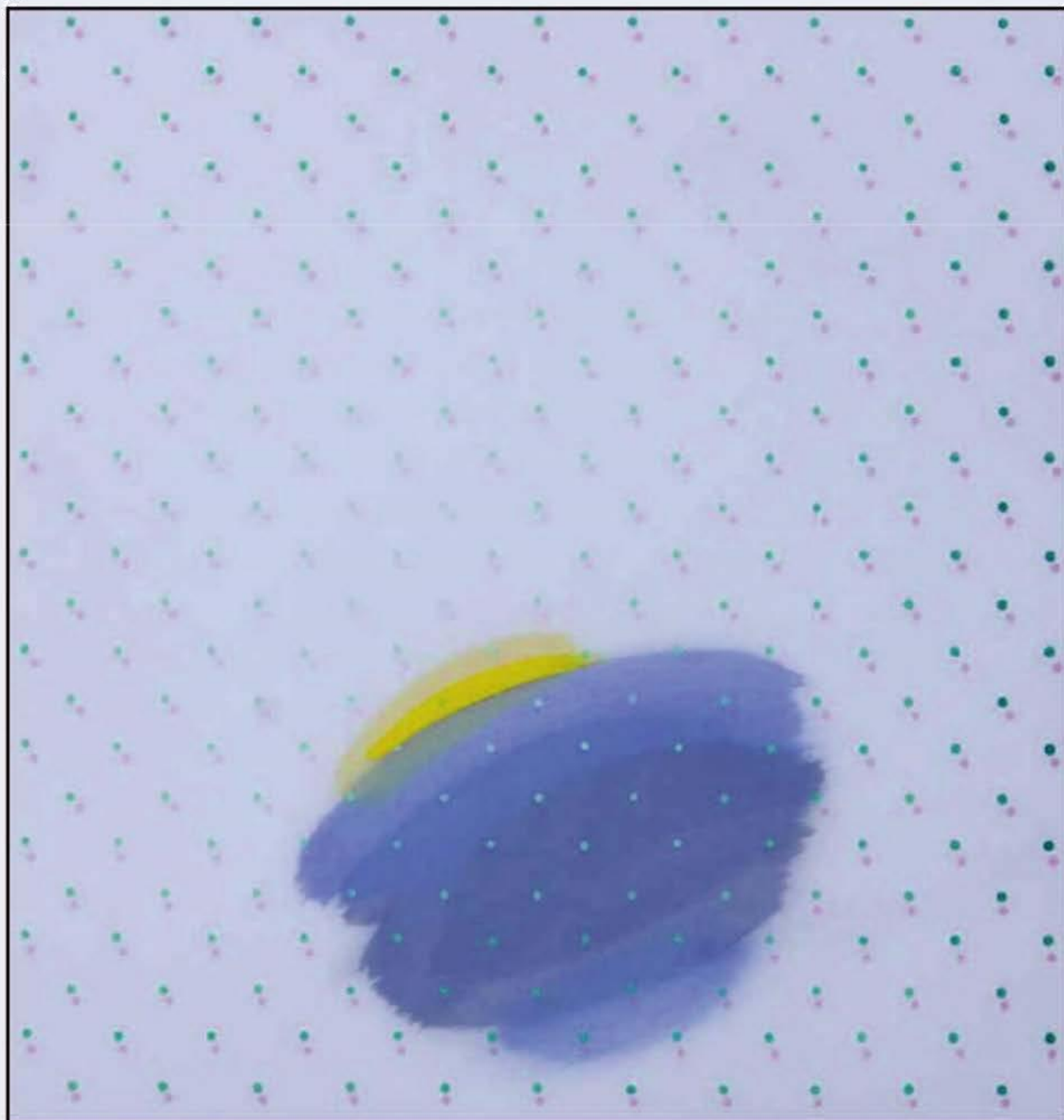


# SEEJSD

SOUTH EAST EUROPEAN JOURNAL OF SUSTAINABLE DEVELOPMENT

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Vol. 6 (1/2022)



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# SEEJSD

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### **Emergence of new global communication**

#### **Abstract**

The new era of global communications has brought serious changes in the way of communication in the world. Communication in every sphere and in each field, as we know it, is slowly diminishing. Over the past period, the process of new global communication was under development, but people were shyly willing to accept the new way of communication. The emergence of the Covid 19 pandemic, dubbed the 21st Century Plague, which took many lives, has accelerated the emergence of new global communication. When the entire world hoped for a change in the way of communication, it happened, not only locally and regionally, but also globally. Suddenly, the business community, educational institutions, hospitals, judicial institutions, municipalities, labor organizations, etc. realized how important it is to change the way of communication in order to realize the planned activities. With the implementation of new types of global communication, the world has also got new way of implementation of organization programs. Protocols and processes have been introduced that require active and precise realization of everything that will be sent from one communication channel (sender) to the other communication channel (receiver). With this scientific paper through the method of analysis of document content and presentation of results, we will analyze and bring closer the importance of the emergence of new global communication. This will clearly emphasize how important it is to follow every small change in the way of communication, in the part of realization of the activities. Eventually, the Covid 19 Pandemic will show how it has completely changed the way society communicates.

**Keywords: Communication, Information Technology, Global Era, New Direction**

## 1. Introduction

From an early age, man begins to actively communicate. He spends his whole life in communication through the act of speaking, listening, asking questions, communicating, sending signs, etc. Communication is actually a social phenomenon whereas a subject of research it is related to many different scientific disciplines and many theories have tried to describe, predict and understand the behaviors and processes that makeup communication. Thus, communication can be defined as a complex process oriented towards acting on informing, generating, understanding the interlocutor, and encouraging some kind of response from the receiver. According to communication expert Fernando Gonzalez Ray, it is a process of social interaction, through signs and sign systems, a product of human activities. If men are taken as an example in the communication process, they express their needs, aspirations, criteria, emotions, etc. According to another communication expert, Idalberto Ciavenato, communication is defined as the process of transmitting information and understanding from one person to another. Therefore, all communication affects at least two people: the one who sends the message and the one who receives it.

We can therefore conclude that the communication process consists of two phases: the transmission phase and the feedback phase. But on the other hand, if we expand the topic of communication and discuss effective communication, we will notice that it is a process where the message is received and understood by the recipient, just as the sender intended to send it. At first glance, this definition seems very simple, and yet in practice, it is very difficult to implement. If society were perfect and knew how to communicate and use this definition correctly and completely, then surely there would not be so many misunderstandings, wars, riots, broken marriages, friendships, and business relationships.

If we add the organization in the communication process, we can conclude that it is a complex concept that encompasses all communication processes between employees, communication processes in the company. Communication processes between different groups and teams in the organization, their interaction with other employees and the company as a whole, as well as the company's interactions with the outside world.

## **2. The impact of the Covid 19 pandemic has completely changed the way society functions**

The COVID-19 pandemic has dealt a severe blow to the entire world, resulting in a serious death rate for much of the global population. The crisis turned into an incredible shock to the global economy and labor markets, affecting not only supply (production of goods and services) but also demand (consumption and investment). The prospects for the economy and the quantity and quality of employment are rapidly deteriorating. Although the forecasts differed in that period, they still underestimated the situation, which resulted in a global economic recession. Rapid and coordinated global policy measures were needed to prevent the spread of COVID-19 on human health and to mitigate the indirect economic consequences globally. Policy measures globally focused on two immediate objectives: health care and economic support measures on both the supply and demand side. However, at that point in the direction of health care measures, digital tools through the Internet, which were part of the support of the activities, became key in the whole process of performing the tasks.

## **3. Information and communication technology at the time of the Covid 19 pandemic**

Freedom of expression and information and freedom of the media is essential to the functioning of a truly democratic society and continue to be the same in times of crisis. Providing timely information on public health risks is a key element in responding to the crisis. In times of health crisis, when people were left alone, they needed verified information. People were constantly reading and listening to the news, seeking advice and a way out for themselves and their loved ones. In fact, for humans, it was also a time of the constant search for information, exposing them to the 24-hour posting of unverified, unsecured, and even false information. But the information and communication technology enabled the citizens to have more sources for checking, both in order to check the Covid 19 pandemic, as well as for work activities. Exactly the technological tools are an important segment in the communication for the achievement of the organizational goals. To fully realize the positive effect of information and communication technology, it took a short period of time for organizations to realize their effectiveness and power. Although in the past the attitude of many managers, who in modern

business thought that there was no better way to communicate than face-to-face communication, still with the covid 19 pandemic, a serious reversal was made.

The use of technological tools in organizational communication has confirmed the long and shy battle of technology that communication can be done over the Internet, especially through the tools that are available for mass communication. Technological communication inventions have enabled electronic communication, voice mail, video conferencing, e-mail, computer networking, and communication platforms which have become one of the most important elements in achieving organizational goals.

Companies from all over the world have already used their effectiveness of information and communication technology very wisely and have oriented themselves towards the virtual office, ie work from home. This is due to the many communication tools and the countless possibilities offered by the Internet. Here, too, we need to emphasize group information exchange software, intranets, and extranets.

An intranet is a generic term for collecting private computer networks within an organization. The intranet uses network technologies as a tool to facilitate communication between people or workgroups, to improve the ability to share data and the overall knowledge of an organization's employees. The intranet uses standard network hardware and software technologies such as Ethernet, WiFi, TCP / IP, browsers, and servers. The website is extremely useful for communication and cooperation between employees for the successful functioning of any business organization. This utility that the Intranet offers to businesses is presented in the form of tools such as. discussion groups, Intranet forms and bulletin boards. The use of Intranet tools helps in the transfer and distribution of the necessary information or documents between the employees of an organization. This in turn results in an easy communication relationship between the employees and the top management. Today, many business planners use Intranet tools, various forms of discussion, chats, emails, electronic bulletin boards, and more, that significantly assists in communication between the different departments and divisions of an organization.

An extranet is a computer network that allows controlled entry from outside, for a specific business or educational purposes. An extranet can be seen as an extension of a company intranet that is extended to users outside the company, usually partners, vendors, and suppliers. An extranet can also be understood as an intranet mapped on the public internet or some other

transmission systems not available to the general public, overseen by multiple administrators from one firm.

The direction of more effective communication includes virtual meetings, audio conferencing, webinars, e-trainings, e-seminars, and one of the most used tools in communication in organizations is the e-mail, which employees use for internal and external communication.

The use of e-mail, in addition to saving time, is an important element in the full correspondence between the sender and the recipient, which leaves the opportunity to check the communication at any time.

As an added value of the communication process is the website of the organization, which at all times has the necessary information for the visitor. The site, rich in information such as contacts of employees, managers, shareholders provides complete information to the interested visitor.

This includes educational digital platforms, which have proven to be one of the most important tools in the past, when children did not attend classes and continued their educational process from home, following the directions of the schools where they attended classes. The universities conducted the process of enrolling and taking exams through university platforms, where new and regular students could be informed about everything they need related to attending classes and the necessary materials.

The local self-government is one of the most important organizations, where the citizen uses his rights, places his communication activities through social media. The briefings were transferred through online platforms such as Zoom, Jitsy, Youtube, etc. The interviews were conducted with questions submitted to the public relations departments and answered. The notifications followed by video were recorded and sent to the media. Citizens' questions were conducted electronically. All promotional events that were previously covered by journalists and media outlets are now held with a pre-recorded video and distributed to the media. All these events, which are now carried out by the public relations services, are aimed at safety and care for the health of employees and citizens in the local self-government units. By adapting and practicing public relations during the pandemic, local government units contribute and raise the level of work and follow the global trend like other local government units worldwide. An example in the world is the city of New York, which is one of the most famous and most visited cities in the world. The New York City Public Relations Department distributes and informs the public through social

media and pre-recorded notifications, giving citizens the information they need during a pandemic.

Electronic message transmission, compared to direct communication, is limited to the use of non-verbal signals. Electronic communication is difficult to replace non-verbal communication. That is why it is important, as in other types of communication that the electronic message be concise, clear, polite, and concrete and the words with which the message is conveyed must be well measured.

#### **4. Research related to the use of information and communication platforms during Covid-19**

Nearly 90 percent of workers want to have the choice of whether to work from home or the office once the coronavirus restrictions are lifted. They also want more working time autonomy, according to research by Cisco Systems. The study shows that the pandemic quickly changed the attitude towards work from home, as two-thirds of workers have a higher rating for the benefits and challenges of working remotely.

Although only 5 percent of respondents worked from home before the pandemic, now 87 percent of employees want to be able to choose where, how, and when to work, a combination of office work and work from home, according to a Cisco report. Cisco Vice President Gordon Thomson says companies will need to make changes to meet new employee demands, which prioritize effective communication and collaboration. Thomson acknowledges that technology must be used to ensure the safety of employees and the protection of their data in their work environment, whether at home or in the office. The survey surveyed 10,000 people in 12 markets in Europe, the Middle East and Russia as part of Cisco's study of the future of jobs.

The results of another study of 7,000 households in Germany who worked from home during the pandemic show that working from home reduces stress, allows more time to be spent with family and leads to greater productivity. The conclusion is that many respondents said they have a positive experience. The majority said working from home has reduced their stress, given them more time to devote to family life, and led to greater productivity. More than three-quarters of respondents who said they had not worked from home before hoped to continue to do so in the future. The research was requested by the health insurance company DAK, and conducted by the

research centers IGES and FORSA before and during the pandemic. The survey also shows that 21 percent of workers were stressed before the pandemic due to travel to work, and after the pandemic that number dropped to 15 percent. The percentage of workers who say they are never or sometimes under stress has risen from 48 to 57 percent. Of those who now work regularly from home, 56 percent say they are more productive than doing their job at work, and two-thirds say they can better combine work and family. According to the survey, almost 77 percent of respondents who have not previously worked from home say they want to continue to do so in the future.

## 5. CONCLUSION

The public has not been able to answer any questions since the Covid-19 pandemic, which continues to cause global damage around the world. It takes science to work at an even faster pace to fully understand the complexity and severity of the impact of the Covid-19 pandemic. However, we should be aware that we have learned many important and serious lessons to be learned from this intense impact that the Covid 19 pandemic has had on the entire social system. One of those lessons is the long-announced change in the way people communicate in the business sector, educational institutions, electoral processes, industry, health care system, etc. This pandemic, under the influence of external and internal factors, made a complete reversal in the final effect of the message that is sent or received in the communication process. With that, the long-announced new era of global communications arrived on the threshold of society and brought serious changes in the way of communication worldwide. Suddenly, the business community, educational institutions, hospitals, judicial institutions, municipalities, labor organizations, etc. realized how important it is to change the way of communication in order to realize the planned activities. With the implementation of new types of global communication, the world received a new way of implementing the programs of organizations. They introduced protocols and processes that require the active and precise realization of everything that will be sent from one communication channel (sender) to the other communication channel (receiver). With that, very clearly and unequivocally, the importance of implementation of each new change in the way of communication was emphasized, especially in the part of the realization of the program activities.

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# Shape optimization with composite sketching in a redesign process

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## Abstract

In order stay competitive in the continuously growing global market, design engineers need to create high quality and innovative products in an efficient way. Sketching is an important part of the design process that helps designers during creative phase of the process and helps them develop inventions in a cost effective, fast and flexible way. In this study, sketching and CAE tools (Shape optimization) are used to redesign an old component of a telescopic hydraulic cylinder with an objective of reducing its mass while maintaining its performance and functionality. The results show that the final product that is derived by using the above mentioned methods has been reduced by 30.77% of the original weight while ensuring normal operation under the given constraints.

**Keywords:** Redesign, form generation, sketching, creativity, shape optimization

## 1. Introduction

Engineering design is quite complex process when it comes to creation of new industrial products. During this process sketching is a useful tool which helps engineer designers to develop their new products. Sketching includes all forms of graphical representations in the early stages of the design process, including hand-drawing and digitalized drawings. As important as they are, sketches help designers during the early stages of design process and pave the way the development of inventions. Being the first language of design, sketching is considered as one of the most powerful tools that an engineer designer can possess. Moreover, sketching is the quickest and most efficient tool for problem definition, ideation and the development of form and function. Considering the fact that in the digital era that we live, the influence of CAD and CAE in general in the product design is quite large, sketching is still an essential tool for the product and engineer designers, being free from the logical processes of the digital programs.

Researchers conclude that engineers that don't possess good sketching capacities, have difficulties with finding results that fastens the design investigational process (Kapoor et. al., 2011) The ability to generate abstract concepts without concentrating too much on the mechanics of drawing afford the designer a higher level of abstraction and reflection, facilitating creativity and innovation.

## 2. Introduction

In this study, sketching is used in the early stages of the redesigning process of a small component of a hydraulic cylinder called as the “base eye” of the cylinder. In this process, both sketching and CAE tools are used in an attempt to develop a new design of the component, making it more resilient and cost-effective than the previous one. The aim of the study is to reduce the weight of the component by at least 35% of the original weight while maintaining the performance and avoiding distortion.

### Sketching for product design

The appearance of the space is a complete visual effect produced by the structure, shape, material, dimension and finishing surface (Kevin, 2012). The shape refers to the profile of the product, while the structure is a result that comes with the positioning of the adjacent shapes in obtaining the final product. Every good product is produced with a number of elements of form, which together make up the final external form. These elements of the form help to give it the final look.

One of the fastest ways for designers to come up with ideas is sketching. Sketching differs from drawing by their level of precision: drawing is more planned and precise, that comes after an earlier sketching process (Kevin, 2012). Apart from being a tool that is used to give shapes to the objects and spaces, sketching is also a tool for planning, thinking and research. It is used by a wide range of people, including scientists, mathematicians, engineers, economists and trainers to help explain, give instructions or simply think "out loud" on paper. With the available complex and immediate information, fast imagination and sketching help to make data more simplified in a much more efficient way than language (Kevin, 2012). The designer uses lines and tags to direct ideas into existence, while they are still only partially formed in his or her mind. This process allows the designer to go back to the sketch and add or subtract it from it or simply review the ideas on paper and continue the thinking process started earlier. Such an idea of sketching is it is a highly creative and dynamic process where the power and poetry of the line can define form or clarify connections thus improving communication (Chitale & Gupta, 2011).

Despite the presence of computer design assistance, sketching is still essential when designing products. This is because the computer cannot visualize what the designer thinks, instead it requires specific input, which in turn requires knowledge of sketching. While computer design software differs in its basic approaches to creating geometry (surfaces versus solids, for example), they all require the designer to "build" a shape by sketching using the same types of geometry - lines, arcs, circles, curves, etc (Chitale & Gupta, 2011).

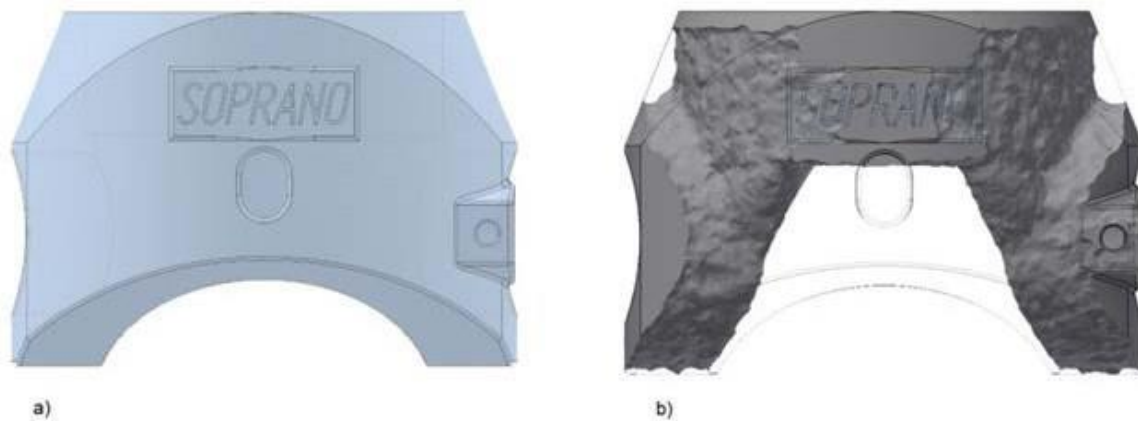
## 3. Research Methods

In this study, sketching is used in the early stages of the redesigning process of a small component of a hydraulic cylinder called as the “base eye” of the cylinder. In this process, both sketching and CAE tools are used in an attempt to develop a new design of the component, making it more resilient and cost-effective than the previous one. The aim of the study is to reduce the weight of the component by at least 35% of the original weight while maintaining the performance and avoiding distortion.

