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Communication Role of Eco-labels – the Example of Cosmetic Web Shops in Hungary

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Abstract: Consumer trends show that environmentally friendly features of the products are more important nowadays – especially at those product groups that could directly harm the health of the consumers. Consumption of cosmetics has continuously been increasing – not only because the personal usage grows, but also, because men shows higher attention to these products now than before. Therefore, it would be important to turn this higher demand toward those cosmetic products, which has lower or no negative effect on the environment. Eco-friendly labels could help customers to find the right solution to their problems. The aim of this study is to examine how much Hungarian cosmetic web shops help their potential customers to choose among natural or environmentally friendly alternatives by giving information on the eco-labels featured by the products/brands. For that, this exploratory study tries to identify the different types of communication forms of eco-labels. The analysis of the offerings and communication of 22 environmentally-friendly/natural/organic cosmetic web shops shows a fragmented picture. Three different levels of eco-label communication have been identified but only a few of these web shops emphasise the eco-labels and there direct meanings to the visitors.

Keywords: eco-labels; cosmetic web shops; online communication; communication typology; exploratory study

1 Introduction

In 2021, the UN recognized the right to a clean and healthy environment as a human right. The text was passed with 43 votes in favour and 4 abstentions from Russia, India, China and Japan (Farge 2021). This global step reflects to the movement and trend that people around the world express their need to a safer world and for safe products and it also shows their respect for nature.

Cosmetics Europe, the European trade association for the cosmetics and personal care sector (including Beiersdorf, Colgate-Palmolive, Henkel, Unilever, P&G, Chanel, L'Oreal and others) represents big producers on the fields of skin care, oral care, hair care, body care products, decorative cosmetics, sun care products and

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perfumes. According to their report, the cosmetics sector employs around 1.8 million people in Europe and adds at least € 29 billion a year to the European economy. There are about 4,600 SMEs in the sector (European Commission). The largest national markets for cosmetics and personal care products within Europe are Germany (€14 billion), France (€11.5 billion), the UK (€9.8 billion), Italy (€9.7 billion), Spain (€6.4 billion) and Poland (€3.8 billion).(Cosmetics Europe, 2020).

In the EU, cosmetics industry made big steps toward harmonization of legislation: in 2009 directives were changed to regulation and from 2013, the EU banned animal testing of cosmetics products and cosmetic ingredients and also selling of cosmetics tested on animals. (Cosmetics Europe, 2020) That means, that using such claim on the product is a form of greenwashing, because the brand communicates something what is not a real virtue or a special feature because the legislation dictates it and it cannot be otherwise.

Certification system should help both consumers and environmental-friendly product producers for differentiating the more sustainable products. Eco-labels (1) can summarize the important information into one "picture" which makes easier for the customer to make decision, (2) increases trust, (3) helps to differentiate among products and companies, (4) based on that, it intensifies competition among producers and (5) boosts research and development.

2 Literature Review

Products are more and more complicated and consumers don't have enough knowledge understand how cosmetics are made and what are the effects and side-effects of their ingredients. Therefore, consumers needs support to compare products to each other and select the suitable variant for them. Eco-labels and green signals can help consumers in this process.

Atkinson and Rosenthal experimental study (2014) examined the governmental or corporate labels and their specification (specific or general) – with the condition of low and high product involvement. Findings show that "specific arguments consistently yield greater eco-label trust and positive attitudes toward the product and label source, but only with low-involvement products is source important, with corporate labels yielding more positive attitudes". (Atkinson & Rosenthal, 2014 p.33).

Recently, 455 eco-labels exist worldwide.(Ecolabel index) There are two basic groups of eco-labels based on the features they highlight: one-dimensional and multi-dimensional labels. One-dimensional labels give information on a given feature of the products or the package (energy efficiency, raw material, special ingredient-free) (Darnall & Aragón-Correa, 2014). The advantage of one-dimensional eco-labels is their clear meaning for the customer: they reflect to the important question the customer would ask. Is there silicon in the product? Is it vegan? – and the answer is given in an easily understandable way, with a stamp-like picture.

One-dimensional eco-labels have some disadvantages, too. First, such one-dimensional labels can create the "halo-effect" which can mislead the customers. For example, if a cosmetics is paraben-free and this logo is on the product, perhaps the consumer may think that other features of the product are also environmentally-friendly. Another problem is the vast number of competing labels at a same product type which create confusion for the customers and makes the whole system less effective. (Darnall & Aragón-Correa, 2014)

Multi-dimensional labels express environmental friendliness in a quantified form based on percentages, rankings or scores. These labels can be national or supranational labels and they reflect to the detailed analysis of the environmental impact of the product based on a life-cycle analysis. The process of being awarded by a multi-dimensional eco-label can be costly for the producer. (Iraldo et al, 2020)

The official EU flower trademark has criteria for absorbent hygiene products (e.g. diapers) and for rinse-off cosmetic products within the personal care product category.(European Commission) Hungarian companies show low determination to get this logo: now only 7 firms' 13 products can use this certification and none of them are cosmetics or skincare products (Herman Otto Intézet 2021a).

The situation in Hungary concerning the usage of national multi-dimensional eco-labels (the official trademark is the Hungarian Cedar) is quite disappointing. Only the criteria for rinse-off cosmetic products (e.g. soap, shampoo, conditioners and shaving products) is available and translated into Hungarian, and nowadays there is no product in this category which is certified (Herman Otto Intézet 2021b). Unfortunately, the tendency is quite clear – at the moment, only 13 products has the right to show the cedar logo and their number has been decreasing constantly.

The reason can be that those who got the certification earlier could not profit from it because the government or the NGO-s did not support the introduction and familiarization of the Green Cedar. As they could not realize competitive advantage from the trademark, competitors were not motivated to get the certification.

Another way of differentiating eco-labels is based on their authenticity: the label can be a self-made one – created by the company itself, or it can be proven by third party, and can be awarded by NGOs or by the government. Online shops can also create their own stamp-like pictograms to communicate product features.

The results of a recent consumer study show that trust plays and important role in the efficiency of labelling policy: consumers trust in government and environmental NGOs certified or uncertified labels, but they don't trust in firms own labelling practice – even if it is a business-alliance created label – only if independent third-party auditors give approval to them. Therefore independency factor plays an important role in the believability of these eco-labels. (Darnall et al. 2018)

However, there are other basic factors/conditions which can modify the effectiveness of eco-labelling: they are (1) the previous knowledge of customer about environmental/health problems and their relationship with the products (2) the previous knowledge of the origin of eco-labels and (3) consumer attitude toward environment protection.

