifying system at all levels, quality driving lessons and provision driving experience for beginners, at which driving schools play an important role. Through such measures in other words by implementing extra training of driving candidates it is possible to achieve more cautious driving, more attentive danger recognition, better behaviour recognition and sense of possible danger due to other participants in traffic together with proper reactions to various dangerous situations.

Alcohol has a strong impact on the change of driving abilities and style of driving. Concurrently, the possibilities of fatal injuries rise together with the blood alcohol content level regardless of driver's age and gender. Driving under the influence of any drugs or medications is also an important risk cause for heavy traffic accident injuries, especially in combination with alcohol. Alcohol is one of the leading factors of traffic accident risk although other factors must not be overlooked. Drinking impairs driver's senses, decreases muscle coordination, leads to slower reaction times and increases the number of wrong reactions. The risk of traffic accidents grows together with the rising of blood alcohol content level. Young drivers that possess less drinking and driving experience are especially at risk when drinking. Therefore, people must be familiarised the consequences that drinking can have regarding their health, family life and society. This will be achieved among other means by extensive educational programs which will introduce efficient steps that can reduce tragedy and suffering, and by enhancing the ability of complete society to face alcohol issues.

The risk of fatal injury in a traffic accident increases by late night driving. Together with impaired vision other factors appear at night such as long distance driving,

young drivers drive faster, many drivers drive under the influence, many overtake, are less cautious and less reliable and towards the morning many become drowsy. Dazed and sleepy drivers become unobservant with longer reacting time, decreased psychophysical coordination and reduced decision making, which all together increase traffic accident risks.

In recent years many studies have emerged that researched the connections of mobile phone use while driving a car and increased level of traffic accident risk, and have shown lower driving performance for drivers who are heavily engaged in cell phone conversations primarily by reducing driver attention, impairing perception of danger and prolonging reaction time.

Moreover, poor construction planning and maintenance of the road network can also have a negative impact on the risk of traffic accidents. Traffic signs and road signs must be clearly visible and the messages must be straightforward and unambiguous not to mislead drivers and cause unwanted errors. Drivers must be familiar with and/or properly qualified for driving in bad weather conditions. Some studies have shown that cloudy weather decreases the incidence of traffic accidents, yet very rainy and wet weather increases it due to slippery road surface. On the other hand, the majority of serious fatal accidents occur in good weather conditions and on dry roads, mainly due to speeding and insufficient minimum safety distance, which is extremely present with heavy goods vehicles and buses.

The severity of the driver's injuries depends on the severity of the accident, which is assessed indirectly by the change in vehicle speed at the moment of impact. By increasing the speed of the vehicle at the time of the accident, the crash force increases, and thus reduces the protective effect of vehicle safety and exponentially increases the risk of fatal and serious injury. This means that the gravity of the accident, and therefore the gravity of the injury, is greater on high-speed or two way roads, when the consequences of the frontal collision of two vehicles at high speeds are even greater and usually with fatal injuries.

Improvements can be achieved through extensive training programs by educating professionals who will transfer their experience and knowledge to young drivers, and especially to professional drivers. The aforementioned issues emphasise the concern for the safety of younger traffic participants. This shows that the problems associated with younger road users, either as causers or victims of traffic accidents, are present and very serious in the environment.

Emotions represent conscious mental reactions of an individual to a situation, event, thought that the individual has assessed as important, which is what happens to young drivers who have no experience in dealing with internal emotions, and such internal emotions are often expressed in traffic. In addition to strength, duration of emotions is also important. Emotions can last an

undetermined period of time. Such strong emotions and passions in traffic due to lack of experience in driving a vehicle often lead to road accidents.

All road users are confronted by a responsible task, as their own safety and the safety of others are extremely significant. The individual's temperament and character play a crucial part. Equally important is the individual's emotional and personal maturity. Clearly, someone who is emotionally liable is rarely able to solve problems in a constructive way, behaves aggressively and suppresses emotions until they finally erupt. Such a person has difficulties with providing safety in comparison to someone, who is emotionally and personally mature, can solve problems in a constructive way, is calm and able to express emotions appropriately. It is also important whether the individual is stressed, frustrated or experiencing distress in the family circle. All this has an impact on road safety.