#### 4. Findings and Results

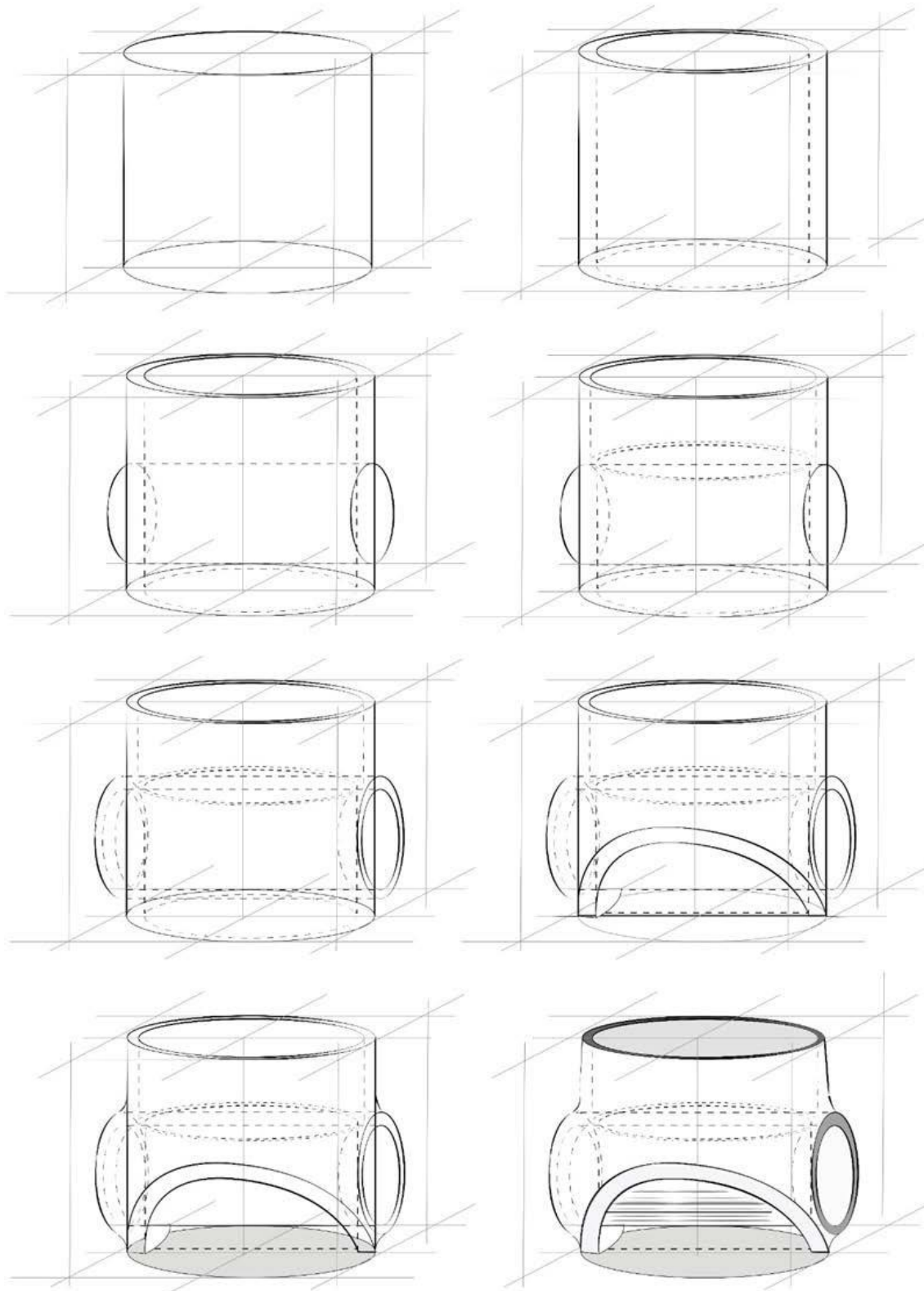
After the CAD generation of the old model (fig. 1, a) and the application of topology optimization method, a draft model of the base eye is derived shown in the figure 1, b. As we can see from the picture, the topology optimization removes the redundant material of the old model by reducing the mass of the product according to the desired percentage we entered in the specifications, without changing the functionality of the product. Various sketches are drawn based on the shape generator recommendations to obtain the final product design. As a drawing technique, the method of form morphology described in Kevin Henry's book is used.

Kevin Henry, uses the term morphology in his book, with the intention to describe the generation of form through sketching as well as computer modeling as according to him that is the “clearest analogy of how designers often add, subtract, or otherwise “morph” form through manipulation” (Henry, 2012). He adds that, shape morphologies help designers in the process of creating and generating new forms by combining and subtracting components (Henry, 2011). We can mention three processes of form creation: the additive process, subtractive process and composite process.

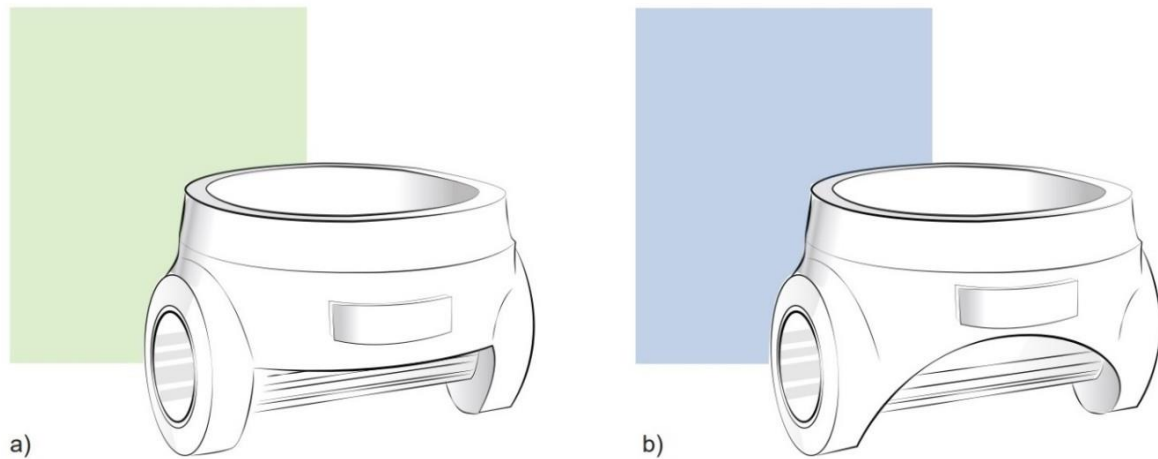


**Figure 1. a) Front view of the old model of the base eye in CAD, b) The base eye after the application topology optimization with 35% decreased mass**

In the additive process we add forms to the existing structures with different purposes such as expanding or changing their function and appearance. The subtractive process, modifies the object by removing material to obtain a more defined form, to change or simplify its function or just for aesthetical purposes. Finally, the composite process which is a combination of both adding and subtracting until we reach the desired form. This process is used to derive our final product which is shown step by step in the following sketches. It starts with the basic form of the base eye which is the cylinder, then based on the topology optimization recommendation for material reduction), some parts are added and others are subtracted as shown in the sketches below (Figure 2). Finally, two final sketches are derived (concept a and b from Figure 3.) from which the concept b is chosen as the final design of the base eye.



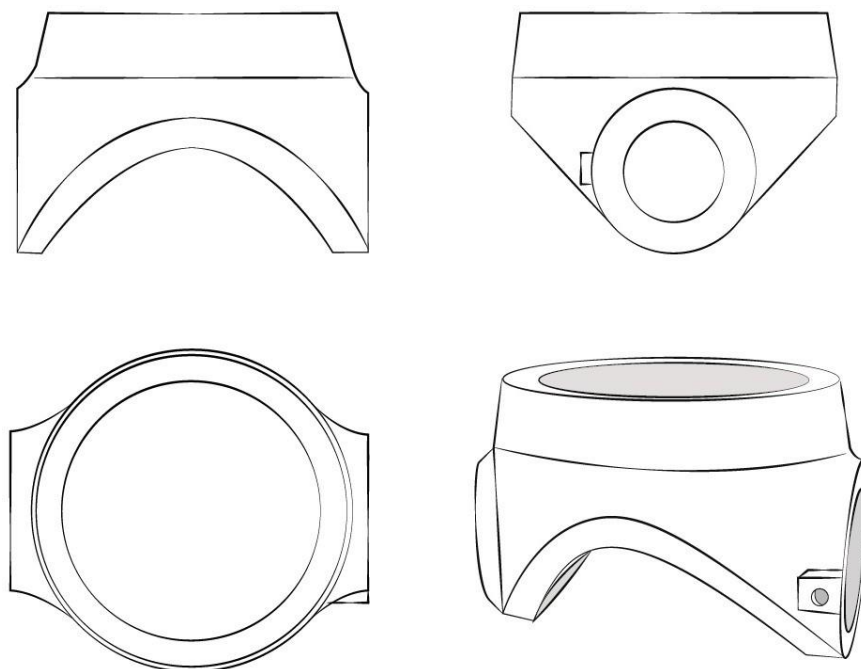
**Figure 2. Composite sketching for form generation of the base eye**



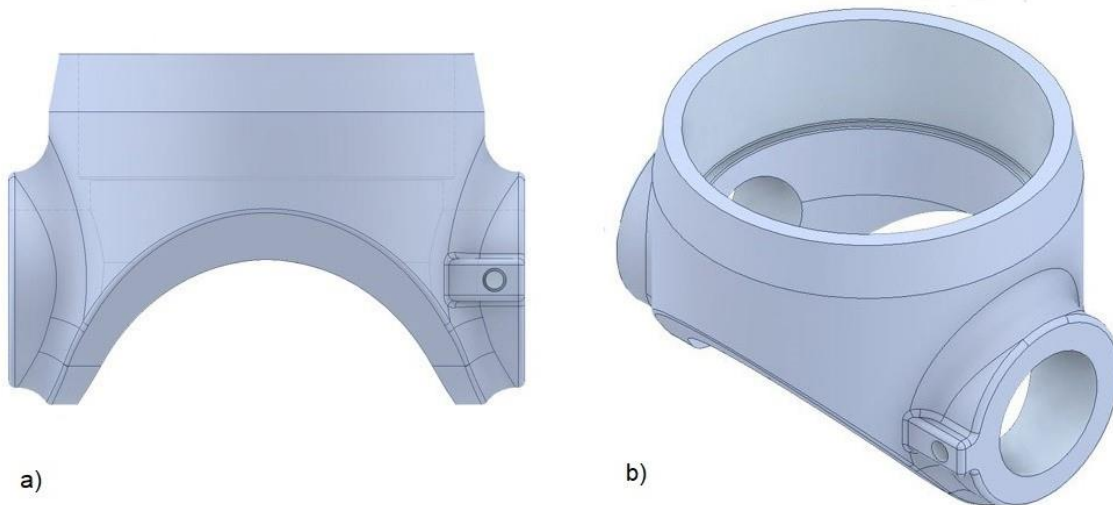
**Figure 3. a) and b) Final sketches of the base eye design concept**

Although ink and paper sketching is the most traditional approach, there are various technological alternatives. Using a traditional computer mouse to sketch remains a daunting task, while electronic sketching (Wacom, <http://wacom.com>) allows designers to translate their movements with their free hand using the tablet's electronic pen, creating a computer sketch. This approach is preferred in many areas, including CGI industry, architecture, industrial design and the arts as it provides many features. Additionally, this approach is used to present the technical drawing of our final basic eye design concept as graphically shown in Figure 4.

Several techniques have been developed for storing and processing digitized sketch data and interpreting this data to create 3D shapes. Techniques such as curve shaping modify sketched strokes by approximating (smoothing) without losing the overall curve. This is mainly done to eliminate product related errors. After processing the digitized information with such techniques, form information is obtained which is known as sketch recognition. The information can be additionally used to create 3D models as it is presented in Figure 5.



**Figure 4. Technical drawings of the base eye design**



**Figure 5. a) Front view of the new model of the base eye, b) Perspective view of the new model of the base**

## 5. Conclusions and Recommendations

Considering the lengthy and expensive process of designing optimal engineer products, finding quicker and feasible solutions is a primary task for the engineer designers in the global competitive market. The use of topology optimization in our design, enabled us to get an optimal form and lighter product reduced by 30.77% from the original weight, by skipping the hard prototyping process. In the same way, sketching had a positive effect on the final design quality by fastening the idea and concept development into a successful product. Given this results, we can conclude that sketching is an important process in the early creative phases of engineering design and as such they should be ongoing research topics within the design community.

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# THE IMPACT OF DIGITAL MARKETING ON THE CUSTOMER'S PURCHASING DECISION

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## ABSTRACT

The article presents the results of the impact that forms of digital marketing have on the decision of citizens or customers to buy online. It accurately represents the opinion of citizens why they decide to buy and what are elements that they see as crucial when deciding to buy. The research was conducted through an online questionnaire with a random sample of 305 respondents from different territories in Kosovo. The results were analyzed through the SPSS program (v.25). The research results show that the main reasons for using social media are related to obtaining information about products and services, but also for networking, offers, and promotions, entertainment, while the areas they buy the most are in terms of technology, clothing, and accessories, while the purchase of books and work tools has a lower level. The research is based on five stages of the process on which it is considered that buyers rely in advance to buy. Those stages are classified into the need for recognition, information research, evaluation, selection decision, and post-purchase evaluation. According to the results of research conducted through Amos SPSS and correlation, we conclude that e-mail marketing and mobile marketing have a positive correlation with the need for knowledge, information research, evaluation, and purchasing decision, while retargeting is correlated only with information research. and the need for purchase. In this context, we say that marketing models are a very important factor in citizens' decision-making for online shopping, but based on the results of e-mail marketing and mobile marketing plays a positive role in purchasing decision-making. In this context, I recommend that companies be careful in the forms of marketing through e-mail marketing and mobile marketing so that this has an even deeper impact on decision-making, based on the five stages of the process. which is also based on the decision to buy online.

**Keywords:** Digital Marketing, E-mail, Mobile, Targeting, Customers purchasing

## 1) INTRODUCTION

Many authors present different definitions of digital marketing, but in general digital marketing can be described as a form of practice of promoting products and services, through the use of digital distribution channels through digital devices (Smith, 2012). It is also defined by (Beier, 2016) as a form of marketing activities, including branding which uses various media such as blogs, websites, emails, advertising words, and various social media networks. It is said that the use of digital marketing has brought about changes in the way of doing business or businessmen concerning consumers.

Most consumers currently own and use a variety of digital media such as computers, mobile devices, and social media which are considered to contribute to the progression of digital advertising spending. (Dahiya & Gayatri, 2018). On the other hand in terms of consumer-aspect and building their confidence to buy through these forms (Li, Guo, Cao, & Li, 2018) It is explained that there is a perceived risk of participants who buy at retail, so their costs are small but which as a whole represent an extraordinary daily consumption. According to (Teixeira, et al., 2017) they say social media can be used to integrate sustainable consumer views into the decision-making process. Also, the author (Abed, 2020) perceives it in that form by saying that social influence and trust represent the respective components that change the purpose of behavior towards social trade. And the authors (Collins & Moody, 2017) emphasize that utilitarian value and online trust further drive the connection between the perceived interactivity of the website and the purpose of repurchase.

Authors (Xu-Priour, Cliquet, & Palmer, 2017) show that trust and social interaction are favorably linked to the purpose of online shopping. As for the claims on this, the authors (Pratono, Darmasetiawan, Yudiarso, & Jeong, 2019) say that trust in social commerce enables Internet retailers to achieve pricing and sales capabilities, which generates positive consequences for their performance. In this context, my research also measures the impact of digital marketing on consumers' decision to buy online, as well as why they decide to buy products online.

## AIM OF THE RESEARCH

The purpose of the research is to analyze the factors influencing digital marketing in consumers' decision to buy online, through digital platforms, why they decide, how much they spend, and what are areas where they spend the most.

### Research question

***What are the factors of digital marketing, which lead to the decision to buy or not on digital platforms?***

## 2) LITERATURE REVIEW

Online shopping has played a very important role in business development. It is considered that digital technologies have been used extensively and have created significant impact in various business areas, including product development, buying, and selling, branding, customer relationship management or even establishing communication (Hudson, Roth, & Madden, 2012). On the other hand through digital technologies, we can say that we have a great impact on the communication process in the world (Chen & Lin, 2019).

We say that marketing communication turns to digital when digital broadcasting technology is used to establish relationships between businesses and customers (Bird, 2007). It is considered that the Internet through its channels such as websites, social media, emails, smartphones, groups, and online communities, can be used in digital communication in the field of marketing, however, it does not mean that digital marketing communication is limited to this particular technology. Various authors see it as a form of profiting from businesses to communicate with their customers (Chen & Lin, 2019).

For digital marketing to be fully utilized, offline digital platforms such as TV are applied, then phones are often used to promote products and services along with business websites (Scharl, Dickinger, & Murphy, 2005). So the communication style in various skills such as interaction, access, client communication, personalization, measurability, and handling of large information sources, is considered to have been

reformed by digital technologies (Chen & Lin, 2019). Digital communication technology enables the delivery of offers and content in real-time and personalized to an individual user of the service.

Through interactive and targeted communication are also achieved the main motives of businesses to use digital marketing communication (Merisavo, et al., 2007) who have emphasized that digital marketing communication enables the delivery of marketing messages and at the same time, have ensured that customer satisfaction is not compromised. For this reason, the increased customer experience with personalization is enabled, through digital media of marketing communication, where it has become more popular than the traditional format. (Adam, Ibrahim, Ikramuddin, & Syahputra, 2020). Many authors suggest that participation by both parties in digital marketing communication is just as common. On the one hand, digital channels are making their efforts to influence the consumer purchasing decision, while on the other hand consumers are exercising their influence through digital media by looking for products and making evaluations, choices, preferences, reference, opinion, suggestion, their evaluation, feedback and recommendations in product categories such as clothing and fashion products, books and accessories (Kink & Hess, 2008).

According to the authors (Mou, Shin, & Cohen, 2017) they point out that the level of trust of users is in itself an important driver in the adoption of electronic services. And on the other hand, the authors (Ghazali, Mutum, Chong, & Nguyen, 2018) emphasize that consumer perceived effectiveness of institutional mechanisms moderately moderates online trust in retailers and repurchase goals.

Authors (Mou, Shin, & Cohen, 2017) also argue that more than hedonistic values, trust, and privacy issues, utilitarian values favorably influence shoppers' attitudes toward online shopping. On the other hand, we have authors who say that (Ji, Zhang, & Yang, 2017) mobility, trust in the service provider, and security/privacy risk also affect embracing social commerce. Authors (Walsh & Brylla, 2017) emphasize that a positive reputation of an online retailer can reduce end-user risk and bring confidence, thereby boosting customer engagement.

In the context of building consumer confidence to buy online, the author (Bird, 2007) explains that empowering consumers determines trust thus achieving their perceived content concerning their market practices and their purchasing purpose. And the authors (Hajli, Shanmugam, Papagiannidis, Zahay, & Richard, 2017) emphasize that the level of consumer credibility regarding a brand improves as trust, commitment, and content level increase. According to (Hsieh & Wu, 2019) emphasize that reading and are essential components that must be taken into account at the time of purchase by the consumer. (De Pelsmacker, Van Tilburg, & Holthof, 2018) state that trust has a beneficial impact on social norms, and also has a perceived risk which negatively affects the control of perceived behavior. Research by (Collins & Moody, 2017) emphasizes that social presence, proximity, and informational reinforcement have the potential to exert purpose over trust in product testimonials.

Numerous researches point out that the consumer buying process usually starts from recognizing the need, the ability of digital media in stimulating this preliminary stage of the buying process has been expressed in different opinions. According to (Ozturk & Coban, 2019) disagreed on the effectiveness of digital media in stimulating the need recognition phase, and the authors (Fu, Phillips, & Phillips, 2018) state that the issue is exactly the opposite in the case of product categories with low inclusion. We say that digital channels, especially social media sites, affect the way consumers search for information (Hausman & Johnston, 2014) state that searching for customer information on various Internet sites like search engines, YouTube, websites, discussion forums, comparison pages, and the like are more frequent than ever, which has caused a massive change in the arena digital.

### 3) METHODOLOGY

The research belongs to the quantitative type and was conducted through a structured questionnaire. The questionnaire was sent via e-mail addresses and distributed on social networks to people over the age of 18, for one week. The research sample was random, with a total of 305 respondents from all regions of Kosovo.

The research tool is organized in several sessions, where first the demographic data are collected, then the reasons for using digital media and the products they usually buy. Other sections ask for information on reasons for deciding to buy, situations, and analysis of digital marketing factors such as E-mail marketing, mobile marketing, target marketing, need to buy, information search, evaluation, the decision to buy, and after purchase. Regression and correlation analysis were used to conduct the research. Demographic-descriptive analyzes were performed first, followed by Alpha Cronbach's reliability test, normality test and regression, and correlation analysis.

The questionnaire was realized by me and compiled didactically. The questionnaire is organized in demographic data (gender, age group, level of education, use of digital media, frequency of online shopping, in which categories they buy the most, how much is their monthly income and how much they spend on online shopping), then in the second group of questions are the questions on the impact of digital marketing on the customer's decision to buy, exactly the reasons why they decide to buy on online platforms, where several factors are analyzed such as (company, product origin, company design, content, form of payment, price, possibility of payment, recommendation, product security, time of arrival, evaluation of previous buyers, platform and communication with sellers), as well as situations which have influenced the waiver of the purchase, such as an analysis of other digital marketing factors such as (e-mail marketing, messaging, phone application, internet messaging, other digital marketing channels). Link of the questionnaire: [https://docs.google.com/forms/d/1bJY\\_AVOEBduOYacccaDzS2r3RyTylf58KjmLVW84GOo/edit?usp=drive\\_web](https://docs.google.com/forms/d/1bJY_AVOEBduOYacccaDzS2r3RyTylf58KjmLVW84GOo/edit?usp=drive_web)

#### 4) RESULTS

According to Table 1, a total of 305 respondents participated in the research, of which 133 were male or 43.6%, 170 were all-female or 55.7% and 2 of them answered this question. In terms of age group, younger than 18 years old were 6 respondents or 2%, between 18-25 years old were 62 respondents or 20.3%, then among the age group 26-35 years old were 108 respondents or 35.4%, 94 were of age group 36-45 years old or 30.8%, 20 of the age group 46-55 years old or 6.6% and over the age of 55 years were 12 respondents or 3.9%. with primary education was declared only one respondent or 0.3%, 29 of them were with secondary qualification or 9.5% and 273 others were declared with higher qualification-faculty or 89.5%.

Table 1. Demographic results

<b>Gender</b>	<b>N</b>	<b>%</b>
Male	133	43.6
Female	170	55.7
N/A	2	0.7
<b>Age</b>	<b>N</b>	<b>%</b>
< 18 age	6	2.0
18 - 25 age	62	20.3
26 - 35 age	108	35.4
36 - 45 age	94	30.8
46 - 55 age	20	6.6
> 55 age	12	3.9
<b>Education</b>	<b>N</b>	<b>%</b>
Primary school	1	0.3
High School	29	9.5
Faculty	273	89.5

Based on the results of Alpha Cronbach's (Table 2) the level of reliability is at the high level with an overall average of 0.723, while based on the results (Table 3) we see that the data have a normal distribution, and in this context, we apply the tests non-parametric for hypothesis validation.