The latest data from the EU Eurobarometer study (Spring, 2021) shows that for the Hungarians health issues and environmental problems have different importance in their life than for the EU population. For Hungarians health issues (41% mentioned) are the second most important problems (following the cost of living- 45%) while environment, and climate change are on the 8th place in the row (9% mentioned). For the EU 27 countries, health issues (28%) are the most important, and environmental and climate change problems are the fifth most important ones (18%) with much smaller difference from the first-mentioned problem. (Eurobarometer, 2021) These remarkable differences highlight the distinct conditions in which eco-labels can influence buying decisions.

Last, but not least, information provided about the products plays more important role in online buying situations when potential customer makes her decision without the real presence of the product or without the help of the shop-assistant.

Buying online through web shops has advantages and disadvantages for the customers. The most important advantage is convenience which means saving energy and money – and staying home has special value in these pandemic times. Web shops also operate 24/7, which helps the customer to choose among the products at any time, which suits her (Wolfinbarger & Gilly, 2001). Another positive attribution is the information-providing factor. For the customer it is also important, that she/he can get to know and compare the whole product supply and product features on that way. This benefit is more visible if the page has product-comparison function. Moreover, web shops can also provide customer feedbacks on the product page– in text form or/and with ratings. This electronic word-of-mouth communication means more credible and direct information for the potential customers than the company's own advertisements. Some web shops also provide the facility to use filters for products search based on consumer preferences such as price-range, brand, ingredient and product type.

Among disadvantages, the most relevant one is the lack of trial, lack of product experience. Although nowadays there are special programs to overcome this difficulty, it still holds back consumers to buy online. Other issue is the security questioned in connection with the payment process. Time can be mentioned from a negative point of view, because delivery of the ordered product takes time and sometimes, stock information is not accurate which ends in disappointment (Rohm & Swaminathan, 2004). Finally, the information overload could create problems because more information does not necessarily means being better informed (Li, 2016). Concerning the research aim of this paper, information overload could be decreased by providing the picture of eco-labels and certifications of green cosmetics instead of providing long list of detailed texts about the product.

3 Methods

3.1 Research aim

The aim of this article is to show the different approaches and practices of web shops to communicate about the eco-labels of their products. Eco-labels are able to show reliable, important information for the customers in a very compressed form. This qualitative study tries to explore the different levels of communicating eco-labels of cosmetics products and attempts to categorize them.

3.2 Sample

Selection of the web shops examined here based on the following methodology: three search terms were used (in Hungarian): “environmentally-friendly cosmetic web shops”, “natural cosmetics web shops” and “organic cosmetics web shops”. Number of search results shows significant difference: for the search term “natural cosmetic web shops” Google showed 291.000 results, while it could list 87.500 results for “environmentally-friendly cosmetic web shops” term and 35.300 for “organic cosmetic web shops” term. In the second step, those web shops has been selected which appeared on the first page as organic search results. Organic search results has the highest importance because their appearance based on their relevance to the search term and reliable search engine optimisation techniques. Moreover, customers also show high attention to the first-page results, and especially, the first three organic search ranking positions result in over 50% of all click-through (Hollingsworth 2021).

After selecting the first-page organic search results, the overlaps have been filtered out. From the first-page 9 environmentally-friendly, 10 natural and 9 organic cosmetics websites 6 web shops’ names appeared twice on the list, so the final sample consisted of 22 green cosmetic web shops. However, two of them were under construction, therefore 20 green cosmetics websites entered into the analysis phase. Table 1 provides sample description.

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Table 1. Description of examined green cosmetics web shops (n.a. – not available)

Web shop name	**Search term**			**Start of ope-ration**	**Web shop type**
	Env. fr. cosm.	Natural cosm.	Organic cosm.		
okokucko.hu	X	X		2011	Multipurpose green
zoldtudatos.hu	X			2020	Multipurpose green
anyabioboltja.hu	X			2019	Multipurpose green
zoldbolt.hu	X			2007	Multipurpose green
netbio.hu	X			2013	Multipurpose green
humanityaruhaz.hu	X	X		2013	Multipurpose green
magyarspajz.hu	X			2015	Multipurpose
zoldpolc.hu	X	X		2009	Multipurpose green
bionagyker.com	X	X		2009	Multipurpose
naturkence.hu		X		2011	Multipurpose green
naturangyal.hu		X		2014	Multipurpose green
medinatural.hu		X	X	2008	Brand store
cosmio.hu		X		2009	Green cosmetics
krempatika.hu		X		2017	Brand store
szepsegdrogeria.hu		X	X	2009	Green cosmetics
naurel.hu			X	UNDER CONSTRUCTION	
bcombio.hu			X	NO ACCESS	
blueberry-cosmetics.hu			X	2012	Green cosmetics
mandulina.hu			X	n.a.	Brand store
okoazis.hu			X	2016	Multipurpose green
notino.hu			X	2008	Multipurpose
naturalskin.hu			X	2011	Green cosmetics

Source: Authors' construction

4 Results

The systematic analysis of the selected web shop pages showed difference in how and in what details they communicate on the website concerning eco-labels. Basically, three communication levels of eco-labels has been identified: product/brand category level (level A); product variant-level (level B), and web shop level (level C) communication. Communication types were also categorize into 3 groups: the environmentally-friendly information can be communicated only in text form, only in image form or in a mixed form (image and text). In the following section, examples of these communication forms are shown.

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4.1 Product-/brand-category related (Level A) eco-label communication

Product/brand category level communication of eco-labels (called level A) are extremely important, as web shops frequently provide search opportunities on their page for customers, and this process automatically makes the competition more intensive between products and brands, therefore, showing eco-labels at this stage is definitely worth doing. This direct competition also exists based on the categorized product supply in the menu of the web shop.

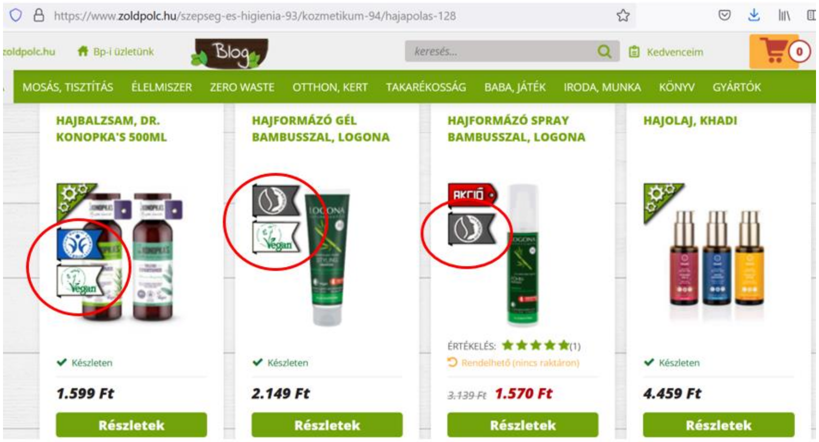

Figure 1

Communication of eco-labels at Level A

(product-/brand-category) (red-circle-highlights from the author)

Source: Zöldpolc (2021) available: zoldpolc.hu/szepseg-es-higienia-93/kozmetikum-94/hajapolas-128

Unfortunately, in majority of the cases websites did not use this opportunity to highlight the green feature of their products. Category-level introduction of products is limited to name, product picture and price – sometimes availability and customer satisfaction information can also be seen. However, even in this case, the image of the product may provide also image of the eco-label, as they regularly shown in the front of the product package.