The factors related to the physical condition of the participant are primarily those determining the state of the sense organs and are essential in traffic. In this context, we primarily refer to vision, hearing and perception of space, time and relationships. Consequently, chronic and acute human illnesses can influence traffic safety along with stress related problems. Here one can also mention current physical well-being, which depends on person’s general well-being and fitness and unforeseen factors.

External factors include vehicle and road conditions and adverse weather conditions. The state of the vehicle can be influenced by the driver by checking its operation functions at the appropriate times. However, road conditions and weather cannot be affected, thus one must adjust to them appropriately.

The participant and thus safe driving are also affected by psychoactive substances. Their impact is manifested in reduced alertness, poor perception, prolonged reaction time, and a general decrease of the driver's psychomotor abilities. Psychoactive substances include alcohol, drugs and medicines. Alcohol is definitely the most common in Slovenia, and Slovenes are at the top of the world charts in terms of alcohol consumption. Ingested alcohol reaches maximum concentration and reaction in of one to two hour period. The concentration depends on the consumer’s body weight, the amount of consumed alcohol and the amount of consumed food. It is typical for alcohol to increase confidence in one's own abilities and to cause complete lack of assessment of oneself and one's actions. Alcohol is one of the top causes of road accidents in Slovenia and drivers with BAC (blood alcohol content) 0.38 are 5 times more likely to cause fatal traffic accidents than those who are sober.

In addition to alcohol, traffic participants can also be affected by drugs, which have their specific effects. Hallucinogenic drugs cause a change in visual and auditory perception since situations seem like illusions (such drugs are LSD, hashish,

marijuana). Narcotics tend to reduce activity of central nervous system (e.g. heroin) On the other hand, stimulants are drugs that stimulate the central nervous system (e.g. cocaine).

At this point medicines, especially sedatives, should not be overlooked. They have a calming effect, reduce tension, affect perception and thinking, and reduce proper judgment and thus impair driver's abilities (e.g. Apaurin).

Every action, and the same goes with the fields of transport, is a combination of physical and intellectual work. The participant must observe, judge, perceive, think and simultaneously respond physically. How much an individual is committed to their work is reflected in what a person is capable, knows and wants to do. In addition, one's energy invested in work is also important. This energy, however, is not boundless, but is consumed and recreated. Thus, it can be established that a person working for a longer period of time, e.g. driving a vehicle without pauses, has much less energy than at the beginning and his or her efficiency is not the same in all stages. This phenomenon is called fatigue, which is reflected as a decline of individual's performance during working hours. The impact of fatigue on the traffic participant is manifested in an unpleasant feeling of concentration deprivation, difficulties with judgement, thinking and body management. After a break, when the participant is rested and full, the energy is restored and one can carry on with work or driving.

Smoking is dangerous because nicotine directly affects health and reduces body's ability to supply oxygen and moreover, smokers pollute the air for everyone around them.

Smoking behind the wheel is especially dangerous because finding a cigarette, a lighter or a match distracts the driver and steals the attention from driving and alertness. When the driver tries to light a cigarette, he focuses on the activity going on a few inches from his/her nose and ignores what is happening on the road. When the crosswind, or resistance at the open window of the car, causes the burning cigarette butts, which the driver wanted to throw out the window, back into the car, a chilling search begins, the steering wheel and the road become the last concern and the car starts to go its own way.

Driving ethics

Ethics is the science that dictates people how to act and live in order to behave in a meaningful and positive way and to be happy. It deals with human behaviour in terms of morality and determining the human positive and negative values. Ethical principles in transport are thus an effective means of regulating the interactions of road users. The traffic route is a limited space where many road users meet and in order for everyone to reach their destination, the conditions for cooperation must be created. Ethical principles help promote mutual respect among road users and

mutual help. To reduce traffic accidents, it is imperative that the driver adheres to ethical principles in traffic.

Ethical conduct includes:
- an obligation of road users to such behaviour that traffic is safe and free-flowing;
- an obligation to take care of those unable to participate in traffic independently (children, the elderly, the infirmed, the disabled);
- a duty to help the victims in an accident;
- a responsibility to protect the environment on and along the transport route.

Human society promotes behaviour and conduct that are in line with socially recognized values and norms which determine what is right and wrong. The universal principle of how to behave or act in different situations can be expressed in a few words: Do to others as you would have them do to you. Even the Slovene constitutional principle that an individual must not interfere with the rights of others by implementing his/her rights, in simple words means only that his behaviour should not harm others.