Table 2 . Alpha Cronbach`s test

Variable groups	Alpha coefficient
EMAIL_MARKETING	0.821
MOBILE_MARKETING	0.695
TARGET_MARKETING	0.734
Need_recognition	0.963
Information_research	0.648
Evaluation	0.525
Purchase_Decision	0.700
Post_purchase	0.739

Table 3. Test of normality

<i>Tests of Normality</i>						
	Kolmogorov-Smirnov <sup>a</sup>			Shapiro-Wilk		
	Statistic	df	Sig.	Statistic	df	Sig.
EMAIL_MARKETING	0.164	302	0.000	0.922	302	0.000
MOBILE_MARKETING	0.184	302	0.000	0.907	302	0.000
TARGET_MARKETING	0.135	302	0.000	0.958	302	0.000
Need_recognition	0.176	302	0.000	0.927	302	0.000
Information_research	0.192	302	0.000	0.917	302	0.000
Evaluation	0.189	302	0.000	0.920	302	0.000
Purchase_Decision	0.189	302	0.000	0.923	302	0.000
Post_purchase	0.194	302	0.000	0.937	302	0.000

a. Lilliefors Significance Correction

Based on the results of the analysis (Table 4) we can conclude that the factors that have an impact on the purchase decision are the evaluation of products by previous customers, which makes this factor very important for the decision-making process. On the other hand, the factor that affects the purchase is the need to know the products, so the form of marketing greatly influences the decision of consumers to choose the product,

so we must keep in mind that products must have enough information and do it. the consumer to feel comfortable when choosing. As well as in the end the other factor is the post-purchase analysis which greatly affects the satisfaction of the customers, so they should feel satisfied when buying to come back again.

Table 4. Regression

Independent Variables	Model -1-				Model -2-				Model 3			
	B	S.H.	$\beta$	Sig.	B	S.H.	$\beta$	Sig.	B	S.H.	$\beta$	Sig.
Email_marketing	*	*	*	*	*	*	*	*	*	*	*	*
Mobile_marketing	*	*	*	*	*	*	*	*	*	*	*	*
Target_marketing	*	*	*	*	*	*	*	*	*	*	*	*
Need_recognition	*	*	*	*	0.180	0.045	0.221	0.000	0.153	0.047	0.187	0.001
Information_research	*	*	*	*	*	*	*	*	*	*	*	*
Evaluation	0.293	0.047	0.336	0.000	0.237	0.048	0.271	0.000	0.219	0.049	0.251	0.000
Post_purchase	*	*	*	*	*	*	*	*	0.122	0.053	0.129	0.022
R	0.336				0.397				0.415			
R <sup>2</sup>	0.113				0.158				0.172			
$\Delta R^2$	0.110				0.152				0.164			
F	38.173				27.980				30.688			
ANOVA (Sig.)	0.000				0.000				0.022			
Dependent variable	Purchase Decision											

Table 5. Correlation

<i>Correlations</i>			1	2	3	4	5	6	7	8
Spearman's rho	EMAIL_MARKETING	Correlation Coefficient	1.000	0.318**	0.393**	0.199**	0.344**	0.271**	0.100	0.137*
		Sig. (2-tailed)	.	0.000	0.000	0.001	0.000	0.000	0.084	0.017
		N		302	302	302	302	302	302	302
	MOBILE_MARKETING	Correlation Coefficient		1.000	0.411**	0.169**	0.177**	0.197**	0.097	0.142*
		Sig. (2-tailed)		.	0.000	0.003	0.002	0.001	0.093	0.013
		N			302	302	302	302	302	302
	TARGET_MARKETING	Correlation Coefficient			1.000	0.191**	0.314**	0.167**	0.084	0.071
		Sig. (2-tailed)			.	0.001	0.000	0.004	0.146	0.221
		N				302	302	302	302	302
	Need_recognition	Correlation Coefficient				1.000	0.260**	0.256**	0.230**	0.262**
		Sig. (2-tailed)				.	0.000	0.000	0.000	0.000
		N					302	302	302	302
	Information_research	Correlation Coefficient					1.000	0.355**	0.189**	0.190**
		Sig. (2-tailed)					.	0.000	0.001	0.001
		N						302	302	302
	Evaluation	Correlation Coefficient						1.000	0.195**	0.258**
		Sig. (2-tailed)						.	0.001	0.000
		N							302	302
	Post_purchase	Correlation Coefficient							1.000	0.157**
		Sig. (2-tailed)							.	0.006
		N								302
	Purchase_Decision	Correlation Coefficient								1.000
		Sig. (2-tailed)								.
		N								

\*\* . Correlation is significant at the 0.01 level (2-tailed).

\* . Correlation is significant at the 0.05 level (2-tailed).

According to the results (Table 5) we see that email marketing has a positive relationship with the purchase decision ( $\rho = 0.137^*$ ,  $p\text{-value} = 0.017$ ), then there is a correlation also mobile marketing ( $\rho = 0.142^*$ ,  $p\text{-value} = 0.013$ ). Significant correlation is also the need for product recognition ( $\rho = 0.262^{**}$ ,  $p\text{-value} = 0.000$ ), then information retrieval ( $\rho = 0.190^{**}$ ,  $p\text{-value} = 0.001$ ) and evaluation by previous buyers ( $\rho = 0.258^{**}$ ,  $p\text{-value} = 0.000$ ).

## 5) DISCUSSION AND RECOMMENDATIONS

- The research was conducted in one month, which was attended by a total of 305 respondents, most of whom were female and over 26 years old. Most of the participants in the research had a high level of education, which makes the research more accurate and meaningful.
- The most common reasons for using social media were information about products and services, networking and entertainment, then family communication and offers and promotions. The most favored categories when shopping online are technology, clothing, accessories, library, and other work tools and services.
- The reasons why they decide to buy usually have to do with the content of the product, the safety of the product, the time when it can reach the destination, and also plays an important role in the organization of the platform. Communication with the seller, company design, form of payment, and price are secondary as important elements, while those that are less important are credit card payments or even the recommendations of others.
- And the reasons why they usually give up buying are the negative comments from previous buyers about the product, the bad behavior of the seller as well as the form of payment.
- The results obtained from the Alpha test show that the data meet the conditions for further analysis, while the normality test confirms that the data are non-parametric distributions, which should be applied to non-parametric tests.
- The results obtained from the Alpha test show that the data meet the conditions for further analysis, while the normality test confirms that the data are non-parametric distributions, which should be applied to non-parametric tests.
- Based on the factor analysis we see that the data are classified into five main factors related to E-mail marketing, then in the second factor is classified as Mobile marketing factor, in the third factor is the information about the product and its evaluation, in the fourth factor is the need for recognition and in the fifth factor the decision to purchase and evaluation after purchase.

- Based on the regression analysis we understand that evaluation is one of the elements that most influences the decision to purchase products, it is precise that they give importance to feedback from previous buyers and the service provided, and the factor Second important is the need for recognition of the importance that consumers place on offers for different products. Also, the third factor is the evaluation element after purchasing the product.

## **Recommendations**

- ❖ Based on the final results, I can say that the companies that deal with the service of online products, should pay great attention to the offers and forms that they offer the products to the customers, to have well-designed and clear platforms.
- ❖ Also, the forms of payments and the behavior with the client should be a very important element when providing this service.
- ❖ They should have an appropriate communication strategy with customers who are not satisfied with the products, as the results show that one of the reasons why someone decides or gives up the purchase is the comment factor or feedback of previous customers on the product.
- ❖ To provide more information about the content of products and their safety.

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## 7) APPENDIX

Figure 1. Histogram

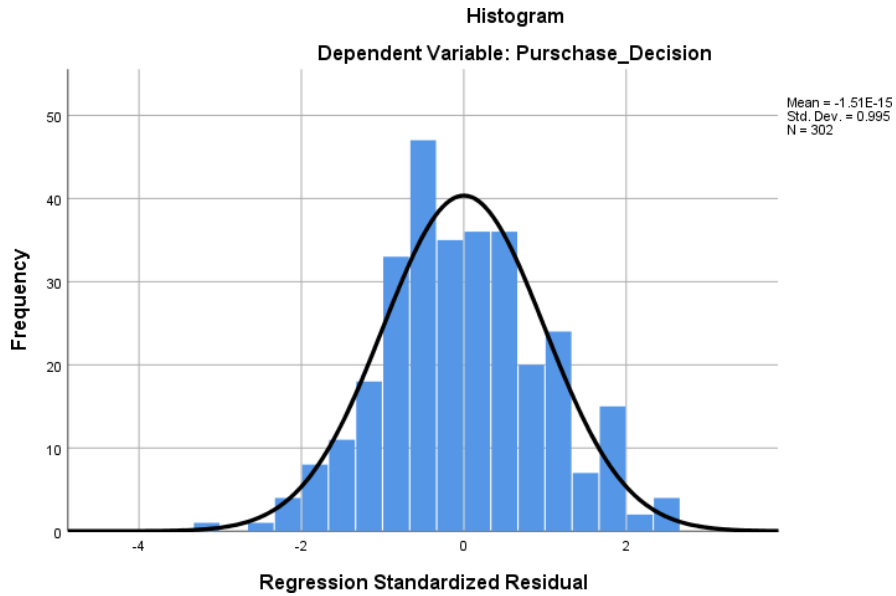


Figure 2. Normality plot

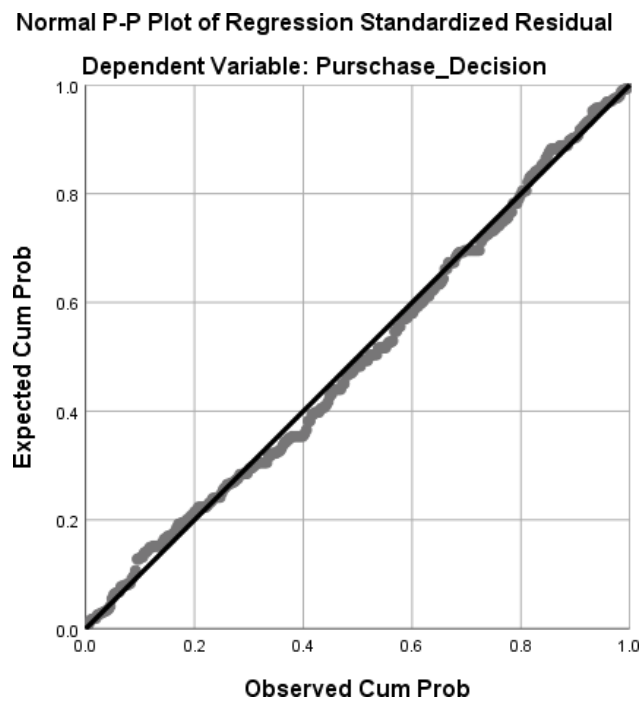
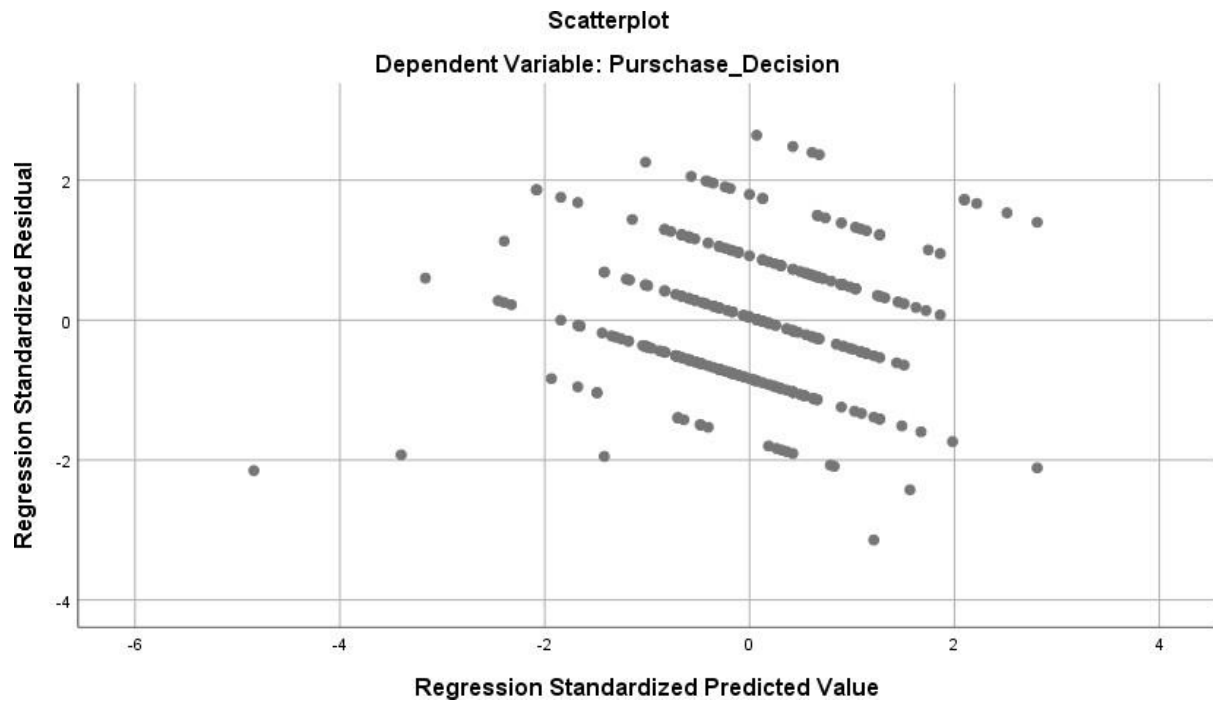


Figure 3. Scatterplot



# **Analyses Of Ecological Indicators of Energy Management in The Transition to Sustainability By Devising a Software System**

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## **ABSTRACT**

The purpose of the research study is analyses and assessment of the Ecological Indicators of Energy Management in The Transition to Sustainability and measure the current state by devising a software system to do so. The global community is using natural resources very intensely – at rates exceeding nature’s ability to regenerate their productivity potential. Economically developed countries throughout the whole world should prepare a new sustainable development strategy including the marked development of renewable natural resource production, as well as the effective implementation of various environmental protection measures. The goal of this paper is to assess the Ecological Indicators of Energy Management in The Transition to Sustainability and realize a review, and synthesis of opportunities for future research. There is a gap in published research regarding current Ecological Indicators of Energy Management in The Transition to Sustainability and what are the required for achieving sustainability. The research aims to approach the analysis of the emerging trends in Ecological Indicators of Energy Management in The Transition to Sustainability and comparison using qualitative method and questionnaire as well as two focus groups. The research methodology used is triangulation technique which combines qualitative and quantitative methodology. The issues, findings as well as recommendations are discussed and argued.

## **KEYWORDS**

ecology, pollution, biodiversity, information system, energy management, rising public awareness

## **1 Introduction**

The global community is using natural resources very intensely – at rates exceeding nature’s ability to regenerate their productivity potential (Horne et al 2018). Nature can renew its resources, however, only at a certain pace. People are constantly consuming more renewable resources than the nature is able to regenerate. Man’s actions are changing various segments of natural capital and this depletion or deterioration of the reserves diminishes the quality of inclusive human well-being, and causes obstructions on sustainable development (UNECE, 2020).

Sustainable development means that the needs of the present generation should be met without compromising the ability of the future generations to meet their own needs (Freeman et al 2017). Environment pollution is one of the major problems of today’s society (UNEP18, 2018). Raising public awareness among citizens and encouraging a sense of responsibility in the protection and promotion of the environment, by animating the young population in taking measures to prevent or reduce environmental pollution. This research is important to be undertaken and solved because they pose threat to life and wellbeing of all citizens and bring different other illnesses. Biocapacity is the ecosystems’ capacity to produce biological materials used by people, and to absorb waste material generated by people and CO<sub>2</sub>, the measure of human demand on the Earth’s

ecosystems (UNECE, 2020). Basically, it is the comparison between the needs of humanity, and the planet's capacity to regenerate, representing the surface of biologically productive land and sea, which is necessary to supply the renewable resources a human population consumes, and absorb the waste produced in that process.

## 2 Literature Review

The development of sustainability concept goes back to ancient times. For hundreds of years people have understood the need for a bigger life-support system<sup>1</sup> than the Earth can provide. This understanding is apparent in people's planting seeds in the ground, protecting native flora and fauna, and preserving the rivers, lakes and seas. Nevertheless, the idea of sustainability in actual appearance was mostly highlighted by the United Commission on the Environment (UNECE, 2020). At the time, Gro Brundtland, chairperson of the Commission, wrote the following text: "Environment is where we live; and development is what we all do in attempting to improve our life within that home. The two are inseparable."<sup>2</sup> The Commission claimed that sustainability "meets the needs of the present without compromising the ability of future generations to meet their own needs."

Brundtland's persuasively written description convinced the audience that the change to sustainability would have to end and slow down the deterioration of the eco-life and of Earth's reserves globally. Since the request for Global Action by the Brundtland Commission, the UN has emphasized the importance for change to sustainability by organizing a number of symposiums and signing contracts (UNEP18, 2018).

For some time, the global public (Karlsson et al 2020) has undertaken an initiative for an inclusive set of sustainable development objectives<sup>3</sup>, and a number of measures have been undertaken in the world. They are aimed toward: reducing starvation and impoverishment; improving medical protection, birth prevention and schooling; and, improving agricultural productivity, while decreasing habitat deterioration.

Today, thousands of administrative and non-administrative corporations, private companies and persons around the globe have accepted the concept of sustainability and started to raise awareness and have funds for sustainability plans. Companies have provided metrics to follow the economic, social and environmental effects of their activities (UNEP18, 2018).

Metropolises around the globe have formed and offered organizations to participate in recommended practices and promote progress. Local and global examples are present all over the globe. Such examples are: student organizations, the national science and engineering academies, and numerous professional scientific organizations (UNECE, 2020). The World Business Council for Sustainable Development and the Alliance for Science and Technology for Global Sustainability have created inter-departmental groups of members from private and public sectors to follow strategies for sustainability objectives.

The social perception of sustainable development is quickly developing as a consequence of these measures. It is expanding from satisfying Brundtland's human needs toward inclusive social well-being.

Well-being is the state of being comfortable, healthy, and secure due to having basic needs met, as well as having access to health, education, community, and opportunity. The essence of the human experience of well-being is a combination of material, social, and personal fulfillment. Inclusive social well-being is well-being of individual people gathered across space and time<sup>4</sup>. Matson P. et al, define development to be sustainable over places and times in which inclusive social well-being does not decline. They often use the expression "inclusive well-being" or just "well-being" (UNEP18, 2018).

## 3 Purpose of the Study

The purpose of the research study is the analyses and assessment of the emerging trends of Of Ecological Indicators of Energy Management in The Transition to Sustainability. We are using qualitative method and questionnaire as well as two focus groups.

The entire shift of the progress of civilization to "sustainable development" depends to a large extent on the transition from the use of conventional energy sources to alternative ones, and in order to promote alternative sources, it is necessary to emphasize that the basic tool for this endeavor is Energy Management (EM). The

main goal of EM is to increase profits by reducing costs in all forms of energy consumption, while one of the most important specific goal is reduction of emissions of harmful gasses and reduction of air pollution..

## 4 Research Methods

The research methodology used is triangulation technique which combines qualitative and quantitative methodology. As research method used quantitative method using questionnaire and focus groups.

Hypothesis H1: The proper definition of Ecological Indicators of Energy Management in The Transition to Sustainability can increase the biocapacity level and reduce pollution.

Main research questions are: What are the main emerging Energy Management in The Transition to Sustainability? What are the Ecological Indicators? How can we improve the current Sustainability level? What are the major challenges in energy management?

The aim of this research study is to investigate current situation in Energy Management issues (increased energy use, limited raw fuel reserves, global warming, etc.) and then develop and increase awareness and perception of the Ecological and Energy Footprint as indicators of sustainability and Energy Management. The model to be developed for this purpose is called the Ecological and Energy Footprint Analysis Model (EEFAM) which offers metrics for comparing the Ecological and Energy Footprint with the available Bio-capacity. Case Study has been chosen.

Social networks will be used to analyze and measure the values of the personal Ecological and Energy (CO<sub>2</sub>) Footprint, as an indicators of sustainability. By using social networks important information can be obtained about the attitude of the individual toward nature, and the awareness of their impact on the habitat. This analysis would enable us to undertake personal and collective initiatives directed toward a more rational use of the existing resources, as well as raising the quality of life and sustainability. Survey and Questionnaires as quantitative method of collection of data will be distributed through using social networks like Facebook and Twitter to analyze and measure the respondent inputs. Also, focus groups for capturing the qualitative input will be used within the social networks.

For some time, the global public has undertaken an initiative for an inclusive set of Sustainable Development and Energy Management objectives, and a number of measures have been undertaken in the world. They are aimed toward reducing starvation and impoverishment; improving medical protection, birth prevention and schooling; providing conditions for the creation of a low-emission society; and, improving agricultural productivity, while decreasing habitat deterioration. Today, thousands of administrative and non-administrative corporations, private companies and persons around the globe have accepted the concept of sustainability and energy management, and have started to raise awareness, and funds, for sustainability and energy management plans. Companies have provided metrics to follow the economic, social and environmental effects of their activities. The overall aim of sustainable development is to develop a set of actions and measures that will enable continuous improvement of the quality of life, both for the current and future generations, through the creation of sustainable communities, which will be able to manage and use resources efficiently, and apply the ecological and social innovation potential of the economy, ensuring prosperity, environmental protection, and social cohesion. For this reason, one of the directions of future development should aim at strengthening the whole system for implementing sustainable development and energy management, including a holistic approach, instead of the present, fragmented one. The aim of the Ecological and Energy Footprint, as indicators of sustainability, is to prove that the present way and rhythm of living is not sustainable. Therefore, it is important to take concrete action to inform society about the importance of the Ecological and Energy Footprint. Additionally, the Ecological Footprint can serve as a useful means of education, teaching people about the Earth's limited capacity, and human overconsumption, with the aim of changing the individual lifestyle, arguing that many contemporary lifestyles are not sustainable.