Figure 1 shows that in the ideal form, eco-labels are highlighted at category level, at the picture of the products. The message of this arrangement is that eco-label is an important feature of the product and it is also important for the customer and for the web shop.

At this category-level, we have found the most advanced method at zoldpolc.hu. On that page, it is possible to search based on the eco-label types (see the red circle on the figure 2). That gives the highest importance of eco-labels as based on a search like that, non-certified product variants cannot enter into the decision making process of the customer. Unfortunately, only one of the examined web shops applies this solution (namely, zoldpolc.hu). That online shop also provide filter based on country of origin. Usage and buying of local products also helps to protect the environment.

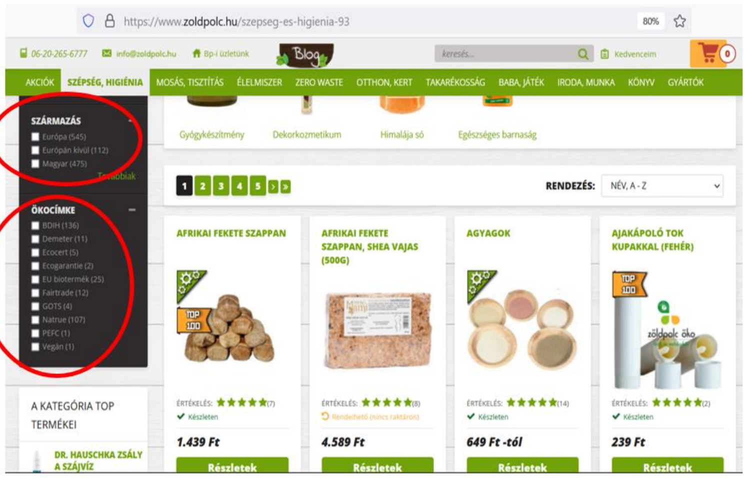

Figure 2

Chance for search based on eco-labels

(red-circle-highlights from the author – 1- country of origin 2- eco-label filter)

Source: Zöldpolc (2021) available: https://www.zoldpolc.hu/szepseg-es-higienia-93

4.2 Product related (Level B) eco-label communication

Level B appearance is connected directly to the product variant, so if the consumer visit the page of the selected product, he/she can see the eco-label there. Here the customer has the opportunity to read the detailed product description, the ingredients of the product and to read longer textual information provided by the web shop.

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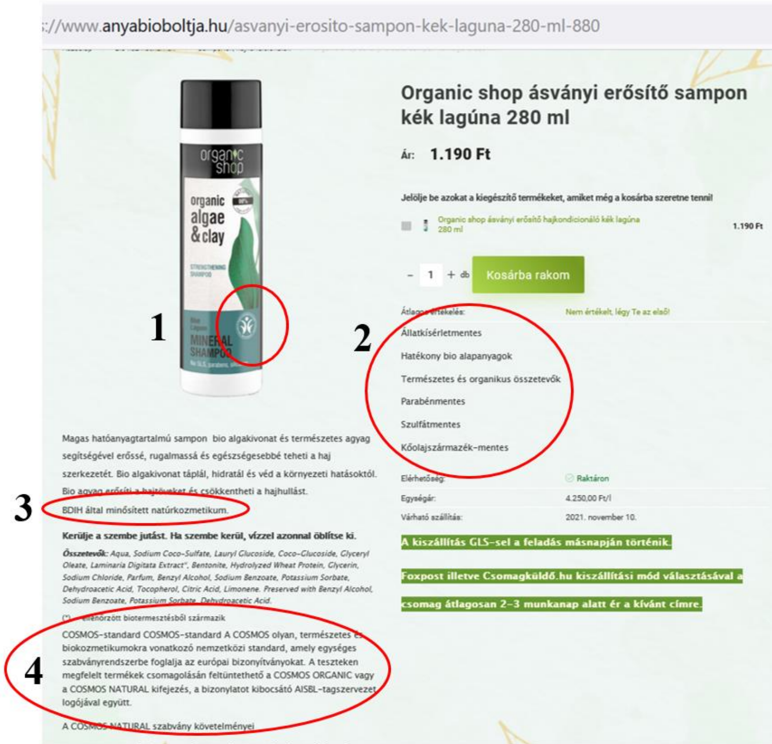

Figure 3
Communication of eco-labels at Level B
(red-circle-highlights from the author)
Source: Anya bioboltja (2021) available: https://www.anyabioboltja.hu/asvanyi-erosito-sampon-kek-laguna-280-ml-880

Figure 3 shows that there are several ways of communication of the certified green features of the product variant. The first chance is to show the product image, which regularly displays the eco-label. The second red-circle shows text information about the product green features: not tested on animals, natural and organic ingredients, effective bio ingredients, paraben-free, silicon-free, petroleum-free. The third circle highlights the information that the product is BDIH certified, while the paragraph in the fourth red circle explains the meaning of COSMOS standard in a detailed way.

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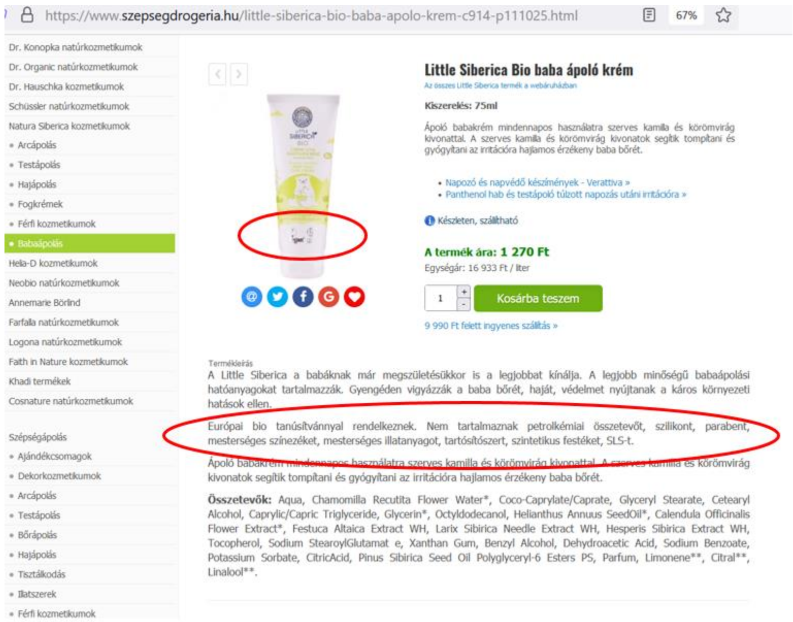