Driving ethics encompasses that part of the natural (moral) principles of behaviour towards people that govern the relations of the driver towards other traffic participants. Certainly, these are mostly unwritten standards of courtesy while operating a vehicle, but the three most important ones are found in the provisions of traffic legislation At the same time, these are the basic principles of road safety regulation and a direct guide when a concrete situation cannot be fully (in full detail) incorporated into this arrangement: the principle of trust, the principle of defensive behaviour and the principle of protection of the weak.

The formation of personal values that an individual accepts for his or her own, some even to the extent that they are perceived as the deepest personal goals for which even individual sacrifices are sometimes made, is greatly influenced by education and learning. Therefore, one of the most important tasks of a driving instructor is to incorporate the moral norms as a cohesive thread into general lessons, and simultaneously informs the candidate at all times (of course, with the right measure), that a good driver, in addition to having a good command of a motor vehicle, also strictly adheres to traffic rules and is focused, subtle and tolerant of other traffic participants while driving.

Safe driving can be affected by traffic ethics, since traffic regulations alone cannot regulate all traffic operations. Thus, ethics fills those gaps in traffic conduct that relate to participants' behaviour which will lead to a better quality of life for all traffic participants.

The state, governments and agencies allocate enormous amounts of money to ensure a higher level of traffic safety, with the intention to achieve fewer deaths and injuries. Every car accident has consequences, be it material damage or various forms of physical injuries and as the most extreme even death. Dead people cannot be brought back to life. In recent years, however, it has been noticed that the situation on Slovenian roads is slightly improving. This is also due to changes in the regulations that we have implemented especially in the period after the independence of our country, both in the field of misdemeanours and in the area of crime connected to traffic safety.

Road transport companies and employers have a duty to directly or indirectly ensure traffic safety. However, increasing competitive pressures in the transport markets have a significant impact on businesses and indirectly on passengers and workers. In order to ensure high quality services and good working conditions, and thus road safety, they require an effective response by the state to possible forms of abuse by employers.

There are a number of violations related to social legislation, but most violations concern exceeding the driving time, violations of rest and breaks, operation of recording equipment (tachograph) and various misuse of recording equipment (tachographs) in goods vehicles and buses, violations with transport of dangerous goods or substances, improperly loaded and secured cargo, etc. These traffic offenses, however, cannot be the sole responsibility of the driver or road user, but also the responsibility of employers, who often exert pressure on employees and force them to act wrongly. The professional driver is thus compelled to commit violations, even though he is aware that such acts endanger the driver’s own safety and that of other traffic participants.

Inferred from the numerous road traffic offenses, it can be concluded that these are systematic and extensive road traffic offenses indirectly committed by employers, who have unfortunately managed to transfer their responsibility to the driver in road transport. Amendments to the Act on Working Time and Compulsory Rest Periods of Mobile Workers and on Recording Equipment in Road Transport, which entered into force in 2014, have significantly increased the fines for businesses and persons responsible for road transport, thereby recognizing employers' liability for traffic safety.

Freight traffic transport drivers and bus drivers are often in breach of traffic restrictions in the field of driving restrictions and they drive technically inappropriate motor vehicles due to pressure from employers. In road transport, the most violations are due to exceeding the continuous driving time, exceeding the daily driving time and insufficient daily rest, and misuse of recording equipment (tachograph).

Night driving has a great impact on everyone, and the consequences are often severe. A number of times drivers start working in the middle of the night or at inconvenient hours when the body is tired due to heavy strain, excessive driving time and insufficient rest. A tired driver becomes unfocused, during summer months additionally overwhelmed by heat. Some studies have shown that drowsiness is one of the major causes of traffic accidents. Night driving is monotonous because the surroundings are boring, if the driver is not rested enough, most of the time there are problems with concentration from midnight to 7 in the morning.

Drivers often take last-minute action with a jerky manoeuvres that can lead to serious accidents due to time pressures ahead of warning signs. With technically challenged vehicles performing such manoeuvers and driving, a tragedy is inevitable. Participants and victims in these accidents, however, are road workers or other drivers located nearby.