## 5 Findings and Results

University students were used as subjects because they are understood to be the future managers of our natural resources. There is an equal number of 35 male and 35 female respondents. Their average age is 19 years old. The average age was expected given the fact that the respondents are students. The youngest respondent is 18 years old, while the oldest is 22 years of age. The expected findings and arguments of the work provides sufficient information on the factors that influence the definition of Ecological Indicators of Energy Management in The Transition to Sustainability and assessment of the different requirements for energy management. In Table 6 below, in terms of the total Ecological Footprint, it is revealed that the total Ecological Footprint of the male respondents (6.47 gha) in the study is slightly higher than that of the female respondents (6.42 gha).

Ecological Footprint Component	Male Respondents' Average Ecological Footprint	Female Respondents' Average Ecological Footprint	National Average Ecological Footprint
Built-up Land Footprint	0.19	0.18	0.03
Forest Land Footprint	0.86	0.86	0.30
Crop Land Footprint	0.83	0.78	0.70
Grazing Land Footprint	0.21	0.20	0.23
Fishing Grounds Footprint	0.17	0.17	0.03
Energy Footprint	4.21	4.23	1.81
Total average Ecological Footprint	6.47	6.42	3.10

Table 1 - Statistical comparison of the Ecological Footprint between the male and female respondents  
The Ecological Footprint approach was applied to compare the environmental impacts between genders. The same web-based software created by the Global Footprint Network was used to convert the consumption data into its equivalent Footprint values. Gender wise, the male respondents have a slightly higher personal Ecological Footprint (6.47 gha) than the female respondents (6.42 gha). It should be noted that most of the Ecological Footprint from the respondents (both male and female) is attributed to their Energy Footprint (65%). This can be explained by the fact that students are more likely to purchase products and services, as well as travel (which entails a larger share of resource consumption which produces CO<sub>2</sub> emissions).

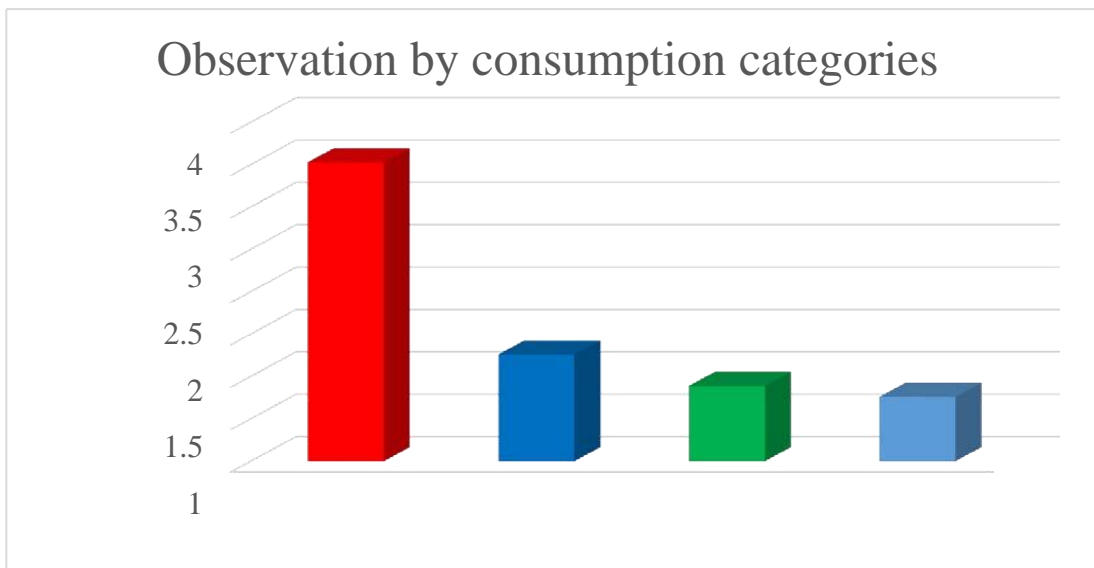


Figure 1 - Ecological Footprint of the respondents by consumption category

As can be seen from Figure 5 below, according to the types of land, the largest share in the Total Ecological Footprint of our respondents is due to the forest land needed to absorb the carbon dioxide (4.22 gha).

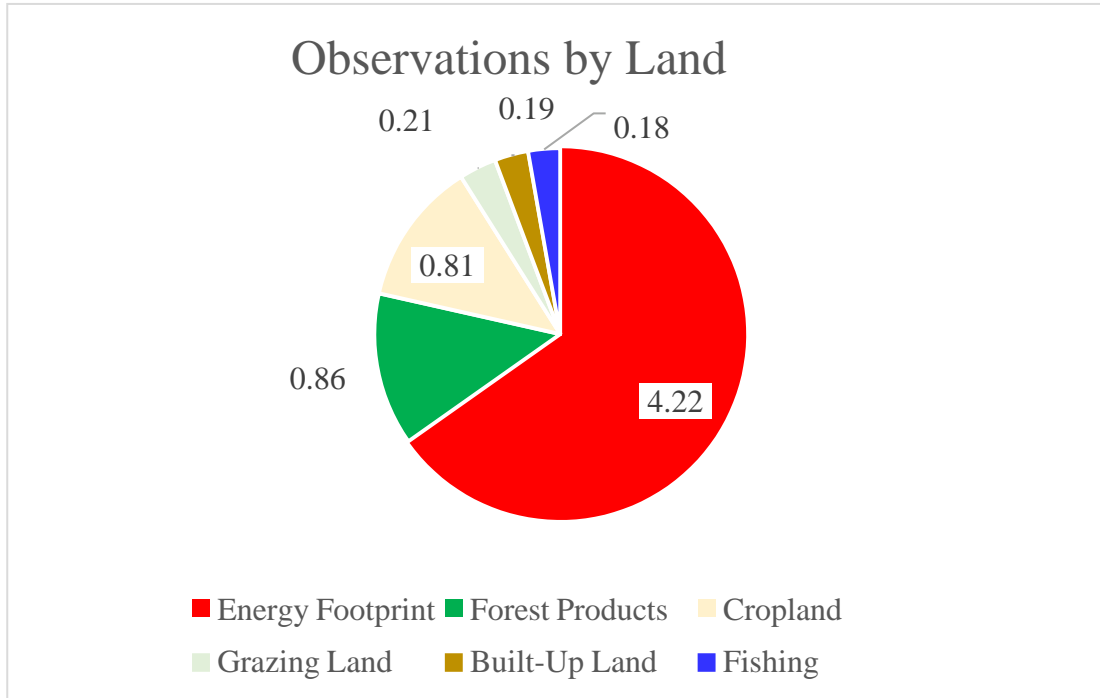


Figure 2 - Ecological Footprint of all the respondents by land type

Furthermore, it is also noticeable that the respondents' Ecological Footprint percentage coming from the Forest Land Footprint (0.86 gha) is three times higher than the percentage of the same Ecological Footprint component at the national average of North Macedonia (0.3 gha). This can be explained by the nature of the occupation of the students, who tend to use more paper products (leading to a higher Forest Land Footprint), as compared to the average citizen of North Macedonia. Moreover, an almost equal (if not the same) percentage distribution can be observed in terms of the Grazing Land Ecological Footprint component. This means that in terms of resource consumption based on grazing/pasture land (i.e. dairy products), the respondents' consumption behavior is representative of the average citizen of North Macedonia.

Consumption has always been interpreted as gender-based. For instance, generally in terms of transport, men's travels are more often due to work or business reasons, while women mostly take trips that involve household chores, hence, they use public transport more often.

In our case, in terms of carbon emissions there is almost no difference between the male and the female student respondents.

Furthermore, in terms of the specific land use components, the female respondents have a slightly higher Energy Footprint (4.23 gha) than the male respondents (4.21 gha). This means that the female respondents have slightly higher CO<sub>2</sub> emissions based on their lifestyle, because of their frequent use of cosmetics (such as hairspray, deodorants, perfumes), cleansers, etc. It indicates a somewhat more carbon-intensive consumption pattern for females as compared to males.

Additionally, there were no significant differences found between the male and the female respondents in terms of the rest of the Ecological Footprint land use components (Built-up Land, Forest Land, Grazing Land, and Fishing Grounds), except for the Crop Land Footprint. Probably by consuming more meat (e.g. beef,

lamb or pork) this leads to the male respondents having a higher Crop Land Footprint (0.83 gha) than the female ones (0.78 gha). This means that there is an almost equal degree of ecological impact among the male and the female respondents of the study in terms of their demand for the land use components.

## 6 Conclusion and Recommendations

The research study provides a review of the published literature as well as an analyses of the emerging trends of factors that influence the definition of Ecological Indicators of Energy Management in The Transition to Sustainability. The impact on Energy management has been analyzed, and insights and results have been provided. Our method shows that findings for Energy Management issues (increased energy use, limited raw fuel reserves, global warming, etc.) and then develop and increase awareness and perception of the Ecological and Energy Footprint as indicators of sustainability and Energy Management. The importance of the study is to highlight, through theoretical considerations and research of the Ecological and Energy Footprint value for university students, the significance of the sustainability concept, which implies respect for nature and its laws, and improved well-being for present and future inhabitants of the Earth. At the same time, it is also essential to point out to one of the ways by which sustainability and energy management are achieved, that is, the balance between human needs and the bio-capacity of the Earth, which can be accomplished by the Ecological and Energy Footprint Analysis.

The topic of Ecological and Energy Footprint is rapidly gaining importance. Nowadays it has become a hot topic globally. The aim of the Ecological and Energy Footprint is to prove that the present way and rhythm of living is not sustainable. Therefore, it is important to take concrete action to inform society about the importance of the Ecological and Energy Footprint, and, with that, to raise public awareness.

What is the student's motivation to reduce their individual Ecological and Energy Footprint? If there is no target to achieve, then an individual can never do enough; their efforts will most likely tend to increase and decrease over time, but, more importantly, highly-motivated individuals will always feel guilty that they are not doing enough.

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# Analyses of Digitalization and Digital Skills of Public Administration

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## ABSTRACT

The purpose of the research study is analyses and assessment of the Digitalization Transformation and Digital Skills of Public Administration. Every administrator is meant to have a certain level of proficiency in digital skills. However, the current education system has fallen short of providing our future generations with the basic understanding of what it takes to succeed in a digital environment. The goal of this paper is to assess the digitalization process and digital skills and competencies of administration and define the digital transformation and realize a review, and synthesis of opportunities for future research. There is a gap in published research regarding current Digitalization Transformation level and what are the required Digital Skills for Public Administration. The research aims to approach the analysis of the emerging trends in Digitalization Transformation and Digital Skills of Public Administration and the digital skills analyses and comparison using qualitative method and questionnaire as well as two focus groups. The research methodology used is triangulation technique which combines qualitative and quantitative methodology. The issues, findings as well as recommendations are discussed and argued.

## KEYWORDS

Digital Skills, Assessment, Public administration proficiency, digital transformation

## 1 Introduction

The process of digitization of public administration is part of the European strategy aimed at improving access to goods and services throughout Europe for both citizens and companies, but also the potential of ICT technologies to promote innovation, sustainability, growth economic and progress. Thanks to the promotion of digital citizenship and the implementation of an open government model, digital technology offers innumerable possibilities both for the organization of administrations and for relations between citizens, companies and administrations. An efficient and innovative public administration must guarantee fast services and high quality to citizens. This means rethinking and digitally redefining procedures and services and giving other administrations and, if possible, civil society free access to data and services. Several administrations are already using contract registries and have digitized bidding procedures. The use of electronic signatures, the digital disclosure of documents and information or electronic invoicing (both in the public and private sectors) are no longer news. Today citizens can actively participate in the life of society through online tools, and represents the digital transformation of citizenship. Given the importance of this topic, it is necessary to educate people about digital.

Any knowledge worker in today's world needs to have a basic proficiency in digital skills. And this is not just true for college graduates but also for high school graduates. Digital skills and proficiency, which are fundamental for human development, have been a matter of intense debate for decades. The proficiency

levels of the digital skills depend on how well it applies to an individual's work.

Any knowledge worker in today's world needs to have a basic proficiency in digital skills. And this is not just true for college graduates but also for high school graduates. Digital skills and competencies are essential for today's work-force in order to meet the needs of an ever-changing digital environment.

Digital literacy is a vital skill for all professionals, but it is especially important for administration professionals because their jobs focus on day-to-day operations within a business. This means that they need to be able to read and understand instructions, instructions, and manuals written in digital formats. They also need to know how to use different software programs and applications that are prevalent in the workplace.

An assessment of digital skills should take into account five different levels: foundation, intermediate, advanced, specialized, professional. It should also include a variety of tasks relevant to the individual's job responsibilities such as using email, using social media platforms like Facebook or Twitter, or creating documents with different word processing. There are many different ways to assess the digital skills of an administration.

## 2 Literature Review

The digitalization of public administration is increasingly moving forward. This systematic literature review analyzes empirical studies that explore the impacts of digitalization projects (n=93) in the public sector. Bibliometric ally, only a few authors have published several times on this topic so far. Most studies focusing on impact come from the US or China, and are related to Computer Science. In terms of content, the majority of examined articles studies services to citizens, and therefore consider them when measuring impact. A classification of the investigated effects by dimensions of public value shows that the analysis of utilitarian-instrumental values, such as efficiency or performance, is prevalent. More interdisciplinary cooperation is needed to research the impact of digitalization in the public sector. The different dimensions of impact should be linked more closely. In addition, research should focus more on the effects of digitalization within administration.

Digital skills generally refer to the ability to use digital devices, software, applications, and networks to manage information (Critical Digital Skills for Employment and Social Inclusion, 2018). Acquiring "digital literacy" means the ability to create and share digital content, communicate, and solve problems using digital technology. Digital skills range from basic to highly specialized. For example, jobs always require a minimum of operational skills (using a computer) and formal skills (understanding technology features like opening websites, hyperlinks, etc.).

Digitalization has been identified as the most significant technological trend that is changing both, society, education and business [4]. Nowadays, firms are constantly under pressure to use digital technologies and to adapt their business models to this new reality [5].

On June 7th, 2021, a search was conducted using Google Scholar citation database of peer-reviewed literature. The initial search criterion was based on the word "digitalization in administration" in the article titles. The initial search revealed 56,700 documents, which included journal articles in the English language to enable interpretation. Table 1 presents an overview of the review process.

Table 1 . Literature Review

Google Scholar database		Documents
Search term	All fields	56627
"Digitalization in administration"	Title-Abstract-Keywords	43954
	Article title	7441
Language	English	2218
Source type	Journal	1572
Document type	Article	1442

Self-assessment surveys can easily be added to existing surveys or other large-scale sampling measures. The

ITU and Eurostat (Eurostat) are examples of organizations incorporating self-report surveys as part of their larger data collection process. The total number of specific skills questions is fewer than other methods because the survey covers other topics as well. In the ITU ICT Household Survey Questionnaire, question HH15 raised 9 ICT skills, mainly computer-based skills, covering basic and intermediate skills, and a computer programming question [7]. The rest of the survey covers other problems of access and use of ICT. Eurostat has developed a digital skills indicator based on in DigComp [8]. A person reports if they have performed various activities in the four competency areas: information skills, communication skills, problem-solving skills, and software skills. A person's score is "no ability", "low", "basic" or "higher than basic" [9]. The use of the Eurostat digital skills measurement standard has items restricted to European countries.

Other evaluations are implemented as independent investigations. Digital Skills to Tangible Outcomes (DiSTO) was originally built and verified in the UK and in the Netherlands [10]. Recently, through association, these surveys have been used as part of specific research projects in Australia, Chile, Brazil, Uruguay, and the United States (London School of Economics and School of Political Science, date unknown). DiSTO uses the Likert scale, which covers mobile and online skills. Another survey developed as part of the research project is the ICT Skills Index (ISI). This online survey using the Likert scale asked 4,444 advanced ICT skills in young people aged 16-35 in small island developing States [10].

DigComp 2.0 as discussed by [3] identifies the key components of digital competence in 5 areas which can be summarized as below:

- 1) Information and data literacy: To articulate information needs, to locate and retrieve digital data, information and content. To judge the relevance of the source and its content. To store, manage, and organise digital data, information and content.
- 2) Communication and collaboration: To interact, communicate and collaborate through digital technologies while being aware of cultural and generational diversity. To participate in society through public and private digital services and participatory citizenship. To manage one's digital identity and reputation.
- 3) Digital content creation: To create and edit digital content To improve and integrate information and content into an existing body of knowledge while understanding how copyright and licenses are to be applied. To know how to give understandable instructions for a computer system.
- 4) Safety: To protect devices, content, personal data and privacy in digital environments. To protect physical and psychological health, and to be aware of digital technologies for social well-being and social inclusion. To be aware of the environmental impact of digital technologies and their use.
- 5) Problem solving: To identify needs and problems, and to resolve conceptual problems and problem situations in digital environments. To use digital tools to innovate processes and products. To keep up-to-date with the digital evolution.

### 3 Purpose of the Study

The purpose of the research study is the analyses and assessment of the emerging trends of Digitalization Transformation and Digital Skills of Public Administration. We are using qualitative method and questionnaire as well as two focus groups.

### 4 Research Methods

The research methodology used is triangulation technique which combines qualitative and quantitative methodology. As research method used quantitative method using questionnaire and focus groups.

Hypothesis H1: The proper Digitalization Transformation and High level of Digital Skills of Public Administration can increase their efficiency and efficacy.

Main research questions are: What are the main emerging digital skills for public administration? What are the main shortcomings of public administration currently? How can we improve their digital skills? What are

the basic skills and what are the expert skills required for public administration? What are the major challenges in public administration?

## 5 Findings and Results

The expected findings and arguments of the work provides sufficient information on the factors that influence the digitalization transformation and different digital skills and assessment of the different requirements from different public administrations.

Analyses were further carried out through IBM SPSS Statistics. Descriptive statistics and correlations between variables were firstly calculated. Tau-equivalent reliability, also known as Cronbach's alpha or coefficient alpha, is the most common test score reliability coefficient for single administration. Cronbach's alpha is a measure of internal consistency, that is, how closely related a set of items are as a group. It is considered to be a measure of scale reliability. Exploratory factor analysis is one method of checking dimensionality. Technically speaking, Cronbach's alpha is a coefficient of reliability (or internal consistency).

Table 1 shows descriptive statistics, Cronbach's alpha ( $\alpha$ ) and the matrix of correlations of Skills and Competences, which were used to carry out multiple regression analyses. Two multiple regressions were performed on the digital skills considered as independent variables and subsequently as dependent variables, Time to Finish the Task (TFT), Correctness Level (CL), Number of Errors (NE), Self-Esteem (SE) and Satisfaction (S).

**Table 1.** Multiple regression, Digital Skills and Competences

	Skills			Competences	
	<i>B</i>	<i><math>\alpha</math></i>		<i>B</i>	<i><math>\alpha</math></i>
<b>Information and data literacy</b>	16.563	4.721		7.635	3.238
<b>Communication and collaboration</b>	0.153	0.042		0.061	0.051
<b>Privacy and Security</b>	0.217	0.557		0.003	0.071
<b>Digital content creation</b>	0.069	0.065		0.015	0.015
<b>Problem solving</b>	0.346	0.186		0.155	0.174
<b>Time to Finish the Task (TFT)</b>	0.159	0.052		0.067	0.052
<b>Correctness Level (CL)</b>	0.047	0.246		0.061	0.120
<b>Number of Errors (NE)</b>	0.046	0.035		0.045	0.035
<b>Self-Esteem (SE)</b>	0.304	0.237		0.007	0.074
<b>Satisfaction (S).</b>	0.243	0.309		0.152	0.133
	$R^2 = 0.29$			$R^2 = 0.139$	

	Skills		Competences	
	<i>B</i>	<i>α</i>	<i>B</i>	<i>α</i>
<b>Information and data literacy</b>	16.563	4.721	7.635	3.238
<b>Communication and collaboration</b>	0.153	0.042	0.061	0.051
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<b>Digital content creation</b>	0.069	0.065	0.015	0.015
<b>Problem solving</b>	0.346	0.186	0.155	0.174
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<b>Self-Esteem (SE)</b>	0.304	0.237	0.007	0.074
<b>Satisfaction (S).</b>	0.243	0.309	0.152	0.133
	$F = 7.13, p < 0.001$		$F = 3.54, p < 0.01$	

\* $p < 0.10$ , \*\* $p < 0.05$ , \*\*\* $p < 0.01$ .

## 6 Conclusion and Recommendations

The research study provides a review of the published literature as well as an analyses of the emerging trends of different Digitalization Transformation and Digital Skills of Public Administration.

The impact on Digital Skills and Competencies has been analyzed, and insights and results have been provided. Our method shows that finding out whether different ways of participating in this assessment can lead to the realization of Competencies is novel. The analyses of the key parameter indicators needed for digital transformation of the public administration and the impact on Digital Skills and Competencies has been analyzed, and insights and results have been provided. Our method shows that finding out whether different ways of participating in this assessment can lead to the realization of Competencies is novel. For this reason, we consider digital skills as a relevant factor. The results show that when young workers have the necessary skills, they tend to establish and maintain strategic relationships to provide critical information and improve their work status. This means that young people should know how to identify the correct information to connect with their inner circle to actively plan an activity and to consciously participate in a group to achieve a specific goal. The aim is for them to know whom to add as friends to their contacts based on the information shared by these people so that when they know how to work together through specialized apps, they get social capital. Having strategic skills can also improve the self-esteem, life satisfaction, and SW of young graduates. This means that when administrator workers acquire the strategic skills necessary to use to achieve specific goals, they feel better because they have a more positive image of themselves. The security that strategic digital skills provide can also encourage them to feel more satisfied with their lives. When young people have these digital skills, it has also been observed that psychosocial variables increase,

this variable considers indicators such as social support, perception of support, feelings, business, and community awareness.