Figure 4 Sample of eco-label communication at level B
(product-variant) (highlights in red circles from the author)
Source: Szépség drogéria (2021) available:
https://www.szepsegdrogeria.hu/little-siberica-bio-baba-apolo-krem-c914-p111025.html

Figure 4 shows the site of a baby cream, which has COSMOS Organic and Vegan certifications. For the producer these are important features based on the fact, that these logos are on the front of the product package. However, the web shop does not highlight these logos, there is no detailed description of the eco-labels, but there is a textual explanation at product-description: "*They have a European bio certificate. They do not contain petrochemical ingredient, silicone, paraben, artificial colouring, artificial fragrance, preservative, synthetic paint, SLS*." (Szépségdrogéria 2021) It seems that the list of the one-dimensional information in text form can be understood more easily for the customers than a complex logo.

4.3 Web shop-related (Level C) eco-label communication

Level C communication of eco-labels focuses more on the trustworthiness and relevance of the web shops on two ways: (1) emphasising that they dedicates themselves totally to green cosmetics and (2) beside selling products they try to educate consumers by providing detailed information on the meaning of different eco-labels. Level C detailed eco-label communication do not only related to products but improves the web shop's image.

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Figure 5 Communication of eco-labels at Level C
(web shop-related) (red circle highlight from the author)
Source: Blueberry cosmetics (2021) available: https://www.blueberry-cosmetics.hu/

Figure 5 shows that blueberry-cosmetics sells product with COSMOS and Vegan eco-labels. These general statements however, can be the basis for greenwashing in case of not all the products are certified. They also emphasise their commitment with the slogan “you can find only clean cosmetics on our website”, however, “clean” is not a technical term in the cosmetic industry.

Although people may think that fierce competition motivates firms to be more innovative and environmentally friendly, it can also be the reason for greenwashing. Unfortunately, among the examined cosmetics web shops we could detect a form of greenwashing: namely the worshipping of false labels. On the left hand side on Figure 6 eco-label-like pictograms can be seen with short description “cruelty-free, vegan, silicon-free”, however these pictograms are self-made ones and are not the official logos of these product features. Customers can be easily misled by such deliberate actions – even if these are true features of companies’ products, but they are not proven by an independent third-party institution.

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Figure 6 Communication of fake/self-made eco-labels at Level C
(web shop-related) (red circle highlight from the author)
Source: Krémpatika (2021) available: https://krempatika.hu/arcapolas

5 Discussion

The analysis of the eco-label communication through the most relevant green cosmetic web shops shows a mixed picture. Typical criticism toward web shops in general, that they don't provide enough information on the product variants and therefore potential customers feel higher risk to make a purchase decision. For example, Ökokuckó sells Boho cosmetics on its page, which has Bio and Ecocert certifications but it does not show these eco-labels. Our main impression was similar: green cosmetic web shops do not communicate eco-labels on an efficient and highlighted way.

The other problem when the product does not have official certification but the web shop creates self-made label-like pictograms. The latter – for sure – is more dangerous for the green cosmetics market.

The other quite common phenomenon is to communicate one-dimensional green character of the product in text form. It is possible, that the examined web shops – as defined natural / organic / environmentally-friendly – do not highlight the eco-labels because (1) the name of the web shop has already have this message and this information is enough for the consumers, (2) consumers don't know the meaning of the labels (3) and as a consequence, it is better to communicate the relevant information in the product description in text form.

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Another aspec,t which may play a role in this practice is that it is not sure that consumers trust the labels. Scepticism toward green claims can be the consequence of former misleading practice of green cosmetic firms.

Table 2. Eco-label categories found at the examined web shops (SM- self-made; Mulitp.- Multipurpose)

Web shop name	**Level of eco-label communication**				**Search term**			**Web shop supply**
	A (category level)	**B (prodct level)**	**C (web shop level)**	**Other**	**Envirr.fr.**	**Natural .**	**Organic**	
zoldpolc.hu	Image	Mixed			X	X		Multip. green
okoazis.hu	Text	Mixed					X	Multip. green
netbio.hu	Text	Text			X			Multip. green
bionagyker.com	Text	Text			X	X		Multip. green
anyabioboltja.hu		Mixed			X			Multip. green
zoldbolt.hu		Mixed			X			Multip. green
naturangyal.hu		Mixed				X		Multip. green
notino.hu		Mixed					X	Multip.
naturalskin.hu		Text	Text				X	Green cosmetics
okokucko.hu		Text			X	X		Multip. green
zoldtudatos.hu		Text			X			Multip. green
szepsegdrogeria.hu		Text				X	X	Green cosmetics
blueberry-cosmetics.hu		Mixed	Mixed				X	Green cosmetics
humanityaruhaz.hu				No labels	X	X		Multip. green
magyarspajz.hu				No labels	X			Multip.
naturkence.hu				SM text		X		Multip. green
medinatural.hu				SM text		X	X	Brand store
cosmio.hu				SM text		X		Green cosm.
krempatika.hu				SM image		X		Brand store
mandulina.hu				SM text			X	Brand store

Source: Author's construction

Beside the lack of relevant information and the potential greenwashing, too much information also can cause problem on a webpage. Too much information may also cause difficulty for the consumer to make efficient decision and do not waste too much time for analysing the supply carefully. (Product comparison sites provide solution for this problem.)

Only a few websites showed the sign of creating information overload. If the web shop wants to avoid information overload it should communicate the eco-label which compresses the information into one image. However, this way of communication can be effective only if consumers know the meaning of these logos. Education of consumers – and also people in general – about the meaning of eco-labels are the responsibility of the government, ministry and industry organizations. Unfortunately, in Hungary there is no or just rare social marketing campaigns which aim to let these eco-labels known by the customers.

Summarizing all the findings, we can say that only a few web shop use both category/brand- and product-level eco-label communication. Those who serve information at both levels show higher commitment to sustainability. All of these web shops were multipurpose green online shops, what means that they serve not only cosmetics but household cleaning products, ingredients, food and zero-waste solutions. Some of these web shops (like zöldpolc) show real commitment to the green issues on other ways: they also use environmentally friendly packaging and/or provide carbon-neutral transport (ökoázis).

The second group provides eco-label information at product level - in text or in mixed form. Product level eco-label information. Two of them also communicate at web shop level: the form af the communication is the same as at the product level.