Goals and driving decisions are influenced by the judgement of why, where, when, and with whom we are driving: why we decided to drive, why to drive day or night, why to drive in peak traffic, to drive even though we drank alcoholic beverages , even though we are tired or stressed.

Stress can be the source of such serious consequences as fatigue and consequently car accidents. Stress is a negative state triggered by illness, injury, exertion in addition to mental distress. The source of stress with occupational drivers usually occurs as physical injury or arousal, fear, anger. However, symptoms of a stress reaction develop within minutes after the stress event. The symptoms are very dangerous for the driver on the road, as he/she can quickly cause an accident or an accident at work (e.g. loading or unloading a truck).

The ability to drive in traffic means that the driver must be able to adapt his/her ride to different situations and constant changes in traffic, and be able to identify possible hazards. The driving technique depends on the construction of the vehicle and of how the driver handles it. The driver knows how to drive, change gears and is able to use the vehicle in traffic. Yet one must also master complex, sometimes unknown procedures, such as preventing slipping at poor grip and understand the laws of physical forces. The driver must be familiar with the functions and benefits of injury prevention systems such as seat belts and airbags.

Legal norms should never be violated, regardless of which legal branch they belong to. In principle, the mere knowledge of the prohibition (and not just the threat of criminal legislation penalties) should motivate or compel the perpetrator to comply with the law.

This is a specific type of blame where no one wants consequences, where there is no intent. If the latter exists, it is no longer a matter of traffic. But even when it comes to negligence, there are completely different motor vehicle drivers. Many commit a subconscious misdemeanour. In other words many accidents happen because something is "overlooked". Despite the potential or even the grave consequences, these offenders should not, at least in our view, be equated with those who knowingly exceed the speed limit or drive under the influence of alcohol or illegitimate drugs.

The prevention of road accidents is one of the most difficult tasks if all measures are not harmonized. Researches point to the reasonableness of punishment, which must be within justifiable limits. The most telling example is that the proportion of serious traffic accidents due to speeding in the state of alcoholic intoxication do not decrease, although the focus of control and the level of sanctions are most pronounced here, which among other things means, that rapid changes in behavioural patterns cannot be expected. It is a long-term cultural and civilization project. As it is successfully establish on one hand, it is also demolished on the other with many inappropriate measures and procedures.

Conclusion

The number of road traffic accidents with fatalities and serious injuries has declined slightly in recent years, but it cannot be argued that this is merely the effect of a tougher punitive offense policy. The reasons can be found in increasingly safer cars, the introduction of vignettes that reduced traffic on regional roads as being the most burdened by traffic accidents, with some technical interventions in traffic management (obstacles on the road to reduce speeds, roundabouts), and partly also with numerous high-profile awareness campaigns for drivers about the dangers of drunk driving and the risk of speeding.

Road traffic regulations have introduced penalty points as a form of sanction, and subsequent laws and their amendments have only made sanctions for violators of road traffic regulations more stringent. It can be rightly argued that sanctioning traffic offenses is the most dynamic area of criminal law, with fines increasing every few years. And this is always accompanied with the argument that higher fines will make everyone safer.

Violations of driving time, rest, manipulation of the tachograph and improperly loaded vehicles cannot be attributed solely to the personal responsibility of the driver, but also to the responsibility of employers who often exert pressure on employees and force them into such acts. The vast majority of employers still blame drivers for major violations. It is up to the employer when the employee will start and end the ride, since the employer’s biggest goal is to get the driver to complete as many trips and kilometres as possible. Drivers thus drive longer

distances than they should, are constantly under pressure and even mobbing, whereas employers make significant profits and do not think about road conditions and traffic safety.

Drivers are mentally, physically and emotionally exhausted at work. If drivers do not respond to fatigue in a timely manner (with rest), they are unreliable and unable to monitor traffic situations. With drivers who take on too many work responsibilities, this effort has an even greater impact, and thus often leads to anger while driving, which consequently affects traffic safety.

Undoubtedly, all of these circumstances contribute to road traffic safety, each in its own right and, above all, in combination with the others. It cannot be simplified and said that through different measures there will be fewer road casualties in a year. Every road casualty is a failure, because every life is precious. Such unwanted phenomenon can only be affected when we know it well, when we know all the circumstances that affect the multiplicity of traffic offenses, and this is the challenge for all included parties.