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## USE OF THE ARTIFICIAL INTELLIGENCE (AI) MARKETING IN SOCIETY

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**Abstract:** Marketing, more than any other business function, deals with customers. Creating customer value and satisfaction are the heart of modern marketing thinking and practice. Marketing is the delivery of customer satisfaction at a profit. The two-fold goal of marketing is to attract new customers by promising superior value and to keep current customers by delivering satisfaction. With combination of the Artificial intelligence (AI), that is a wide-ranging branch of computer science concerned with building smart machines capable of performing tasks that typically require human intelligence, represent new wave of the marketing in the society as known as Artificial Intelligence (AI) Marketing. AI-based marketing is the use of machine learning and AI-powered systems to complement strategic decision-making. It is derived analysis and pattern matching insights from large sets of customer and user data (e.g., purchases, web visits, clicks, product usage, etc.). AI systems complete complex calculations and provide recommendations based on what they learn from data, and how they've been taught to process it. The insights are delivered to marketers via dashboards, reports and recommendations.

The mechanism of AI Marketing is increasing awareness leading to better social change. When society points to new and better opportunities for progress, it develops new forms to exploit these new changes. The new forms of change are better able to harness the available social energies and skills and resources to use the opportunities to get the intended results.

**Keywords** - Marketing, Artificial Intelligence, AI, Society, New Wave

## Introduction

Economy is growing so fast that produce new way to attract new customers for its needs. The development of technology in recent years is so fast that many of the world's most wanted jobs today did not exist 15 years ago. Marketing as a part of all process its constantly changing. The success of every economy depends on the extent of satisfying consumers. One of the leading authors of the area of management Peter Drucker, for marketing, said: "Marketing is not a sale nor tightly specializing activity. It is work viewed from the aspect of the ultimate result, which means from the aspect of the consumer. Therefore, care and the responsibility for marketing is the concern of the entire organization."

Today, new approach to the marketing, as known as AI (Artificial Intelligence) Marketing is challenging new contact between both sides, whom both sides are expecting benefits. Many companies - and the marketing teams that support them - are rapidly adopting intelligent technology solutions to encourage operational efficiency while improving the customer experience. AI marketing uses artificial intelligence technologies to make automated decisions based on data collection, data analysis, and additional observations of audience or economic trends that may impact marketing efforts.

AI Marketing represent process by collecting data from in-store and on-line and helps building unified customer profiles. It manage to leverage customer data collected and offer a personalized experience to customers with advanced marketing technology solutions powered by machine learning. Through AI Marketing, company will reach, connect and delight with their shoppers faster and in a more accurate way. Through these platforms, marketers are able to gain a more nuanced, comprehensive understanding of their target audiences. The insights gathered through this process can then be used to drive conversions while simultaneously easing the workload for marketing teams.

### Use of the Marketing and its concepts

Hence, we can conclude that marketing is a broad concept that it contains a series of activities that work together and affect the market. Its main task is to understand consumer's needs, develop a product or service with superior value, set up an appropriate price, distribute, and

promote an efficient and effective way. The leading author in the field of marketing, Philip Kotler<sup>1</sup>, gives perhaps the most accurate definition of marketing:

"Marketing is a social and managerial process in which individuals and groups receive what they need and what they want through creating and exchanging value with others. It includes building profitable and value-fulfilled relationships of exchange with buyers." On the other hand, all these activities, company should take them in order to influence increasing awareness among potential buyers in relation of a particular product or service.

Marketing covers all those activities that the company takes when creating its own brand. It involves communication with customers, creating a visual identity of what is offer on the market, relationship between company employees, customers, associates and suppliers, distribution channels of the product or service, promotion, building strategies for acquiring new markets.

Marketing does not only mean sales, but its philosophy will help you attract buyers, potential domestic and foreign partners, consumers who will get used to your product or service, building long-term relationships based on trust and cooperation. With proper marketing strategy, the company will always know how to maintain existing buyers and be open and available for new ones. Every entrepreneur must not focus only on the product (its features, a way of manufacturing, use of a new technology, involvement trained staff), but also to keep an eye on how it is positioned on the market. Especially, which wants to achieve, to which group consumer's wants to be connect, in which way to implement it and how to maintain at the desired level.

Neil Borden, an advertising professor at Harvard University, popularized the idea of marketing mix that was later reckoned as the four Ps. In 1964, Borden in his article "The Concept of the Marketing Mix" discussed the ways in which companies could use advertising to engage with their customers.

Working on the book by Borden, E. Jerome McCarthy, marketing professor at Michigan State University, came up with the concept of 4 Ps. In 1960, McCarthy co-wrote the book "Basic Marketing: A Managerial Approach," further popularizing the idea of the 4 Ps. At the time the concept was first coined, the marketing mix helped companies account for the physical barriers that prevented widespread product adoption.<sup>2</sup> The marketing concept has four basic elements,

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<sup>1</sup> <https://www.businessmanagementideas.com/marketing/marketing-definition/20516>

<sup>2</sup> <https://www.investopedia.com/terms/f/four-ps.asp>

which are being built all important market strategies and activities: product, price, place and promotion. From then, it became widely popular and is being used extensively across companies to form the best marketing strategy for a product or a service. They leverage the components of the marketing mix and decide on the best ways to promote their product.

The product is the foundation on which all marketing and business activities will be built. Its main goal will be the satisfaction of certain customer needs, solving their problems. The product must provide a minimum of what is promised, otherwise all elements of the marketing mix will fail "in water". The price should have several basic characteristics - cover the cost of producing the product or service, covering all indirect expenses and eventually provided the necessary margin. If the company in the wrong way determines the price of what it offers on the market (too high or too low), you can immediately feel the consequences. The place represents all those channels through which the product or service offered will be available to consumers. Different products and services have specific requirements in terms of how and where they will be sold, whether direct sales, sales through intermediaries, online, telephone ... The promotion is a set of activities that are done so that the product can be known and recognizable on the market. Among the more important tools of the promotion are: advertising, advertising, campaigns, prize games, sponsorships, etc. All these elements of the promotion help for greater visibility, popularity and product recognition or service. When the entrepreneur or the marketing manager will manage to make a real combination of these four elements, in that case it can be reliable in the success of the market on a long-term basis.

### **7 P concept in the marketing**

As the market has evolved over the years, the concepts also needed an upgrade. The concept of the 4 Ps has been in use since the 1950s, but it seemed to miss some key elements. The 7 P model talks about the three additional elements apart from the 4 Ps: People, Process, and Physical Evidence. The term People in marketing refers to the employees working for a company. They play an important role in the success of an organization as they are the ones who deliver the services to clients. It is important to manage this resource and People Analytics helps a lot in managing people. Process refers to the business process through which the service is provided to the clients. It becomes necessary to keep a regular check on the process so that any sort of mistake can be avoided. Examining the process means assessing aspects such as the sales funnel, payment

systems, distribution procedures, and customer relationships management. Physical Evidence in marketing means to maintain evidence/proof that service or purchase took place and proof or confirmation of the existence of the brand. It can either be a receipt, or an invoice, or a brochure, for product delivery confirmation while for brand validation, it can be the company's website, brand logo, business cards, etc.<sup>3</sup>

## **Purpose of Study**

### **Artificial Intelligence – the beginning of the future**

We live at a time when the possibilities for creating an artificial mind and machines that work and react as human beings are actualized, implemented, and significantly change everyday life and the world around us. Decades backward popular culture across forms of comics and films placed us the look of artificial intelligence, and cinematography literally explained this meaning.

Artificial intelligence is a broad branch of computer science that deals with building smart machines capable of performing tasks that usually needs human intelligence. AI is interdisciplinary science with multiple approaches, but advancement in machine learning and deep learning create a change in paradigm literally in each sector of the technology industry.

### **How Does Artificial Intelligence Work?**

Popular misconceptions tend to set AI on an island with robots and cars that manage independently. However, this approach does not recognize the main practical application of artificial intelligence; Processing huge amounts of generated data per day. With the strategic application of AI of certain processes, the collection of inspection and automation of tasks occur with otherwise unimaginable speed and scale. Comparing the mountains of data created by people, AI systems perform intelligent searches, interpreting the text and images to detect models in complex data and then act according to those teachings. Less than a decade after breaking the Nazi encryption machine Enigma and helping the Allied Forces win World War II, mathematician Alan Turing changed history a second time with a simple question: "Can machines think?". Turing's

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<sup>3</sup> <https://www.analyticssteps.com/blogs/4ps-marketing-product-price-place-and-promotion>

paper "Computing Machinery and Intelligence" (1950), and its subsequent Turing Test, established the fundamental goal and vision of artificial intelligence. At its core, AI is the branch of computer science that aims to answer Turing's question in the affirmative. It is the endeavor to replicate or simulate human intelligence in machines.

Thanks to the scientific achievements in the study of artificial intelligence and machine learning, today the idea of a computer that will be completely or partially replaced by human intelligence is real and already achieved. One thing is certain: This idea changes the world, primarily changing operations in many, already digitized industrial branches such as health, finance, customs, transport, education, business, etc. Therefore, the scientific and professional public of today, as well as other proven world businessmen and IT experts are loudly express their opinion on all changes and future guidelines on the development of artificial intelligence. Elon Musk and recently deceased brilliant mind of our time Stephen Hawking were agreed that if the development of artificial intelligence is not controlled, catastrophic consequences over mankind may occur. On the other hand, Bill Gates and Mark Zuckerberg do not agree with their opinion, but in the development of artificial intelligence, they see infinite potential. Answer this dilemma will give us the future.

## **Introduction to AI**

### **Research Methods**

The research methodology used in this scientific paper is the content analysis combined with qualitative methodology. As research method used analyses of documents as a data source.

### **Hypothesis**

New wave of AI Marketing introduces challenges that marketers must be aware of automated decisions based on data collection, data analysis, and additional observations of audience or economic trends that may affect marketing efforts. Main research question are: Can we start to understand AI Marketing as a tomorrow's technology? What are the major challenges and efforts of the AI Marketing? Does system of marketing process in modern industry is becoming increasingly dependent upon automation technology? The answers of these questions are bellow in this section.

## **AI Marketing**

AI marketing is a method of leveraging intelligence technologies to collect data, customer insights, anticipate customers' next moves, and make automated decisions that impact marketing efforts. Marketers will use AI-derived insights to guide future decisions about campaign spending, strategy and content topics. AI in marketing can be used in planning, production personalization, promotion, and performance stages of marketing. In addition, AI can be used in an unattended manner, to directly instrument and optimize campaigns without human intervention. AI in marketing utilizes machine learning and neural networks to derive analysis and pattern matching insights from large sets of customer and user data (e.g., purchases, web visits, clicks, product usage, etc.). The insights are delivered to marketers via dashboards, reports and recommendations. In marketing, AI is usually used in which speed is essential. AI, actually, can boost the return of investment (ROI) of marketing.

### **How does Ai Marketing work?**

As every task gets more and more automated, artificial intelligence has slowly taken its place in apps we use daily. AI technology is not new and big companies like Google, Apple, Amazon, Facebook, Uber... have already taken advantage of it. AI Marketing leverages this technology to do mass advertising and generate sales for known brands (aggregators). These known brands pay commissions (up to 60% for certain products) in the form of cashback to AI Marketing. AI Marketing does keyword analysis related to products sold by the partners to identify trends at regional market level. Advertising is then generated on the large advertising platforms like Google AdWords, Facebook Ads.... toward those selected keywords to promote products from the partners. These ads will generate sales and a commission on the sale (cashback) will be earned by AI Marketing.

For example, predictive marketing solutions apply artificial intelligence to lead scoring and qualification. Attributes of existing customers are analyzed to qualify the likelihood of sales leads become future customers. AI-powered features are now a part of numerous marketing technology systems, such as email marketing, marketing automation and predictive analytics. In addition to assisting with marketing campaigns, artificial intelligence can be applied to content creation. For example, the Associated Press uses an AI solution called Automated Insights to produce 4,400 quarterly earnings stories. This software solution uses AI techniques to generate stories (i.e., based

on data) that read just like a human wrote them. A team of global marketing experts, including Alexis Mavrommatis from Esade, have published research in Business Horizons summarizing the benefits of AI throughout the marketing process. In it, they describe how each of the nine components inherent to strategic marketing can be improved by AI. Those nine components are<sup>4</sup>:

1. Analyzing the current situation
2. Understanding markets and customers
3. Segmenting, targeting and positioning
4. Planning direction, objectives, and marketing support
5. Developing product strategy
6. Developing pricing strategy
7. Channels and logistics
8. Developing marketing communications and influencing strategy
9. Planning metrics and implementation control

## **Findings and Results**

### **Analyses of AI in Marketing**

#### **1. Nike - Personalized online experiences**

Nike creates personalized experiences for customers by using artificial intelligence. The technology enables Nike's website to recommend products that uniquely suit customers. It also enables customers to search for products using conversational language, images without interacting with a person. Nike uses AI thoroughly to personalize the customer journey, which is a huge value-add to their business.

#### **2. Amazon - Personalized shopping recommendations**

Amazon has set the standard for product recommendations and continues to be the leader in the eCommerce marketplace today. Amazon's product recommendations feature provides customers with a more personalized and enjoyable shopping experience. Research shows that 53%

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<sup>4</sup> The 101 of artificial intelligence in marketing Alexis Mavrommatis  
[https://dobetter.esade.edu/en/101-ai-marketing?\\_wrapper\\_format=html](https://dobetter.esade.edu/en/101-ai-marketing?_wrapper_format=html)

of shoppers say they always do research before buying a product to make sure that they are making the best possible purchase. That's why product recommendations will be a great help for customers to find what they are looking for. Whether the recommendations are based on customers' historical purchases or just similar products at different pricing points, it's effective to educate customers and empower them to make the purchase decision much easier. Besides, Amazon also designed a pricing strategy to excel in the modern and ever-changing market. Amazon's dynamic pricing is a great success. Instead of overwhelming customers with the rapid changes in prices, the company leverages this strategy to adjust its prices at the same rapid pace of the market demand. This helps Amazon stay ahead of the competition and grab the first-mover advantage to offer customers compelling products' prices before their rivals take any action.

### **3. Alibaba – Fashion AI store**

Alibaba brings AI to fashion to improve the fashion retail experience by opening a physical Fashion AI store in Hong Kong. This use of Artificial Intelligence effectively simplifies the apparel shopping experience and gains more customers' interest. Alibaba's Fashion AI store uses 3 key features to streamline the fashion retail experience for customers:

**Smart lock to capture customers' preference:** Products in this store have special tracking tags containing radio-frequency identification, gyro-sensors, low-energy Bluetooth chips. Each garment will carry specialized information about the item it's attached to. The amazing gyro-sensor will empower the tag to decide which items can be touched and which one is not.

**Smart mirrors:** The store's mirrors are located on the sales floor and in changing rooms with intelligent touch screens. It displays the information about the items customers are interacting with thanks to the intelligent locks equipped with each product. Smart mirrors can also recommend other apparel to complement the items customers are currently browsing.

**New fitting experience:** This concept enables customers to quickly get the best look at what they wear by adding suggested garments and accessories brought to them by the store's staff after they try out an item. FashionAI also carries increased omnichannel capability with a "Virtual Wardrobe" on its mobile Taobao app. This feature allows customers to view the clothes they are trying on along with other recommended items that would complement their outfits.

#### **4. BMW - Intelligent Personal Assistant**

Besides the technology to learn about the driver and adjust the system and cabin experience to best fit each individual, BMW's AI-enhanced sports cars are also equipped with an intelligent personal assistant. This personal assistant enables various vehicle functions such as Climate control, Lights, Media, and settings like Caring car, Experience Modes, etc. This amazing assistant allows drivers to communicate with their cars like they do with smartphones. It is a voiced-activated manual that can anticipate travel routes to simplify the destination input, alert the drivers, and integrate with other apps.

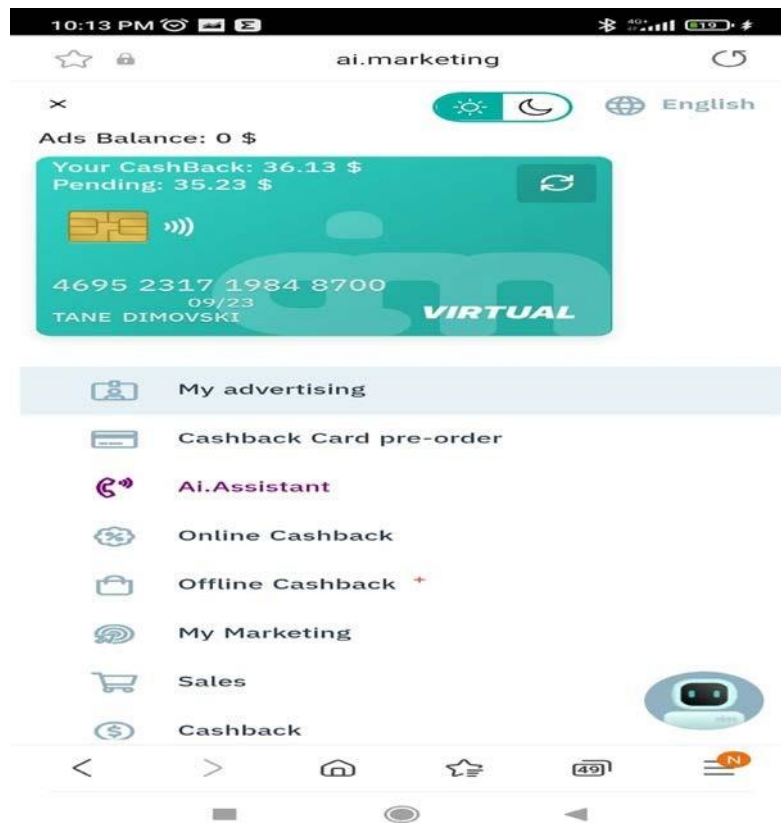
#### **5. Starbucks - Reward Program/Mobile App**

Starbucks captures its prospects' data through the use of AI in Rewards Program and Mobile App. In fact, Starbucks has successfully built its relationships with customers through this Rewards Program. For example, the company gives its customers free coffee on their birthdays. Via its mobile app, customers can talk with the barista via voice assistance to order their coffee. Through this AI-powered tool, Starbucks acquires your buying history and gives you tastes they know you will enjoy after considering the date of purchase, the time of order, and the location.

#### **How does AI Marketing system work?**

AI Marketing analyzes trends in social media and search queries. The analysis results are used to select the key words and trends gaining popularity regionally. Programs/products that correspond to regional trends are mainly selected since our platform is connected to cashback programs of numerous websites (over 50). The marketing team orders advertising based on the trends in a particular region using Google Ad-words, Yandex Direct, social media and other Internet platforms. After customers attracted by the advertising purchase a product or service, the Cashback Program Operator notifies us about the cashback via API and an accrual with the "Pending" status appears in your personal account. After the Cashback Program Operator confirms a purchase (if the customer does not request to refund or return the purchased ticket or product, for example), we receive cashback and you get 55% of the cashback amount while ai.marketing website gets 45%. Cashback confirmation time depending on the cashback program and can take from 16 to 60 days. The cashback you receive is displayed in the "Cashback" account. The 45% of the cashback received by ai.marketing mainly forms the company's earnings. This funds are

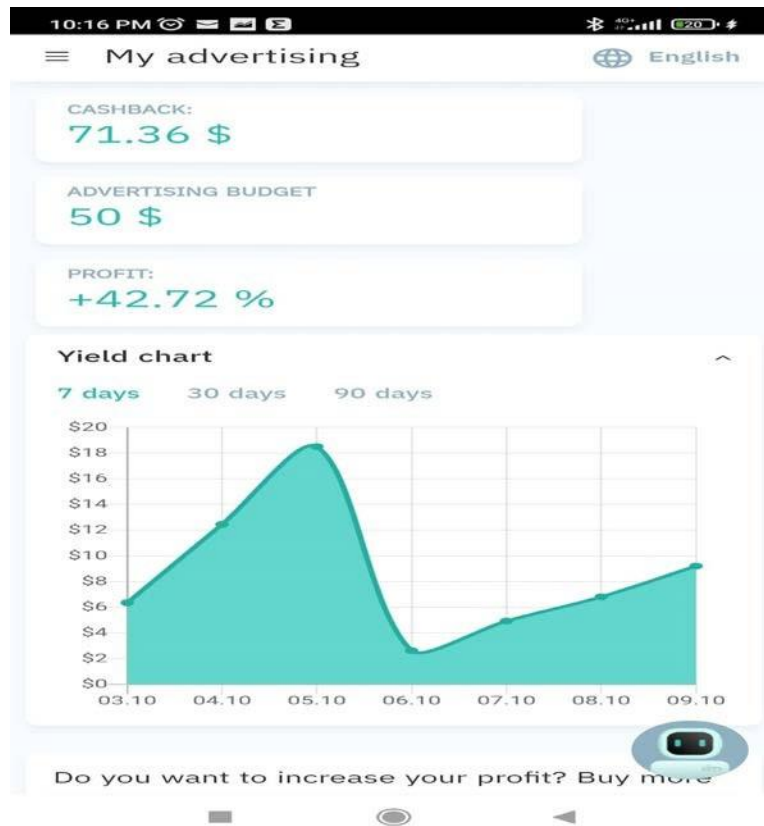
used to cover operating activities and to back up the MarketBot Protect fund. MarketBot Protect fund covers payments to clients when customers return of refund the product or service and the Cashback Operator cancels the payout.



I. Table (Print screen from [www.ai.marketing](http://www.ai.marketing))

Example:

By the holiday season analysis system detects that the word combinations “last minute tour”, “cheap ticket” and “book hotel” have become trendy. Ai robot select cashback programs from travel industry websites such as OneTwoTrip, Booking, Teztour, etc. Then, Ai robot is order massive advertising in the selected areas. After customers make purchases, accruals will appear on your account as “Pending” in the “Sales” section of your account. After the cashback has been confirmed by the Cashback Program Operator, money is received on the “Cashback” account and is available for withdrawal.