7 out of the 20 web shops belongs to the third group: majority of these websites promote natural cosmetics which means that they sell ingredients to home-made cosmetics or they make cosmetics on their own not only sell them. They don't show eco-labels at product or at category-levels. All brand-stores (mandulina.hu, krempatika.hu and medinatural.hu) implements this strategy. They are small Hungarian firms, which mix cosmetics from natural ingredients. Probably they are too small to undergo the certification process. The problem is that these firms use technical terms (like natural, bio, organic) without proving it. Moreover, they create self-made eco-label-like pictograms, which are able to mislead the consumers (Figure 6).

Majority of the green cosmetics web shops provide information in text form about one-dimensional green features like paraben-free, silicon-free, cruelty-free. Perhaps it makes easier for the customer to focus on one or two product features and made product decision on them rather than analysing all the pros and cons related to the products. Not surprisingly, simplicity pays off: one-dimensional eco-label messages are more easier to be understood by the customers.

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Conclusions

After this exploratory phase of the research, a quantitative study could show the proportion of the eco-label communication types among the existing web shops and can find out which types of communication is more effective among potential customers. Further analysis could examine and prove the consumers' knowledge on eco-labels, and the importance of this information in their buying decisions.

Another direction of following research should analyse environmentally-friendly cosmetic web shops owners' design decisions on what type of information and how they provide about the green products.

Just at the time of writing this article, the European Commission makes it possible to all cosmetic product types to get the EU flower certification. (Commission Decision, 2021) Till these days, only rinse-off cosmetics (hair shampoo, conditioners, body wash) could be awarded by the EU flower but now deodorant, sunscreens, body and facial creams can also use this differentiating way of proving the sustainability of their products to the customers. "‥ ***the expansion of the eco-label to new categories could help fight greenwashing*** *which, according to the NGO, is proliferating in the cosmetics industry, with "three out of four products in the EU displaying an environmental claim or label.*" (Gallon 2021)

This paper was able to categorize eco-label communication types among web shops. However, another direction of development would be using negative labelling instead of positive ones – especially because a study shows that negative ethical labelling has more effect on attitude and preference than positive labelling (Dam & Jonge, 2015).

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Measuring Safetyconsciousness

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Abstract: In the last three decades the penetration, possibilities and importance of ICT technologies have spread with a rapid growth. ICT have claimed a major part of our private and professional lives. With the growth of possibilities and the dependence on the ICT technologies the problem of information security and the security of information technology have also risen. Security consciousness of the user plays a major role in the security of systems. In a previous research I have modified the widely used DOSPERT questionnaire for a comparable measurement of the IT security risk awareness with other risk types. In present article, information security-related questions from the modified DOSPERT questionnaire, along with other questions designed to measure security awareness, to compare the results have been used.

Keywords: BYOD, Safety Consciousness, DOSPERT

1 Measuring safetyconsciousness

One of the main risks is security threats from the user. To use a simple analogy, a chain is only as strong as its weakest link, and various studies have shown that one of the most prominent sources of risk in IT systems is the user and his or her security awareness (Michelberger, Kemendi 2020)(Ali, Szikora 2017).

Security awareness in different domains of life can be measured using a variety of tools. Among these, the DOSPERT questionnaire developed by Weber, Blais and Betz in 2002 (Blais 2002, Weber 2002) has been used for a previous research. This is a self-report questionnaire that measures the likelihood of following certain behaviors, their expected benefits and the perceived magnitude of the risk of these behaviors. In a previous research I have modified this questionnaire to be able to measure risks in the ICT domain in a previous research (Fehér-Polgár 2020).

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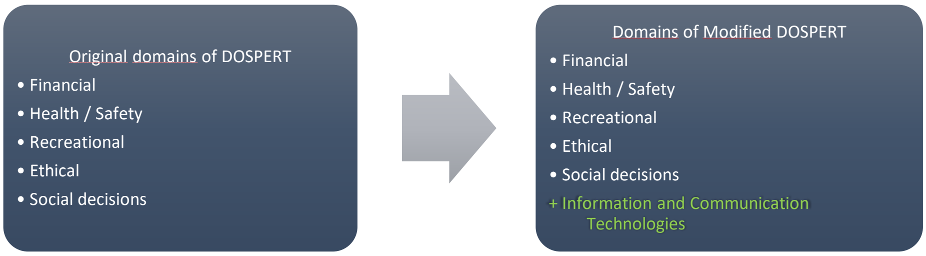

Figure 1
Domains of the original and the modified DOSPERT questionnaire
(Fehér-Polgár 2020)

For this purpose, I have created 5 new questions on behavioral patterns that are highly threatening to security, yet common and can be committed by almost any user at any firm:

- Would you send corporate data to your private email
- Would you connecting to public open Wi-Fi
- Would you let somebody to use your mobile without your previous consent
- Would you use your pin (password) - unlock pattern in front of others
- Would you copy corporate data to private smartphones

2 Current research on safetyconsciousness

Present research reflects the results of a comparative analysis initiated on the basis of a Buzánszky 2021 (Buzánszky 2021).

The sample of questionnaire respondents was selected using snowball method. The age of respondents had a scale from 18 to 60 years, the mean age was 33,58 years and the standard deviation was 10.33 years. Males had been over represented in the sample, as they were the 61% of the respondents. 66% of the respondents had answered that they have never studied IT security before in an organized way. The overall results are limited due to the sample size.

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3 Methodology and findings

For the comparison, taking into account the specificity of the sample and the questions, Spearman's correlation was used. Ten questions were derived from the modified DOSPERT questionnaire, 5 were about the likelihood of adopting different behaviors and 5 on the perceived risks of these behaviors. These were compared with the questions on safety-conscious behavioral patterns constructed by Buzánszky (2021).

When examining the correlation between these, weak and moderate correlations have been found in several areas, the most interesting and significant of which were the following.

Table 1. Correlation between feeling risky for connecting open WiFi networks and the usage of two-factor authentication (n=129)

			Feeling risky for connecting open WiFi networks
Spearman's rho	Usage of two-factor authentication	Correlation Coefficient	,233**
		Sig. (2-tailed)	,008

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

Source: own research, 2021

The correlation between feeling high risk of connecting to open WiFi networks and the usage of two-factor authentication has been found significant.

This can be translated as those who are feeling risky to connect open WiFi networks have a risen safety consciousness and more likely to apply two factor authentications where that is applicable.

Table 2. Correlation between connecting to open WiFi networks and installing security updates for the operating system (n=129)

			Connecting to open WiFi networks
Spearman's rho	Installing security updates for the operating system.	Correlation Coefficient	-,205*
		Sig. (2-tailed)	,035

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

Source: own research, 2021

In between the probability of connecting to an open WiFi network and installing of security updates for the operating system has had an indirect correlation.