II. Table (Print screen from [www.ai.marketing](http://www.ai.marketing))

## Conclusions and Recommendations

The research study provides an analysis of the artificial intelligence marketing and shows how this new wave of marketing can improve business of the world companies. Every tasks gets more and more automated, artificial intelligence has slowly taken its place in apps we use daily. The whole process start in 1950s with Alan Turing, an English computer scientist, who tested a human evaluator's ability to distinguish between responses from both another human and a machine programmed to generate human-like responses. His paper "Computing Machinery and Intelligence" (1950), and its subsequent Turing Test, established the fundamental goal and vision of artificial intelligence. Today follows with something that have big impact to whole society. AI Marketing leverages this technology to do mass advertising and generate sales for known brands (aggregators). These known brands Google, Apple, Amazon, Facebook, Uber...) pay commissions (up to 60% for certain products) in the form of cashback to AI Marketing. As machines continue to gain the ability to learn and make decisions independently, the uses of AI will grow, spurring exponential application for marketers. It will allows organizations to accurately

predict user behavior. AI solutions allow marketers to gain meaningful insights regarding the likes and preferences of the customers and understand the emotions or sentiments that they associate with their brand. As a result, this helps businesses to devise market strategies to ensure the effective branding of their services and products. With continuous advancements being worked into AI technologies round the clock, predicting customer behavior continues to grow more and more convenient with every passing day. Besides designing successful marketing campaigns, these tools also allow brands to enhance their customer engagement as well. At the end, we can recommend use of AI Marketing, as soon as possible to every marketing department, marketers, companies, organizations, etc. because the amendment “Know the customer” is a marketing commandment or with other words, the more you know about your ideal consumer, the easier it is to sell your products or services. These valuable insights help to improve the consumer engagement experience and to make your goal to be successful.

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**DRY AGED MEAT**  
**CHALLENGES FOR MANUFACTURERS AND CONSUMERS**  
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**Abstract:**

Dry aged meat is becoming increasingly popular and comprises a rather heterogeneous product group of dry meat that has matured over several weeks to months. The transitions between traditionally hung meat and dry aged meat are fluent. Studies have shown that this can be hygienically risky food that can harbour pathogenic microorganisms, toxins and biogenic amines. <sup>123</sup> From a legal point of view, it is therefore important to assess whether it is a safe food within the meaning of Art. 14 Regulation (EC) 178/2002, as sensory characteristics of "spoilage" have been determined, especially in meat that has been matured for a long time. <sup>2</sup> It is discussed whether dry aged met should be regarded as "fresh meat" or already as "meat preparation". This assignment in turn influences the food safety and process hygiene criteria to be complied with in accordance with Regulation (EC) No. 2073/2005 (Discussion). In this study we included the microbiological evaluation of 15 poultry meat samples, including duck dry aged and chicken dry aged, sampled in throughout the year for the TAC (Total Aerobic Count). Salmonella and Listeria. Almost half of the samples did not meet the criteria regarding the TAC and therefore unfit to enter the market due its limitations regarding the shelf life. Uniform minimum requirements for dry aged meat deriving from different animal species and corresponding requirements are needed. Identification not only helps monitoring, but also protect consumers from being misled and deceived. Dry aged is currently not a protected term and cannot be classified as a new type of food according to VO (EG) 258/97. In summary, it can be concluded that due to the inhomogeneous product group and a currently not established public opinion, the legal grey area for an offense of deception is enormous. Sufficient identification of the product is discussed in order to do justice to consumer protection.

*Keywords: Meat, New Developments, Veterinary Public Health*

## Introduction

Dry aged beef is becoming increasingly popular and comprises a rather heterogeneous product group of dry beef that has matured over several weeks to months. It is discussed whether dry aged beef should be regarded as “fresh meat” or already as “meat preparation”. Studies have shown that this can very well be hygienically risky food that can be contaminated with pathogenic microorganisms, toxins and biogenic amines (Bartholomä, 2012; Bartholomä, 2013; Bartholomä, 2014). From a legal point of view, it is therefore important to assess whether it is a safe food within the scope of Art. 14 Regulation (EC) 178/2002. Aged meat products often are exposed in the market without giving specifications of the aging methods as well as time of consumption. Due to its undefined product status: the process hygienic criteria have to be in compliance with EU regulation for Microbiological Criteria. No unique microbiological criteria for Dry Aged Meat are in place. But the Microbiological quality of the fresh meat for sure plays the key role to get a final quality and safe dry aged meat. Depending on the product characteristics, different food safety and process hygiene criteria are listed in Regulation (EC) No. 2073/2005 for different categories of meat preparations. Meat preparations that are made from other types of meat than poultry and are intended for consumption in a fully heated state on the one hand, and meat preparations that are intended for raw consumption on the other; this results in differences in microbiological criteria such as Salmonella in 25g or 10g not detectable (EN / ISO 6579). Dry aged is currently not a protected term. Dry aged meat has been used for long but never been registered and legally regulated. It should be for the sake of the consumers cleared whether it should be classified as a novel food according to European regulation 258/97 (ALTS, 2012) or be considered as a meat preparation but still neither the first nor the second apply for such meat. Most of the meat from different animal species have a limited shelf life which ranges from, depending on the processing hygiene and the contamination of meat along the processing from slaughter to chilling as the end point of processing and usually the shelf life ranges from 4 to 10 days (Dawson et al., 2012) and 10 to 21 days of beef, depending on the processing hygiene and the state of packaging. The spoilage of meat is mainly caused by the mesophilic aerobic counts, psychotropic bacteria, Enterobacteriaceae, and Coliforms. These bacteria are used as indicators of proper processing hygiene and immediately affect the shelf life of meat. During aging of meat, this shelf-life time is prolonged to one month or longer as it allows the onset of aging process. Aging is the process during which microbes and enzymes act on the meat to help break down connective tissue to affect the softening (tenderness) of the meat. Two methods of aging can be applied, the wet aging by placing the meat in a plastic bag under vacuum; and dry aging by storing meat in a controlled environment of Temperature and Salt. A product label should indicate the aging processes used. The Conditions for Aging are by dry aging -Temperature: between -0.5 to 1 °C (2 °C to 3 °C can be used when aging only up to 3 weeks) with relative humidity:

between 75% to 85% and Air speed: between 0.2 to 0.5 m/s and meat is mainly let open and placed in special racks within the aging chamber, whereas during wet aging meat is placed in plastic bags, vacuumed and stored in normal storage room. Dry aging can loss of up to 50%, whereas during wet aging the amount of loss is lower (Kim et, al., 2017) as the meat is packed in a plastic bag and the meat juice is held and most probably remains bound and is not dripped. Dry aging as a process involves the degradation of connective tissue and the muscle protein structure of carcasses or cuts of meat by ensuring the growth of beneficial forms of fungi. Best practices are to cut the pieces into smaller ones and typical cuts such as incisions from the ribs, sirloin. For dry aging meat, the fat cover is often left in the surface as to help develop aroma and to some extent retain the moisture in the meat cut and therefore it develops dry aging has a stronger aroma than wet (sour blood aroma). The predominant bacteria over dry aging meat are *Pseudomonas*, which multiply in the presence of oxygen and in the case of packaged meat for wet aging, bacteria of the genus *Lactobacilli* multiply in the absence of oxygen by convert in lactose to lactic acid and a slightly sour taste results or smell when compared to *Pseudomonas*. Dry Aging Meat comprises a sort of meat which has undergone a gastronomic treat and usually found in some of the best restaurants and butcher shops. Premium dried aged meat products usually from wheat-fed beef due to greater marble within the meat. Under extremely lean meat will spoil if aged, the aroma of dry aged meat can range from that of butter to nutty aroma. The aroma also depends on other factors, such as the quality of the cut of the meat, whether it is grass-fed or wheat-fed, the storage temperature and the relative humidity during aging. Premium products can age up to 6 weeks if specification and monitoring is provided. It can be difficult to age more than 8 weeks with dry aging. In regard to the enzymatic action in Dry Aged Meat, aging process and changes in meat Endogenous proteolytic enzymes from the meat itself, as well as from specific beneficial forms of fungi weaken the structural proteins of myofibrils in meat. This stage lasts 10 to 14 days and results in a softer flesh. The aroma of meat can usually be described as buttery and light. Evaporation loss of water from meat by evaporation causes concentration of residual proteins and increases the intensity of aroma to a delicious wild taste. The final water loss can be up to 50 percent and depends on the relative humidity used during drying. Regarding the temperature requirement for Dry Aged Meat, a storage temperature below 5 °C should be used and frozen or thawed meat should not age because the desired enzymatic action will not occur and mould growth will not start on the surface of the meat. The temperature should be recorded as required in the food safety program throughout the aging process to ensure that the health of the meat is maintained in accordance with the requirements. In the light of the aging process in Dry Aged Meat, to prevent spoilage, portions of meat should be adequately separated from each other to allow efficient and controlled air flow between each portion. The desired air speed is 0.2 to 0.5 m / s and can be controlled with a cooling unit designed with a fan. The velocity and air flow should be kept uniform for the duration of the drying process and is most critical at the beginning of the dry aging process. To take care about cross-contamination, dry aged meat

should be separated from all other meat products and not be stored in the refrigerator where other

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fresh meat is stored. A parathion and preparation for packaging and sale should be separated from areas used for fresh meat: Meat products with dry aging should not be displayed on retail shelves with other fresh meat. During the drying process, most of the lean meat and adipose tissue samples showed high numbers of total psychrotrophic aerobic bacteria, *Pseudomonas* spp., lactic acid bacteria and yeasts, but the variation between loins was high. The microbiological load on freshly cut dry-aged steaks was generally lower than on loin surfaces, but both psychrotrophic aerobic and anaerobic bacteria were present inside several steaks. The water activity inside dry-aged beef steaks was high ( $a_w \geq 0.98$ ), which could allow growth of psychrotrophic pathogens, though more in-depth studies are necessary to determine potential growth during the storage of (trimmed) steaks or even inside loins during the dry-aging process (Gowda et al, 2022). Under the microbiological approach, dry aging involves limiting the growth of bacteria and encouraging the growth of beneficial mould. During the dry aging process, moulds of the genus *Penicillium*, *Rhizopus* and *Mucor* can be found on the surface of the meat. Other fungal species infections in humans and the production of harmful toxins and They also do not offer any favourable characteristics for aging meat. In dry aged beef harmful yeasts/molds (*Candida* sp., *Cladosporium* sp., *Rhodotorula* sp.) were also observed at the initial phase of aging and they disappeared with increasing dry aging time and in addition, *Penicillium camemberti* and *Debaryomyces hansenii* used for cheese manufacturing were observed with an increase in the dry aging period (Kim et al., 2018). High numbers of Aerobic Mesophilic Bacteria, psychrotrophic counts, and yeasts and moulds were found using the traditional dry aging at Rh of 85 %, whereas no Enterobacteriaceae and lactic acid bacteria were found at dry aging with RH 65 % (Bernardo et al, 2020). Within the microbiological assessment of dry age meat, bacteria to be considered and tested include the Total number of bacteria, *Enterobacteriaceae*, *Salmonella*, *Campylobacter* and *Listeria monocytogenes*. These all contribute to the shelf life of meat and constitute a public health threat. Data about the microbiological safety of dry aged poultry meat, including physico-chemical attributes as well as microbiological data on safety of dry aged poultry meat are scarce. In this study we report the microbiological status of dry aged duck, which is becoming popular in the last years in Switzerland and elsewhere.

### Purpose of Study

The purpose of this study was to review the actual literature on dry aged meat, regarding the legal base on the microbiological criteria in Europe. Dry aged meat is differently perceived in different parts of the world and therefore the legal issue regarding its microbiological fitness and sensory characteristics will be reviewed and discusses. In addition, the microbiological assess-

ment of dry aged duck meat was instituted to evaluate the shelf-life and the microbiological safety in relation to *Listeria monocytogenes*.  
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## Materials and methods

In total: 15 samples were taken in different sampling weeks during 2020 in a poultry slaughterhouse. All samples were **analyzed** for the Total Aerobic Count 10 000 000 CFU/g, *E coli* (reference level 1 000 000 CFU/g, *Listeria monocytogenes* (reference level not present on 1g of analyzed sample). All samples were analyzed according to **ISO protocols**, for the Total aerobic count: 4888:1, for *E coli* ISO 3811:1979 and for *Listeria monocytogenes* ISO 11290/1. In the figure Nr. 1 is given the duck meat and in the figure 2 is given chicken meat during the aging process at 4 C and 79 % relative humidity in the aging chamber. The results were evaluated using the referent criteria form the Swiss Quality Testing Services for fresh meat and meat products.



Figure 1: Dry defeathered duck



Figure 2: Whole chicken in aging chamber

## Results

Out of 15 samples teste randomly during a week of production, none of them was positive for Salmonella nor for *Listeria monocytogenes*.

Number of the Farm/ Sampling material	Results			
	Total Aerobic Count	<i>E. coli</i>	Salmonella	<i>L. monocytogenes</i>
1 <sup>a</sup>	210.000.000	43 CFU/g	S. Albany	n.n.

2	68.000.000	10 CFU/g	n.n.	n.n.
3	68.000.000	2900 CFU/g	n.n.	n.n.
4	420 000	280 000 CFU/g	n.d.	n.n.
5	10 000	3400 CFU/g	n.d.	n.n.
6	10 000 000	1500 CFU/g	n.d.	n.n.
7	500 000	51 000 CFU/g	n.d.	n.n.
8	600 000	100 CFU/g	n.d.	0
9	3 000 000	1 500 000 CFU/g	n.d.	n.n.
10	2.100.000	1.500.000 CFU/g/	n.d.	n.n.
11	4.600.000	1.500.000 CFU/g	n.d.	0 (erfüllt)
12	780 000	42 000 CFU/g	n.d.	n.n.
13	30 000 000	91 000 CFU/g	n.d.	n.n.
14	3.600.000	1.000.000 CFU/g	n.d.	n.n.
15	3.100.000	1.400.000 CFU/g	n.d.	n.n.

a-chicken sample

## Discussion

Out of 15 samples 7 samples do not meet the microbiological criteria for Total Aerobic Count Bacteria and this might be in association with the processing, handling, storage; such meat might. Regarding E coli 3 out of 15 samples do not meet the microbiological criteria; such contamination might be in association with faecal contamination, processing failure, handling and storage. Salmonella and Listeria were not found in none of the samples. Attention has to be paid to the hygiene and microbiological levels as exceeding of these levels ends up with condemnation of the lot and this has financial consequences. High levels of E coli also might bear the risk of the presence of pathogenic bacteria such as Salmonella. Proper treatment of such meat has to be instituted, although in practice this might not be the case. Microbiological status of such meat has to be studied and levels also set and be in correlation with food safety intentions. The number of yeast and mould can not be excluded in such high numbers of bacterial counts and further studies have to be instituted to show the numbers and assess the consumption fitness of dry aged poultry meat. Dry Age meat poses good business alternative, at the same time self-control systems to be integrated to assure firstly safety and at the same time a good quality, taking also in consideration the high prices in the market. Actually, the dry aged poultry is mainly offered by exclusive restaurants, due to the expertise on cooking and high prices and there is a tendency of growing and for the sustainability of the growth there is a need for standardisation of the aging process, especially for poultry meat, which is rare.

Dry aged should be included as a protected designation in the guidelines for meat and meat products in order to avoid legal uncertainties. Classification as a new type of food according to VO (EG) 258/97 would not be suitable. Clear product-specific requirements for food safety and process hygiene criteria should be introduced in Regulation (EC) No. 2073/2005. The traditional method of meat maturation should be considered as a special test criterion in the EU approval procedure of the food company and a special mention should be made in the approval notice. Since it is hygienically risky food, the legal classification as unsafe food within the meaning of EU Regulation 178/2002 Article 14 must be countered with appropriate self-monitoring measures for placing on the market. Identifying the product, similar to that used for fresh minced meat, would be a possibility here to provide consumers with preventive health protection. Due to the inhomogeneous product group, a solid understanding of the public is necessary in order to counteract any deceit of consumers. Uniform minimum requirements for the procedure should be included and implemented in the relevant industry-specific guidelines on good hygiene and manufacturing practice, including in the HACCP concept.

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## COMPARISON TECHNIQUES BETWEEN NATURAL AND ARTIFICIAL DYES. ANTHOTYPE PRINTING

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**Abstract:** The dyes either natural from tea or artificial dyes which are commercially available are widely used in textile colouring. The colouring process includes extraction of the certain dye or pigment in the amount of 5 g to be dissolved in hot water (90 °C). Amount of sodium chloride was added to boiling water for colouring natural materials such as wool and cotton. The main goal of this research is to replace the artificial colours with the natural ones and to find a key solution how the colour can be fixed without fading over washing and over the time. The fixation of the colour was carried out using egg yolk in acidic medium using liposomes as vehicles. The sustainability of the renewable materials with natural origin is in progress to be found in the textile industry. Moreover, the anthotype printing including turmeric spice with acidic boric (10%) development allows an ecofriendly approach in the terms of photography where students can develop their own photos with routine procedure.

**Keywords**—*dyes, fixation, anthotype, cotton, wool*

### Introduction

In the literature, the classification of the dyes according to the origin can be divided as from animal, plant, and mineral origin. The process of colouring is applicable on natural fibers cotton, wool, silk, and linen.<sup>1</sup> The colourants contain certain group which is chromophoric or auxochromic and the colour itself depends on that group in the colourant. For example, tannins are complex polymeric polyphenols containing aromatic ring structure.<sup>2-4</sup> Natural colours are considered to be ecofriendly, but with poor bonding properties in the connection with textile fiber materials. The natural dyes have properties to be less hazard, without toxicity with high level of sustainability and with the origin from natural renewable sources.<sup>1</sup> The importance of eco-friendly dyeing of textiles has started with the process of re-examination. The natural colourants are considered to be dyes extracted from the plants, insects, and minerals. One of the most important benefits is the origin of the natural dyes where the source is renewable. The fastness of the colour on the material is not always the satisfactory one in the comparison to the artificial colours, for the environmental and health issues is used. The natural colourants have advantages such as less toxicity, less polluting, less problems with the health and are considered to be biodegradable.<sup>5</sup> The drawbacks using natural dyes are linked with the time which is more in the process of dyeing. Not always is possible all the shadows to be obtained using natural dyes.<sup>5</sup> Depending on the harvest time, on the plant material, the colour can be varied and the shade cannot be reproducible. The extract of tea

can be used as natural dyes where substances such as flavonoids, flavonols, and phenolic acids are the main colouring components in the production of tea.<sup>1</sup> The dye from saffron (*Crocus sativus*) can be extracted in hot water where antocyanides are the main compounds which are responsible for the colour.<sup>1-4</sup> The carrots contain carotenoids which are red, yellow, and orange pigments where the structure of the primary dyes is chain-conjugated double bonds. The chemistry of natural dyes depends on the several chromophoric and auxochromic groups. The natural consisted of dyes with groups such as -OH, -NH<sub>2</sub>, -COOH which with the active site of the fiber containing the groups -OH, SO<sub>3</sub>H, -COOH, -C<sub>6</sub>H<sub>5</sub>OH, -NH<sub>2</sub> make complex with or without mordant.<sup>5</sup>

Microencapsulation was introduced in order small quantities of the substances of interest to be encapsulated such as therapeutic oils, insecticides, and moisturizers.<sup>6-9</sup> The microencapsulation of the herbal extracts can be shown to 20 times acceptable washing of the material without losing the antimicrobial activity. The cycle of washing and the choice of the material if it is from natural or artificial origin, plays role of the colour fading.<sup>5</sup> Moreover, the anthotype (from the Greek word for flower *anthos*) of printing is old technique which can be used in the study program of textile, design and modeling as a technique for self standing students to make their own photos with the use of less toxic substances. Although the technique is well known since 19-th century nowadays is actualized using as a special method to make photo session for authentically student practice.<sup>10,11</sup> Photographs can be done using crushed flowers, petals, leaves, plant juices, and roots. In addition, an ecological direction is in the picture. In the literature, pigments from spinach, beetroot, spices such as turmeric spice, chard, daisy, pokeberries, and red vine. Very poor dark tones are obtained from tomato, peas, carrots, cinnamon, and parsley, and the contrast is not sufficient in the final photography.<sup>11</sup> Depending on the pigments which are used in the analysis, the time for exposure on the sunlight is different. Using wax in the finishing process of the process of anthotype method is introduced in order the original tones not to be faded. Obtaining the contrast using turmeric is usually with the use of borax solution. Over the time, the procedure of dyeing the materials is almost the same, but the choice of the colours was changed with the time.<sup>11</sup>

In this study, anthotype technique was used in the photography in the means the process to be more ecofriendly and in order the students to have their own chance besides of creating models to make photographs as well in their session. The aqueous extraction method is used in terms of separation non-dye material. One of the main disadvantages is the colour breaking and the proper temperature for wool and silk should not exceed 90 °C. The role of adding salt in the dye bath is to form at the highest possible level of colouring. The fixation and finishing can be done with the use of liposomes. The use of natural colours somehow can be a challenge in the fixation of the colour which can be faded over the time. The photography nowadays uses techniques from the period from many years ago such as anthotype printing and cyanotype technique. The purpose of this research is to make a comparison using different techniques implementing natural and artificial dyes.

## Research Methods-Materials

Samples of tea in form of bag such as from forest fruits, *Hibiscus*, *Tilia*, saffron-*Crocus sativus*, artificial red

colour, turmeric spice, eggs, and vinegar were bought from the local market. Boric acid, sodium chloride, and ethanol (96%) were bought from Alkaloid AD (Republic of North Macedonia). All reagents were with analytical purity. Cotton and wool were bought as raw materials from the local market. An analytical balance (VWR LA 124, Austria) with 0.1 mg accuracy was used in the analysis.

*Material burning.* In order to test the purchased fiber sample if it is natural or artificial, burning test was performed in order to make a difference based on the smell and the formed product. The test itself shows the characteristics of the materials such as if the fibers melt or burn, if the fibers shrink from the flame. Moreover, the test shows the change of the colour, the present of any kind of smoke, as well as the form and how the residue of the burned fibers looks like. A part of tested material (10 cm) is placed on laboratory vessel. The whole material could be made from different materials and should be separated carefully in order to determine the entire fiber content of the fabric. The test is useful to see if the fabric is made from synthetic or natural fibers, but the test should also be taken with consideration because during the burning test outside factors can affect to the material. Although some materials are slow in igniting, the same materials can burn very quickly. Some of the materials can burn hot and caution should be taken.

Each tea samples ( $25 \text{ g} \pm 0.0001 \text{ g}$ ) were weighted and transferred to laboratory beakers and on the hot plate, in the period of 30 min all samples of tea were boiled in distilled water (200 mL). The artificial colour was used in the amount of  $5 \text{ g} \pm 0.0001 \text{ g}$ . In all experiments, sodium chloride (NaCl) salt was added. After the period of 30 min, a piece of textile, cotton or wool was placed in the backer and mixed well with the colour. The dyeing is carried out in acidic medium and the vinegar can be used in order to improve fastness of dyed samples. The washing process is repeated in the following 7 days and the drying in the sun light.

Based on the characteristics of liposomes, they can be used in the textile dyeing because can encapsulate both hydrophobic and hydrophilic dyes. The final properties of the materials are considered to be improved using liposomes. The liposomes are generally used to improve stabilizing process and the dye to be in controlled way in the releasing process.

In the experiment, natural colours from teas and plants (Figure 1a) are used as well as an artificial red colour (Figure 1b). The trials with carrots and saffron were only to see the direction of the experiment. The herbal textile production begins with the pure organic yarn/fabric where each step is carefully controlled without the use of any chemical process in dyeing and processing. In general, only materials such as wools and cotton can be considered as satisfactory materials for the use of natural herbal dyes. During the processes such as spinning, weaving, and enhancing the appearance no chemicals are added.

In the Figure 1 the colours which were used in the experiments are presented. The natural colours are presented in Figure 1a, while the artificial colour is presented in the Figure 1b.



**Figure 1.** Natural (a) and artificial (b) colours

*Anthotype Printing.* The image which is created with the use of photosensitive material from plants is called anthotype. In this process, emulsion which is made was from plant. In this study turmeric spice was used in the amount of  $5 \text{ g} \pm 0.0001 \text{ g}$  and was placed in the laboratory glass backer where 20 mL of 96% ethanol was added. A white piece of paper used for the art purposes was placed where the mixture was poured through the whole paper. The photography which was chosen to be developed with anthotype printing was first printed on transparent paper. The photography is placed on the paper which is in whole with ethanolic turmeric solution and exposed to the sunlight. The piece of paper is coated with the solution which should be saturated well followed by the drying process until the yellow colour was formed. Once dried, the coated paper is then left to be exposed to direct sunlight to record an image via a sun bleaching process. The picture which was intended to be developed should be previously printed on transparent paper and then placed it gently on the prepared piece of ethanolic turmeric paper. The material was placed in the picture frame exposing on the sunlight 5 h. The image is formed over the time with the process so called sun bleaching. The image was developed in water boric acid solution (10%) and finally the yellow-brownish colour was formed.

## Findings and Results

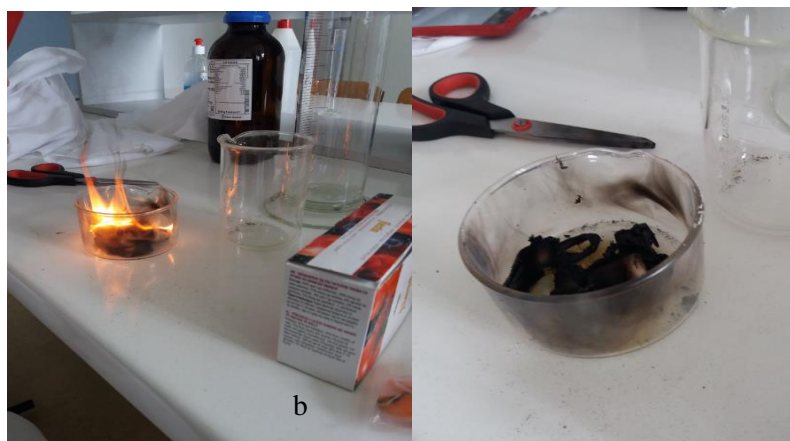
The dyeing process was successfully applied on the cotton (Figure 2a) and wool material (Figure 2b,c). The used colours were artificial and natural from forest fruits, *Hibiscus*, and *Tilia*. The cotton was used without changing of the bought piece of material, while the wool which was firstly washed with the water was knitted obtaining a winter jumper and the colour of *Tilia* was placed on it.



**Figure 2.** Natural materials, cotton (a) and wool: raw (b) and woven (c)

The qualitative characteristic of how one fiber can be burnt is based on the subjective test, but it is conducted to

determine if the material is based on the natural or artificial fibers. When one material is present in the experiment, it is easy to distinguish the results which are obtained (Figure 3a). The natural materials burn in the flame and only ash was left and without plastic smell. The ash of the natural fibers is soft and the odor is somehow like burning hair or paper (Figure 3b). The yellow flame (Figure 3a) is characteristic for cellulosic fibers followed from soft gray ash (Figure 3b).

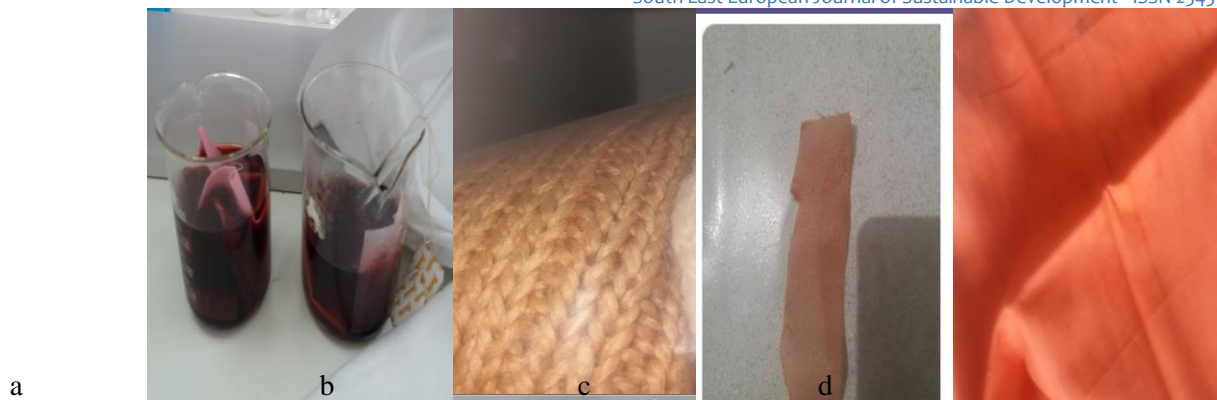


**Figure 3.** Experiment with material burning: burning (a), ash (b)

The cotton was ignited on contact with flames, the burning was quickly and was not melted. The odor was like burning paper, leaves or wood. The residue was classified as a fine, feathery, gray ash. The wool burnt with orange colour without melting. The odor was like burning hair or feathers. The residue in the laboratory vessel was black, easily crushed into black powder. The artificial fibers burnt and were melted with the tendency to shrink away from the flame.

Dyes can be defined as substances which can be applied to the material and play important role in the successful trading of textile products. One material can be consider as acceptable material if the consumer is satisfied with the fixation of the colour along to the light, the availability of washing the material after prolonged use. The dyes should give colour to the fiber with high affinity, the colour should be uniformed in all parts, without fading, and the dyes should be commercially available. The obtained colour was along with the expected one in terms which kind of dye was included in the experiment.

The process and the results of dyeing are presented in Figure 4. The forest fruit tea and *Hibiscus* tea were chosen for dyeing cotton (Figure 4a), while *Tilia* was chosen to dye wool material (Figure 4b).



**Figure 4.** Dyeing of materials with: Forest fruit and *Hibiscus* (a), *Tilia* (b) natural colour from the forest food (c), synthetic colour (d)

The results show that with the use of natural colour not so intensive colour was obtained (Figure 4c) in the comparison with the use of artificial red colour (Figure 4d) where more intensive colour was obtained.

The dyeing process includes preparation, dyeing, and finishing. The preparation step includes removing of all unwanted particles from the material before dyeing. The whiteness of the materials was achieved with washing the material with water or with detergents. The cotton in the experiment was used as it was bought from the shop, but the wool was washed with warm water (90 °C). In the dyeing process the colour was applied to the material where the diffusion of the dye should be in the inner surface of the fibers. The dyeing step on the cotton and the wool was done using tea from *Hibiscus*, *Tilia* tea and the red colour artificial colour. From the obtained results can be seen that the colour of the artificial one is more intensive, where the colour on the materials from the natural colours are stable during period without fading. The finishing process was in trials of investigations where the chemical compounds aimed at improving the quality of the fabric.

The eco-based textile technology is based on using the liposomes where the phospholipids are natural surfactants where the structure enables clearly separation of hydrophilic and hydrophobic regions. In the experimental trial, lecithin from egg yolk was included in the experiment where the dye was carried out with the liposomal carrier and in that way enables cost-effective and eco-friendly way of production of fabric. The idea of using liposomes was based on the characteristics such as nontoxicity and biodegradability of substances. The fixation of the colour was done using liposomes where egg yolk was mixed with the colour of interest. The use of liposomes in textile processes confirmed the lower temperature for dyeing process. The low temperatures, on the other hand gave a more natural feel improving the quality with lower environmental impact. The sustainable textile product can be defined for the material as it was created, produced, transported, and disposed taking into the account environmental impacts in life cycle.

*Anthotype printing.* The anthotype printing method can be considered as a sustainable photography and itself is based on the chemical process (Figure 5). If the anthotype paper after developing is kept in dry condition and without direct sun lighting, it can last long time. The students can make their own photographs with anthotype technique and put their own seal on their work and in this research this type of printing was introduced as a demonstration method in the learning process for the students from the direction Textile, design and modeling.

The crucial item is the moisture of the paper on which the photography is placed on. The paper should not be wet, but only with slight amount of moisture. The sharp or blurry of the final print is depended on the pressure from the back side of the picture frame. The sharp is bigger with the increasing of the pressure. The sunlight should be directly to the object of interest where the angle plays important role. The best exposure is the one where the sun rays are normal to the photography.



**Figure 5. Developing of anthotype photographic prints:** chosen printed photography on transparent paper (a), paper for developing the picture with turmeric solution (b), picture frame (c), developed picture with sunlight (d), using boring acid for contrast (e)

The developing method consisted of several steps including the choice of picture (Figure 5a), correctly application of turmeric spice solution on the paper (Figure 5b), the process of developing under the sun bleaching (Figure 5c), the result of developed photography (Figure 5d), and using of boric acid solution (Figure 5d). Successfully application of the method depends on many factors such as the quality of the pigments, the paper which was used in the analysis, as well as the weather condition, percentage of the moisture etc. The final colour is obtained from the pigments which play important role and the exposure of the material to the pigments. Over time, it is noticed that the dark tones can be faded. The effect of using boric acid solution is achieving the contrast which can be used only with turmeric spice without destruction of the material. The anthotype technique is inexpensive, an easy to handle method which can be conducted at any place where you are needed to obtain photographs. Moreover, the technique is sustainable technique where the developed anthotype photographic prints are developed from the crushed spice (turmeric) dissolved in the boric acid solution.

Pigments properties influence not only to the final colour of the print, but also have a link of how long it takes

to produce one. Depending on the sunlight exposure, the moisture and weather conditions, around between 4 and 6 hours are enough to produce desired prints. The humidity, sunlight, temperature, as well as types of pigments and the type of the used paper in the experiment are factors which play role for the final photography.

## Conclusions and Recommendations

The colours either herbal with natural origin or artificial colours can be used in the textile industry. The liposomes can be used as auxiliaries in the process of dyeing in textile. The obtained colour is more resistant to wet treatment and oxidation. The ecofriendly anthotype printing can be successfully applied in the photography. The process of dyeing depends on several factors such as type of material (fiber, yarn, fabric, and garment), generic type of fiber, and size. The increasing complexity and difficulty in treating textile has lead to constant methods for effective eco-coloring and economically viable. Consumers aware of hygienic healthy and protective life-style and the clothes should be with functional properties. On the other hand, anthotype method can be considered as organic, inexpensive and easy to practice at home photographic technique. The students studying textile, design and modeling can make their own exhibition with their own developed photographs.

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# Quality Indicators in Working Environment in the case of Defense and Security Trade Union

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## ABSTRACT

The main objective in this paper is to analyze several quality indicators for the working environment in the Defense and Security Trade Union (SOB) and to examine serious problems that contradict the concept of sustainability and human capital conservation. The research aims to present the real situation for the workplace's quality, but also to obtain data on the level of awareness and education on Occupational Safety and Health (OSH) among SOB members, which does not meet international standards for a NATO member such as the Republic of North Macedonia. Due to collecting of the necessary data, educational trainings for the members of SOB, and trainings for the future trainers for presidents in SOB were realized during 2020/2021. For the same purpose, an anonymous survey was conducted and ten quality indicators were developed. Although the quality indicator for accidents at work was only 13 (on a 0 to 100 scale), the value of 53 belonged to the indicator for the importance of level of protection at work from physical injury. A total value of 69 was registered for the personal protective equipment (PPE) indicator, which is one of the biggest problems in terms of requiring adequate safety working conditions. During trainings and operations, most of the military personnel include intense combat training and extremely dangerous situations, so the stress they are exposed to is a much bigger problem than physical exertion.

## KEYWORDS

quality indicator, occupational safety and health, personal protective equipment, risk, hazard

## 1 Introduction

In the contemporary circumstances, sustainable development concepts pose more OSH issues, and despite strictly defined environment and green technology issues, the costs of safety and health hazards and diseases have to be seriously considered. Information on harmful factors in the work environment and the impact of those factors on human health, imposes the need to record, collect, process and analyze data and the consequences of unfavorable working conditions.

In crisis situations, normally, military activities are considered more dangerous than civilian work, but on the other hand, peacetime have been very seldom analyzed [1]. The safety and health risks faced by military personnel are serious causes of incidents such as dangerous accidents, exposures and nearmisses. If not adequately addressed, these risks, even if they do not cause immediate harm, may cause greater damage in the near future [2].

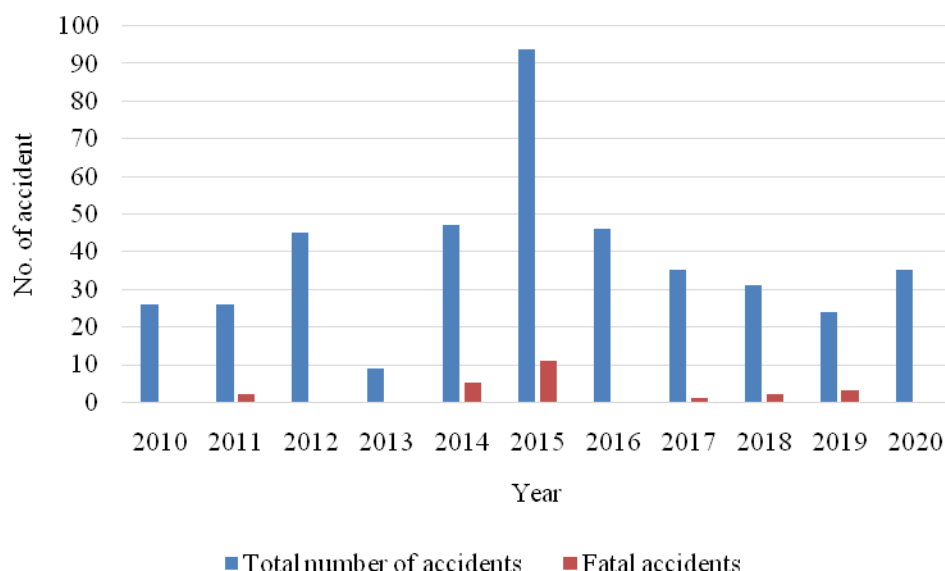
Statistical analysis of operations in Iraq and Afghanistan found that about 25 percent of veterans of these conflicts experienced a dangerous incident - such as exposure to biological warfare agents, oil fires, or witnessing a

traumatic event. Also, 53 percent of military personnel reported exposure to dangerous occurrences, so exposure to air borne hazards such as volatile organic compounds and particulate matter produced from burning solid waste pits, oil fires, or dust storms had led to respiratory illness that required use of protective equipment, such as respirators [3].

The Memorandum of the Army Department, 110 Army Pentagon, Washington DC from 2005, states that injuries and illnesses such as cuts, fractures, sprains or amputations, as well as chronic illnesses, skin and respiratory diseases or poisonings, are abnormal conditions or serious disorders of physical and mental health. Thus, in a population of 230,945 employees in 2000, the United States recorded an incidence rate of 73 cases per 1 million working hours [4], while Sweden had an incidence of 28 cases per 1 million working hours in the ranks of its armed forces [5].

## 2. Defense sector in the Republic of North Macedonia

According to data from relevant institutions in the Republic of North Macedonia (RNM), in an average population of 732452 employees, an average incidence rate for fatal accidents at work of 4.31, and an average injury incidence rate of 15.24, were registered during the period 2010-2020, [6] (Fig 1). The reported accidents and injuries in the Defense sector for the same period are shown in the chart below:



**Fig.1** Accidents and injuries in the Defense sector in RNM

The data in the table indicate that 2015 is the year with the highest number of accidents, but also the largest number of fatal accidents at work that occurred in the Defense sector during the entire decade. The purpose of this study was to present the current situation of OSH in the SOB of the RNM, and to point out serious problems (inadequate personal protective equipment, untimely replacement, insufficient level of hygiene in the working and sanitary facilities, insufficient motivation for work, inadequate or insufficient education and professional development), which undermine the basic concept of protection of the employee at his workplace [7].

## 3. Materials and methods

### 3.1. Quality indicators

Modern safety management tools, versus traditional safety management approaches that concentrate on how accidents happen or “something went wrong”, present more successful methodology. This methodology primarily focuses on safety at work, especially in high-risk work environments, and is aimed at solving the problems that

generate uncertainty in the adjustment and performing of the employees in expected or unexpected working conditions [8]. In this direction, quality indicators are developed to enable a more detailed analysis of the causes and circumstances for injuries and illnesses at work. A quality indicator is a data or a structured group of data that has a close relation with the level of the qualitative and quantitative outcomes obtained in a particular field [9]. The basic goals for the formation of quality indicators of the working environment, as descriptors that qualitatively or quantitatively indicate a certain state or change of a particular state, in their character are very specific, and include:

- workplace factors that positively affect employee health, work capacity and work efficiency;
- physical, chemical and biological hazards;
- defining limits for concentrations, levels and doses of harmful substances and occurrences in the working environment;
- defining the levels of physical and mental effort of employees that are determined by the anatomical, physiological and mental abilities of the individual;
- targeting employees or groups of employees who are directly exposed to unfavorable working conditions;
- proposing measures for elimination of harmful factors;
- organizational measures to improve the quality of the working environment.

For this study, ten quality indicators were developed. On a 0 to 100 scale, the value of each indicator shows the real parameter obtained from the conducted survey.

$$I = (PSE/NR) \cdot 100$$

This value (I), is obtained through the number of employees who positively stated for the respective indicator (PSE), and the total number of respondents (NR). The obtained values are expressed in percentages.

### 3.2. International Labour Organization (ILO) Program project

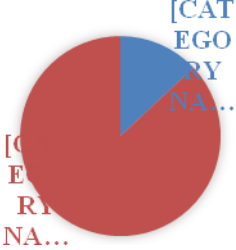

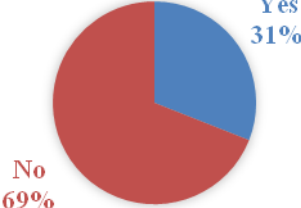
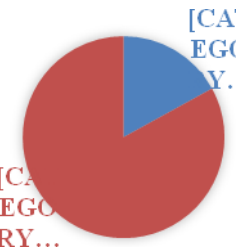
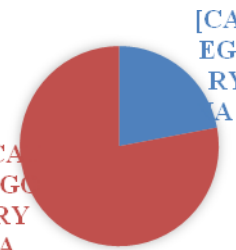
The data for this paper were collected through trainings, workshops and an anonymous survey, that were part of the implementation of a project from the ILO Program, funded by the EU [10]. The project involved members of SOB, so that in the field of OSH were organized and conducted multiple trainings during 2020/2021 in: Regional Basic Organizations (RBO) Crisis Management Center, RBO Veles and Prilep, RBO Kumanovo, RBO Ilinden, RBO 8043 and RBO TRC, with a total of 97 people present (76 men and 21 women). The members of the SOB were pointed out the basic rights and obligations in the field of OSH, but also all the hazards in the workplace - severe mechanical injuries, physical and mental loads, stress due to work with weapons, airborne or contact exposures to chemicals or heat arising from fires, exposure to radioactive radiation or electromagnetic waves, problems with personal protective equipment at work or lack thereof, and a number of other factors that definitely put this profile in the rank of high-risk jobs [7].