This means that those who are likely to install security updates for their softwares are less likely to connect to open, and therefore likely unsecure WiFi networks.

Table 3. Correlation between copying corporate data to private smartphone and installing security updates for the operating system (n=129)

			Copying corporate data to private smartphone
Spearman's rho	Installing security updates for the operating system.	Correlation Coefficient	,197*
		Sig. (2-tailed)	,021

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

Source: own research, 2021

Correlation had been found in the sample in-between of installing security updates and coping corporate data to private smartphone owned by the user.

While with the previous pair of questions we could see positive, security conscious behavior, here we can see the opposite. Sending corporate data to one's private smartphone is a high risk behavior, as the corporate data is sent out from the computer system of the firm and this way is out of the control of the corporation.

Table 4. Correlation between copying corporate data to private smartphone and the usage of password management software (n=129)

			Copying corporate data to private smartphone
Spearman's rho	Usage of password management software.	Correlation Coefficient	-,200*
		Sig. (2-tailed)	,020

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

Source: own research, 2021

In between of copying corporate data to the user's own smartphone and the usage of password management software there could be seen a week, but significant inverse correlation.

This can be translated as those who are less likely to copy corporate data out from the firm's computer network are more likely to use password management softwares.

These answers can be considered as a positive behavior for the safety consciousness.

Table 5. Correlation between sending corporate data to private email and how safety conscious of dealing with an incoming email with an attachment (n=129)

			Sending corporate data to private email
Spearman's rho	How safety conscious of dealing with an incoming email with an attachment	Correlation Coefficient	-,231**
		Sig. (2-tailed)	,009

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

Source: own research, 2021

Correlation between of another pair of interesting and safety conscious behavior can be seen. Those who are more likely process less risky their email attachments are less likely for sending out corporate data from the computer network of the firm too. Dealing with precautions with email attachment is must. According to IT specialists and researchers of the field of safety and security sciences are considering all email attachments as risks for the ICT security. Completely relying on virus and malware scanners are not enough. The safetyconscious behavior and lowering the risks cause of this is a must.

Conclusions

The research made with the help of Péter Buzánszky have had produced a low numbered sample, which means we cannot extrapolate the outcomes of this sample for the whole population, and the findings can only be used with limitations.

Although we could see two basic groups in the sample. One with a higher and one with a lower level of ICT safetyconsciousness. Those who have a higher level can be considered as a lower risk for the firm as they less likely to act risky while working for the firm.

While the other group, with a lower safetyconscious level can be seen a risk source, which needs to be taken care. This could be done, among with other precautions, with the help of further ICT security studies.

For the first step for lowering this risk firms need to find those employees and future employees who can be a source of ICT risk with their higher potential risky behaviors. The modified DOSPERT questionnaire - after further research and refinement - could be used to find current and future employees with a higher potential risk.

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Adaptation of executive compensation in COVID-19 crisis conditions

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Abstract: Executive compensations are one of the most important mechanisms of corporate governance. Adapting executive compensation enables better global competitiveness of business organization. In order to achieve and maintain a competitive advantage, each business organization develops an executive compensation model that supports organizational strategy. After the outbreak of COVID-19 pandemic, there were a large number of job losses, and many employees in different industries had to face with reduced salaries or lost income. COVID-19 pandemic also affected the earnings at the highest, managerial level. This paper deals with the analysis of the impact of COVID-19 pandemic on executive compensations, and their adjustment to difficult business conditions and reduced profitability.

Keywords: Executive compensation, COVID-19, crisis management, risk management

1 Introduction

Executive compensation is very important mechanism of business governance. By modeling executive compensations, better competitiveness of company in the global market is achieved. The executive compensation strategy enables the realization of targeted performances. It is necessary to constantly develop compensation models and base them on targeted business performance, in accordance with the company's strategic goals. For competitiveness achieving, each company develops a specific executive compensation model, as a support tool for the strengthening of business strategy.

The business strategies of the companies faced the unpredictable and strong impact of COVID-19 pandemic, which resulted in a significant slowdown in macroeconomic activities. The contraction in macroeconomic activities was expected to overcome the 2008-2009 global economic crisis. Negative macroeconomic effects differ between national economies, depending on the measures of social distancing, and the length of its implementation. Due to the strong influence of COVID-19 pandemic, companies have faced the problem of implementing compensation strategies, especially when it comes to rewarding

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managers, as the highest hierarchical structures. The amount and structure of executive compensations are defined by contracts concluded between managers and shareholders, so any change in them is conditioned by contractual regulations.

From a long-term perspective, the changed macroeconomic conditions imply the adjustment of executive compensations, especially since the duration of COVID-19 crisis cannot be predicted. Adjustments include harmonization of short-term and long-term incentives with the achieved performances in crisis conditions, with the consent of shareholders, as well as harmonization of existing regulatory restrictions.

2 Literature review

Business owners strive to maximize the return on investment, while accepting the appropriate degree of risk, which means designing compensation models that motivate top management to make business decisions that will satisfy their interests (Firth et al. 1996). Rewarding managers should be based on the achieved business performances, in order to motivate them, while avoiding the encouragement of inadequate business performances, and encourage rational risk-taking (Eduardo, 2009). Compensation is based on the achieved business performances and may include: cash bonus, stock options, right to share purchase, share in the achieved result (Gitman, 1997). Jensen and Murphy (1990) in their studies emphasized the importance of several compensation components: stock options, bonuses based on performance, payroll amount revisions, and firing managers depending on unfulfilled targeted performances.

The relation among executive compensation and achieved targeted performances has strengthened over time. Hall and Liebman (1998) argue that this relationship doubled after 1981. According to research by Bertrand and Mullainathan (2001), companies that have a firm corporate governance structure have a deep pay-performance relation.

Recent theoretical papers do not only study the pay-performance relation, but also investigate the impact of other potential factors on executive compensation. First of all, the following factors are important: risks, human resources, managerial skills, social similarities, power, reputation, and the influence of core stakeholder groups. Subsequent research has also examined the role of risk in modeling executive compensation (Garvey – Milbourn, 2003; Conyon – Sadler, 2001). These studies have concluded that the volume and structure of managers' compensation is depending on many different factors specific to a particular company, and managers as bearers of governance with their individual characteristics.

The executive compensations trend after the global economic crisis 2008–2009 is on the ascending path again. Thus, the average monetary executive compensation increased from 6,435,000 US dollars (2009) to 12,553,000 US dollars (2019) (Bout – Wilby, 2021). The consequences of executive compensation are increasingly gaining the attention of scientific community. Current research topics are: the impact of compensation policy on management decisions (investment decisions, risk-taking, acquisition); as well as the impact on future business performance. Recent research also addresses the issue of rapidly increasing executive compensations. The authors explain this with better incentives, increased importance of general skills (Frydman, 2008; Murphy – Container, 2004), changes in communication technologies, increased power of managers (Bebchuk – Fried, 2003) and companies' growth (Gabaix – Landier, 2008).

3 Methods

The paper uses several scientific research methods, which are commonly used in the social sciences. The historical method and the comparative method were used to investigate the social phenomenon of executive compensations. The historical method starts from monitoring social phenomena and processes, taking into account the time dimension of research. The comparative method is used in the process of researching social phenomena using similarities and differences as research instruments. The paper also uses the method of content analysis, in order to determine the presence of certain ideas in the field of executive compensations.

In addition to the above, standard methods of induction and deduction, analytic and synthetic methods were used. By the inductive method, individual and special facts were connected into general conclusions. The deductive method was used to draw individual conclusions from general attitudes. The analytic method was used to extract the most important elements from the whole, and to observe the relations between them. The synthetic method served to connect individual elements into an integral whole that expressed a new whole of the paper.

4 Results and Discussion

Factors that contribute to the executive compensation model are: company size, risk, the possibility of company growth, capital structure, managers' age and ownership structure (Polak et al. 2014). The company size is important factor of executive compensation amount and structure. The largest companies need highly skilled and experienced managers, and they expect compensation to be aligned with the responsibilities of their position. The capital structure is a significant factor of the amount of basic salary, since it is one of the most important executive compensation components. The company's ownership structure also is an important factor of basic salary volume. Most state-owned companies generally apply lower executive compensations, as opposed to privately owned organizations. The applied executive compensation model is also depending on the managers' age. Older executives are aiming at long-term goals; younger ones focus on goals in a short-term period. The length of engagement, the acquired skills and experience of managers, are also related to compensation expectations.

Implemented executive compensation model should promote competitiveness, compared to companies form the same industry sector. Rewarding should also be sufficiently alluring, and contain different compensation components (Marinovic-Matovic – Marinovic, 2011). Some compensation components should provide security and the standard of living, such as basic salary. Other, especially incentives, should be aimed at motivating managers to achieve the targeted goals. The structure and volume of executive compensation is not unique, and should be the best choice of every company.

The pandemic caused by COVID-19 virus has resulted in a significant slowdown in macroeconomic activity. According to the first forecasts of the International Monetary Fund (IMF, 2020a), expectations were that the decline of the global economy would amount to about 3.0% in 2020. According to Baker et al. (2020), the COVID-19 pandemic has led to enormous business unsecurity, with which historical parallels cannot be drawn. Industrial production fell by an average of about 28% in the G20 countries between February and April 2020 (OECD, 2020). The prognosis of recovery remains uncertain and depends on the final control of COVID-19 pandemic.

Following the outbreak of COVID-19 pandemic, control measures have resulted in a sharp drop of employment in all world economies, as many employees have been laid off, or their employment contracts have not been renewed. According to the International Labour Organization (2020a), in the first three months of 2020 (January-March), a loss of 5.4% of global working time was recorded, equivalent to 155 million jobs, compared to fourth quarter of 2019. Comparisons of the second quarter of 2020 and the fourth quarter of 2019 show that global working hours are down by 14%, or 400 million jobs (International Labour Organization, 2020a). The International Labour Organization estimated that global job losses in 2020 amounted to 114 million, with the share of lost working hours being highest in Europe (6.0%), the United States (2.7%), and in Arab countries (1.7%) (International Labour Organization, 2020b).

With the spread of pandemic and the closure of a large number of jobs, a part of the working-age population was left without part or all of their income. Many employees had to accept shorter working hours and / or pay reductions in various industries. According to a research study conducted in late March 2020, by Adams-Prassl et al. (2020), 11% of study participants lost their jobs due to the outbreak of COVID-19 pandemic in the United States, and 8% in the United Kingdom. In early

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April 2020, the share of the unemployed rose to 18% (USA) and 15% (UK), while in Germany 5% of respondents lost their employment at the begining of April 2020 (Adams-Prassl et al. 2020).

According to the IMF analysis (IMF, 2020b), the recovery of the global economy began in the third quarter of 2020, although the negative effects of the crisis will be present in all macroeconomic segments for a long time to come. The IMF estimates that per capita income will remain lower for several years than it was before the pandemic, which will have a negative impact on productivity (IMF, 2020b).

Regarding executive compensations in the changed macroeconomic conditions, as a result of COVID-19 pandemic, different reactions of companies have been noted. According to Glass, Lewis & Co. (2021a) survey of more than 5,000 USA and Canadian companies, only 273 reported adjustments of the amount and structure of executive compensations after the outbreak of COVID-19 pandemic. The most common was the reduction of basic salaries, followed by the reduction of other material components of executive compensation, while other changes were recorded in a smaller percentage. Figure 1 shows the adjustments of executive compensations in the conditions of COVID-19 pandemic.

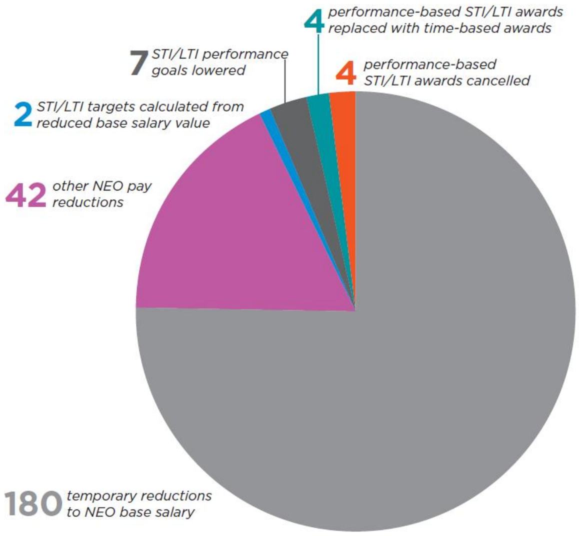

Figure 1. Adjustment of executive compensation in COVID-19 conditions
Source: Glass, Lewis & Co. (2021a) available:
https://corpgov.law.harvard.edu/2021/02/18/executive-compensation-in-the-context-of-the-covid-19-pandemic/

According to Bout and Wilby (2021), the salaries of managers in 2020 were potentially reduced by 3% to 4% due to a decline in the amount of bonuses in many companies, that reported worse business results after the outbreak of COVID-19 pandemic. It was expected that the average amount of executive compensations would be slightly increased at the beginning of 2021, because some companies would provide "supplemental grants"for their managers, in order to compensate for non-payment of obligations from 2020. In 2021, a potential increase of stock options is expected, due to the harmonization of long-term plans of companies, after a year of working in crisis conditions coused by COVID-19 pandemic (Bout – Wilby, 2021).