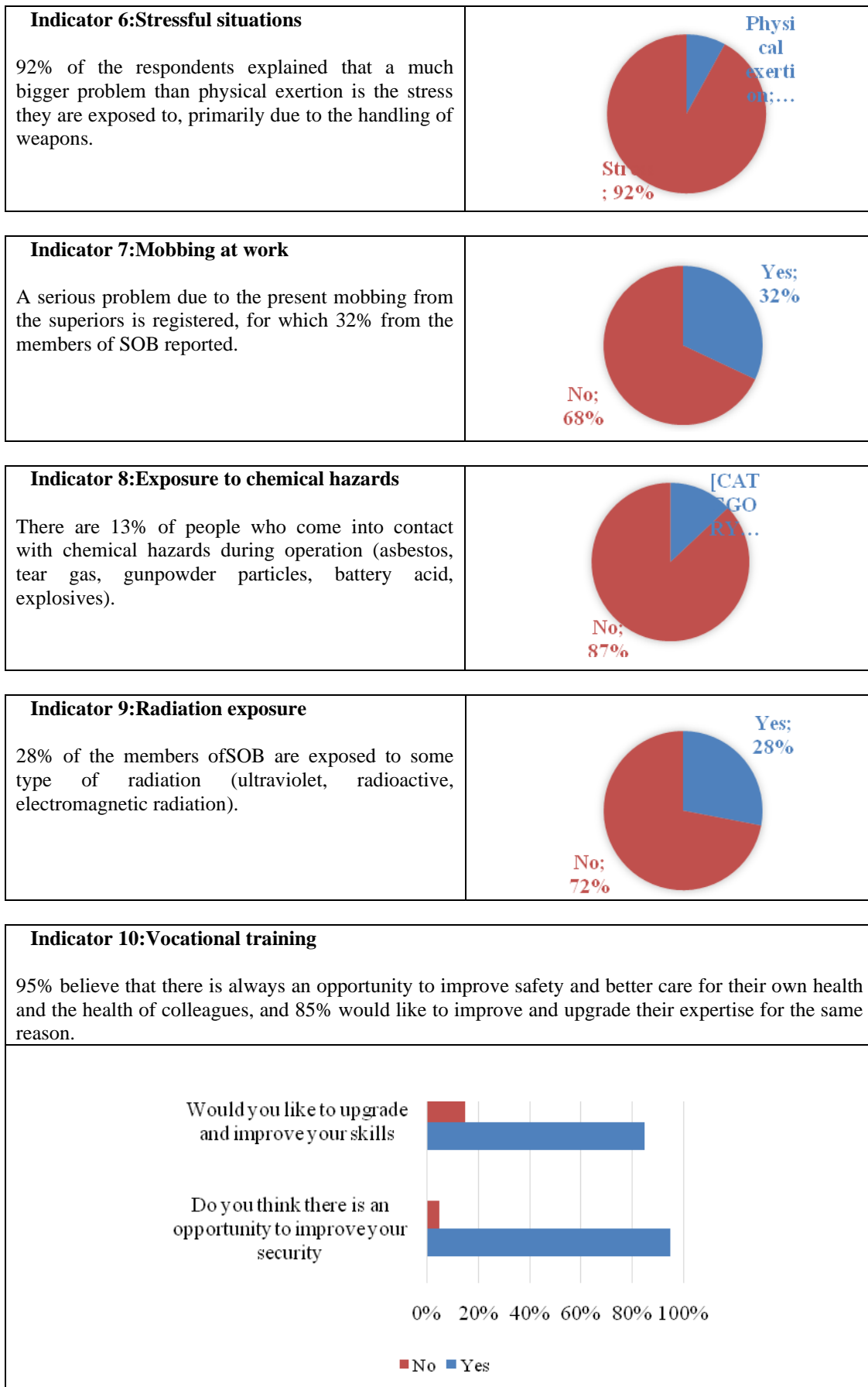
The survey describes a number of job risks, including: loss of life, dangers of detonation when destroying ammunition, injury during handling of weapons and contact with mine explosives, defective motor vehicles, work at height, outdated technology and vehicles, handling hoists and cranes that are not regularly inspected and serviced, dangers when diving and hiking, skin diseases and diseases of the respiratory organs, contact with carcinogens, unfavorable weather conditions in the field - large temperature differences, etc.

For all these risks, the members of SOB offered proposed measures to reduce the risks, procurement of new and better equipment for personal protection at work, new uniforms, improvement of working conditions, renewal of the vehicle fleet, provision of necessary medicines, regular educational training and staff training, as well as increased controls on elders in order to prevent mobbing in the workplace.

## 4. Results and discussion

Quality indicators are one of the tools to monitor and control efficiency of the quality management system. The results collected serve as a basis for implementation of corrective measures and continuous quality improvement. To achieve the desired goals, an anonymous survey among the members of SOB, was conducted. From the processed data from the questionnaire, 10 quality indicators were developed (Fig 2). [11].

<p><b>Indicator 1: Injuries at work</b></p> <p>13% of respondents had any work-related injuries (fractures, bruises, collarbone injuries and other physical injuries).</p>	
<p><b>Indicator 2: Workplace safety - an opportunity to improve safety</b></p> <p>53% believe that the safety of the worker which even if fully protected from physical injury is not enough, so that 22% of SOB members feel unsafe in their workplace.</p>	
<p><b>Indicator 3: Personal protective equipment at work</b></p> <p>One of the biggest problems is the personal protective equipment (PPE) at work, for which 69% stated that it is inadequate and not in good condition.</p>	
<p><b>Indicator 4: Working conditions</b></p> <p>83% are not satisfied with the working conditions (sanitary and hygienic conditions, living quarters, diet).</p>	
<p><b>Indicator 5: Exposure to strenuous physical activity</b></p> <p>22% of respondents are exposed to high-altitude work, 45% to extreme physical activity.</p>	



**Fig.2**Accidents and injuries in the Defense sector in RNM.

During trainings and operations, most of the military personnel is engaged in intense combat training and extremely dangerous

situations, so the stress they are exposed to is a much bigger problem than physical exertion. So, about 97% of the members of the SOB are at the opinion that nothing can compensate for the loss of a lost human life.

The main benefit of the survey was that the main goal was achieved: to make employees think much more about the value of human life, the importance of their safety at work and the safety of colleagues, asking questions and seeking answers, but also proposing their own vision for solving existing ones.

## 5. Conclusion

The data in this study can be used to develop strategies for reducing the risks of dangerous incidents, injuries and exposure to hazardous substances, during training and operations of military personnel. Such risks are most often generated due to the implementation of intense combat training, vigorous manual handling, patrolling and direct combat, which make the activities of military personnel extremely dangerous. Implementation of practical approaches and tools in occupational health and safety management system are closely related to reduce incidents, poor health, illnesses, and injuries at work. In this regard, quality indicators are developed to enable a more detailed analysis of the causes for injuries and to provide guidance for increasing safety at workplaces. Although the obtained value of the indicator for injuries at work is not very high, still many members of the SOB believe that the safety of the employee which even if fully protected from physical injury is not enough, and feel unsafe in their workplace. Serious problems like inadequate personal protective equipment, untimely replacement, insufficient level of hygiene in the working and sanitary facilities, insufficient motivation for work, inadequate or insufficient education or professional development, are pointed out as the main drivers of the feeling of insecurity and lack of care for the health and life of employees. When it comes to work equipment, it is also necessary to procure better quality equipment for personal protection at work, new uniforms, renewal of the vehicle fleet, provision of necessary medicines, as well as improvement of working conditions, regular training and retraining of the staff, but also intensified controls on supervisors in order to prevent mobbing in the workplace. However, it seems that one of the biggest problems that SOB members have pointed out as perhaps the main reason for the incidents that happen to them at work is stress. They explained that the stress they are exposed to is a much bigger problem than physical exertion. Nevertheless, one of the main benefits of the survey is that is clear to everyone that nothing can compensate for the loss of human life, and education and professional upgrade are of great importance to every employee.

In 2020, RNM became the 30th member of NATO, so the cooperation of the Ministry of Defense and the Army of RNM with NATO, regarding the Program for the Advancement of Defense Education, began to be implemented and is focused on the priorities in the development of military education.

### *Acknowledgments.*

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# Analyses Of the Different Modalities of Online Teaching During COVID19 Pandemic

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## ABSTRACT

The purpose of the research study is analyses and assessment of the modalities of online teaching during COVID19 Pandemic. During the COVID19 pandemic the entire educational system has changed dramatically and shifted into different modalities of digital online education. However, there is a gap in published research regarding different modalities and their analyses, positive and negative aspects and lessons learned from this shift to digital online education. The COVID-19 pandemic enforced large inequalities in access to technology, such as between rich and poor, rural and urban, girls and boys, across and within cities, regions and countries. The research aims to approach the analysis of the emerging trends in different modalities of online teaching and learning and their analyses and comparison using qualitative method and questionnaire as well as two focus groups. The research methodology used is triangulation technique which combines qualitative and quantitative methodology. As research method used questionnaire and focus groups. The issues, findings as well as recommendations are discussed and argued.

## KEYWORDS

online education technologies, resources for learning, covid19, digital online education, web technologies

## 1 Introduction

Because of the COVID19 pandemic an urgent response to the current situation required an increase in educators' awareness towards online teaching. Online learning platforms were often the first to be introduced to allow children to continue learning from home; In fact, they were the most effective learning method to kick-start some form of learning. However, they have the smallest range. Furthermore, another element of the digital divide refers to the digital literacy gap, a barrier that can be even more difficult to overcome. There is also a significant digital gender gap, as girls are much less likely to own or have access to digital devices and have fewer opportunities to acquire digital skills. In some countries, online platforms reach less than 10 percent of the population. Because they need electricity, a reliable Internet connection and enough devices for children at home: especially devices with good functionality and performance and sufficiently large screen sizes.

Because of this, many governments have implemented a variety of learning modalities, including those that do not require technology and used a TV channels for showing previously recorded lessons for all courses for elementary schools level or those that are more commonly known as digital online learning and their different versions and modalities.

## 2 Literature Review

The Traditional, the Blended Hybrid, and the Flexible modalities encompass face-to-face training with social distancing and private protecting gadget (Heilporn et al, 2021). The Traditional and Blended Hybrid modalities make use of school rooms wherein social distancing measures may be implemented. The Flexible modality permits a small range of alternating college students to be bodily gift withinside the lecture room at the same time as others attend synchronously on line. These 3 modalities (Traditional, Blended Hybrid, and Flexible) permit the college to retain coaching their instructions in a lecture room, the use of lecture room gadget as they usually do (Goodyear, 2020). However, the student`s bodily attendance withinside the lecture

room isn't always obligatory all through the length of the pandemic. For that reason, cameras are mounted withinside the school rooms to permit college students who can not be bodily gift withinside the lecture room to wait the magnificence remotely and synchronously or at a later time.

The Remote Virtual and Online modalities are executed on line synchronously and asynchronously, respectively. They exclude any face-to-face contact. However, the 2 modalities are inherently different as discussed by (Heilporn et al, 2021). The Remote Virtual modality calls for the college's presence on line for the duration of the magnificence` hour at the same time as college students who can attend synchronously are endorsed to do so. Others are allowed to look at the recording at a later time without a penalty. The college conducts the magnificence in a completely comparable way as they formerly did withinside the lecture room. The ensuing Remote Virtual video recordings are published withinside the gaining knowledge of control gadget in step with the dates after they have been delivered. The Microsoft Teams software program is used for this Remote Virtual modality because the videoconferencing tool. Using Teams, the professor can see the scholars and the scholars can enhance their hand and ask questions or make remarks for the duration of the consultation through voice or through text.

The Online modality calls for pre-recording lecture substances and streaming them, on demand, thru the gaining knowledge of control gadget. Instead of turning in a entire lecture in a single video at a scheduled hour, gaining knowledge of modules are commonly created to host a mess of quick video recordings, every one cover a selected region of a entire lecture.

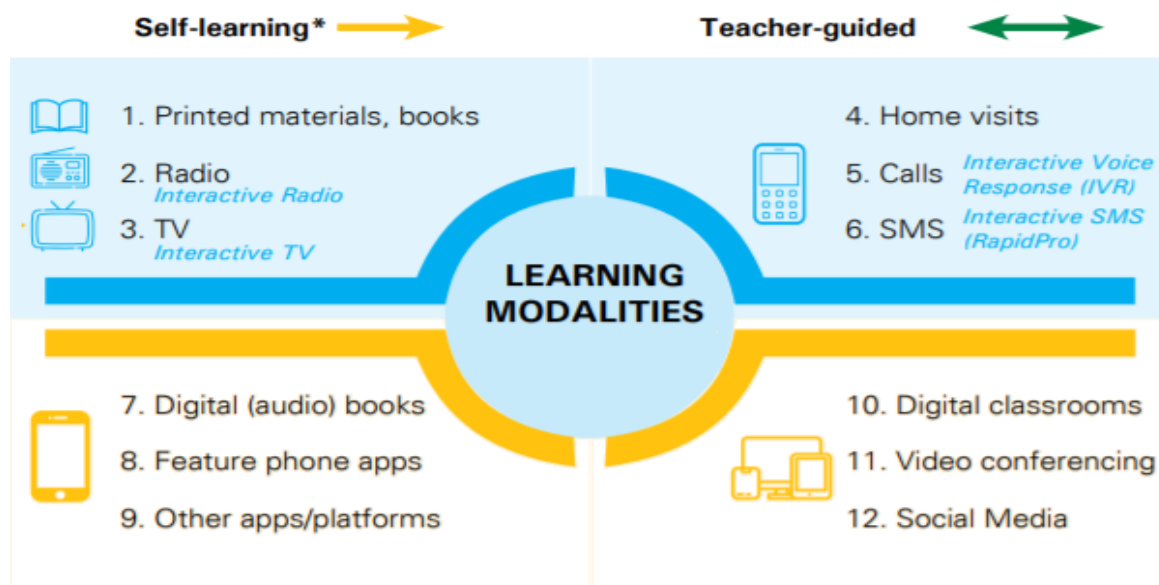


Figure 1. Review of different Learning Modalities during Pandemic from Covid-19

The advantages of the mixed training are for professors and college students. With the potentiality of connection via the Internet, new getting to know opportunities arise, with brought sources that assist closer to comfort, accessibility, effectiveness, and greater alternatives to get entry to training. Classes in hybrid mode permit for optimization of using educational sources and supply manipulate of the potential and social distance, as there are fewer human beings withinside the classroom, such that the social distancing measures imposed via way of means of the kingdom may be higher complied with. In the case of reflect classrooms, they conquer a few of the problems that the virtual divide can cause (Beatty, 2019) perform the equal examine with different University stages. Other investigators have proven that the mixed getting to know education modality in postgraduate packages is presently in excessive call for in Spain, and for this reason, the instructional establishments sell their packages via the Internet, proceeding to draw college students and sell the fine in their packages and establishments (Leoste et al., 2019). According to Goodyear and different researchers, maximum research spotlight that hybrid getting to know modifies the position performed via way of means of college students. They participate now no longer best as members however additionally as protagonists of their getting to know, even turning into the co-configurators of getting to know environment/sports collectively with different apprentices (Goodyear, 2020).

### 3 Purpose of the Study

The purpose of the research study is the analyses and assessment of the emerging trends of the different modalities of online teaching used during COVID19 Pandemic that impacted online education using qualitative method and questionnaire.

### 4 Research Methods

The research methodology used is triangulation technique which combines qualitative and quantitative methodology. As research method used quantitative method using questionnaire and focus groups. Hypothesis H1: The proper use of modality for online education technologies can increase the knowledge transfer level.

Main research questions of the study are:

- RQ1: What are the main emerging online technologies?
- RQ2: What are the main learning modalities?
- RQ3: How can we improve the online learning process?
- RQ4: What are the major challenges in online education?

### 5 Findings and Results

The expected findings and arguments of the work provides sufficient information on the factors that influence the different modalities of online teaching and learning process as well as the analyses of the best online technologies and how much they are aligned with instructional pedagogies. The pandemic has changed the crucial context wherein observe plans are applied for 2 reasons: First, the use of latest structures has been necessary, thinking about that the situations which have arisen require one of a kind methodologies from the ones used whilst the curriculum became in the beginning designed. Second, each the expertise and the expert abilities required to enforce those methodologies are withinside the spotlight, requiring the schooling of experts and students. Online lessons are more and more more being held at nearly Universities in North Macedonia wherein any difficulty may be executed with out face-to-face contact.

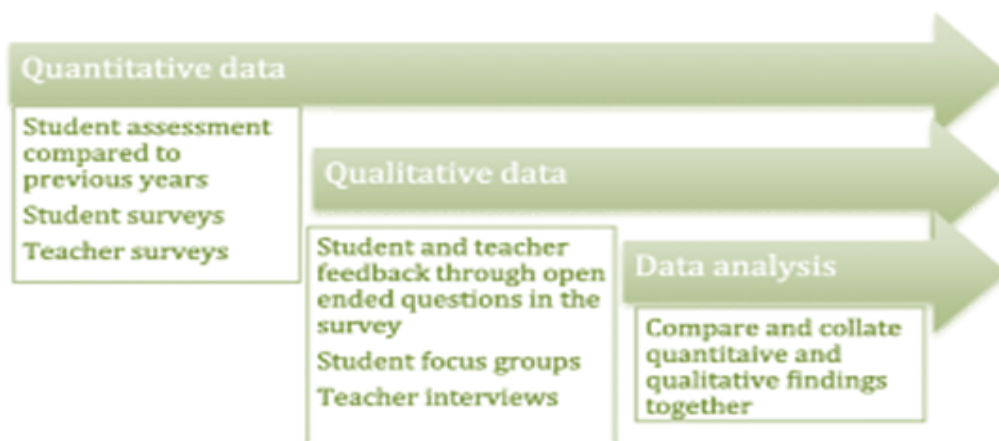


Figure 1. Data Collection Procedure

The concept at the back of this observe, echoing the proposals of (Bergdahl and Nouri, 2020), is the popularity that any discourse on learning modality and changes of the college and its instructors isn't always constrained

simplest to the college environment. The participation of the instructional network and, on this unique case of the University, the method of learning modality may be the figuring out elements withinside the achievement of any innovation initiative this is tried and, withinside the guarantee, via innovation and the usage of ICT, of excessive ranges of delight in our students (Bergdahl and Nouri, 2020). The case of digital coaching lets in for greater flexibility for newbies who stay in remote regions however additionally for instructors from one of a kind elements of the world.

The data collection procedure involved collection of quantitative data from student and teacher surveys and comparison in between years 2020 and 2021. Qualitative data was collected from student and teacher questionnaires and focus groups. The data analyses process was done by analyzing the data from the quantitative and qualitative methodology and using triangulation technique by combining both of them

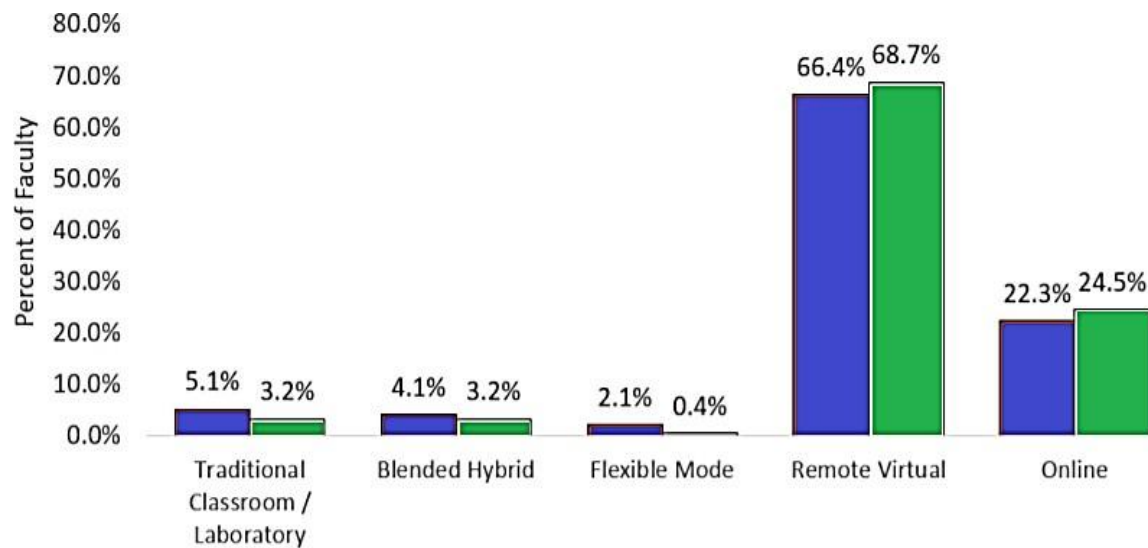


Figure 2. Teaching modalities selected by the Informatics (green) and technical faculty (blue)

The first and most obvious observation is that the majority of faculty members in Faculty of Informatics prefer remote virtual or online. Online modality during the pandemic was the most used teaching modality. These two modalities do not correspond to face-to-face contact among the students involved in the class. The result of this observation are from Faculty of Informatics and Technical Faculty.



Figure 3. Comparative analyses of modes of teachings in 2020 versus 2021

From the results obtained from the previous questionnaire filled in by 42 student participants presented in the above graph drawn we can conclude the following: Teaching modes Blended Learning versus Distance Education and Online Distance learning regarding accessibility has shown highest preference for Distance Education during academic year 2020. Regarding the satisfaction student have emphasized learning with physical presence. Regarding participation again students' preference is with physical presence during classes. The same evaluation preference from students is regarding their success and results they obtained. Regarding the innovation aspect of education modalities students' preference was Blended Learning. Regarding the pre-requirements to follow properly online classes the students consider knowledge of ICT is of primary importance and pre-condition in order to achieve proper online education.

## 6 Conclusion and Recommendations

The research study provides a review of the published literature as well as an analyses of the emerging trends of different modalities used during the pandemic from COVID-19 as well as the assessment and analyses how it did impact online education?

Based on the literature review, and the questionnaires and feedback from students and teachers as the best modality has been shown the blended learning modality. The e-learning system is combined with physical classes and the student's involvement and acceptance of e-learning, deciding which of the multiple features should be implemented, in order to assist specific groups and maintain their satisfaction. Also, identifying the optimal requirements and definitions is considered as a major step in order application to be powerful and reliable.

To address differential access to technology, multiple learning modalities are required, particularly those that are low tech or no tech. As with different self-gaining knowledge of modalities, the use of revealed gaining knowledge of materials desires to be a part of a broader gaining knowledge of approach that

includes teacher-guided approaches, as nicely as steerage to parents on how to efficiently help learners in the usage of the learning materials. The hypothesis The proper use of modality for online education technologies can increase the knowledge transfer level has been evaluated as positive and true based on the student feedback.

What are the possibilities for effective learning with low or no-tech modalities, and combining self-learning with teacher-guided approaches? Unfortunately, while there are creative solutions, there is no doubt a large gap in what low- and no-tech modalities can offer compared to high-tech and online modalities remains to be further analyzed and investigated as future work.

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