Despite the strong impact of COVID-19 pandemic on business results, in the near future companies may be restricted to apply the changes in the amount and structure of executive compensation, due to the restrictions of contracts concluded with their top managers (KPMG, 2021). As an alternative, companies have the option of reducing the basic salary or targets for achieving incentives (KPMG, 2021). Changes to these compensation components are generally not regulated by contract, and do not require the approval of managers or shareholders. Table 1 shows the possible short-term adjustments of the structure and volume of executive compensations, as well as the advantages and disadvantages of the measures taken.

Table 1. Short-term adjustment of executive compensation in COVID-19 conditions

1. Approach	2. Advantages	3. Disadvantages
4. Cut base salary	• Can align executives with broader employee actions • Immediate cash flow savings	• Shareholders generally do not give much credit • Can backfire when salaries are restored and companies report pay increases • Risks angering executives
5. Cut/eliminate annual incentives	• Longer-term cash flow savings • Immediate accounting impact/expense savings	• Potentially demotivating to team; particularly if performance improves at an accelerated pace • Removes (if eliminated) tool for CEO to galvanize team and drive behaviors

Source: KPMG. (2021)

Available: https://home.kpmg/xx/en/home/insights/2020/07/covid-19-executive-compensation.html

From a long-term perspective, companies need to adjust executive compensations to changed business conditions, depending on the duration of COVID-19 crisis. First of all, the adjustment of short-term and long-term incentives is necessary, which requires the consent of shareholders, as well as compliance with various regulatory restrictions (KPMG, 2021).

The adjustment of the volume and structure of executive compensations should be explained, regarding the impact of pandemic on the achieved business performances. It is necessary to explain both the causes that lead to the adjustment of compensation, and the consequences that may occur if executive compensation is amended, in terms of retaining managers, maintaining their engagement at a high

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level, or achieving business performances in difficult business conditions (Glass, Lewis & Co, 2021b).

The crisis caused by COVID-19 pandemic has led to a consideration of business performance which should be linked to compensation, with the aim of high motivation of managers. When adjusting executive compensation, companies need to decide whether to reward managers for unforeseen risks, or to take on greater risks in difficult business conditions (Zattoni – Pugliese, 2021).

Conclusion

Achieving and maintaining competitiveness and long-term success of the company requires top quality managers. Attracting and retaining quality managers requires adequate executive compensation models. Executive compensation models, and the management of these models in order to improve business performance, have been the subject of research interest for nearly a century. The research of executive compensation is directed towards adequate motivation of managers, as well as concerns for equality and fairness.

Although the global economic system has shown a satisfactory level of resilience to the effect of COVID-19 crisis, the predicted loss of the global economic production by 2025 is up to 28 trillion US dollars, while 120 million jobs will be lost permanently in the tourism sector alone. The latest macroeconomic indicators have implied an economic recovery, although the duration of the COVID-19 crisis is difficult to predict. Macroeconomic recovery in Europe and the United States has slowed due to the emergence of new variants of COVID-19 virus, latest movement restrictions, and declining of social and economic activity. Updated forecasts point to a longer-term negative impact of the pandemic on global macroeconomic indicators, with a slower rate of economic growth over the next few years.

Regarding executive compensation in the changed macroeconomic conditions, as a result of COVID-19 pandemic, different corporate strategies have been implemented. The most common is the reduction of basic salaries of managers, followed by the decrease of other material components of compensation, while other changes were applied in a smaller percentage. From a long-term perspective, companies need to adjust executive compensations to changed business conditions, especially depending on the lasting impact of COVID-19 crisis.

Executive compensation adaptation measures can’t be universally applied in all companies whose business is affected by COVID-19 pandemic. The volume and structure of compensation should be adjusted according to agreement between all stakeholders, and possible solutions should be harmonized with current microeconomic trends. The adaptation of executive compensation should be coordinated with the measures applied to other employees in company, since COVID-19 pandemic has led to a reduction in number of employees, salary cuts, and decrease of working hours in many companies.

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Driving forces of change management processes

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Abstract: Since 2020, the pandemic has been a major force shaping the social, economic, and technological environment. Market players' rules, competitors, and client needs are quickly changing factors, driving companies to adjust and accelerate decision-making when it is time to change. In an environment of continuous digital transformation, companies can leverage new opportunities that are driving forces. However, there is little research into the opportunities and challenges associated with the drivers of change management for companies. In response to this gap in the literature, this paper aims to provide a deeper analysis of the drivers of process change management and to explore views on the most important drivers. One of the significant skills that helps an organization develop is the ability to realize the need for change. To be aware of this, a good knowledge of the internal and external forces that cause changes are required. The purpose of the article is to determine which main driving forces of change are currently presented using the latest research and how changes will affect employees based on semi-structured interviews. The article identifies human resources, resistance to change, efficiency factors that represent the main driving force during a pandemic.

Keywords: change management; force of change; organizational change; external forces; internal forces; resistance.

1 Introduction

The impact of the coronavirus is felt by all businesses around the world. Managers solve a wide range of interrelated issues that have arisen since the arrival of the pandemic, including ensuring data security during the transition to remote work, increasing cash and liquidity, reorienting operations, and managing complex programs, including government support. The COVID-19 crisis has taken various forms around the world and the pandemic has impacted economic activity around the world (Muhammad et al., 2020). Many organizations, to improve performance efficiency, in one way or another at their level adapt to non-global changes, for example, changing the organizational structure or renewing the staff in response to new rules, and so on. Failures caused by COVID-19 cause large-scale changes. Some call it “the driving force of change”. The forces of change are of two types: organizations are influenced by internal and external forces (Scott and Davis, 2015).

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There is no doubt that COVID-19 is a global external force that has an impact on the entire economy and is conducive to change and change management. External forces of change can be more severe, forcing changes. The organization or business must change or cease to exist. Driving forces must outweigh resisting forces in any situation if the change is to happen (Kurt Lewin, 1951). Such forces affect organizations' contribution and efforts to sustainability (DeSimone and Popoff, 2000). Organizations have a higher degree of control over internal changes, which are proactive than over external stimuli, which are reactive (DeSimone and Popoff, 2000; Lozano, 2013). Although the pandemic has brought enormous suffering and loss, some suggest that the driving force of change, such as the devastating COVID-19 virus, can be used and turned into something constructive; capitalize on this current force of change and achieve good results (Tracy Strawn, 2020). The pressure for change is created both inside and outside the organization. Organizations must move forward relying on these forces to survive. Some of them are external, originating outside the company, while others are internal, originating from sources within the organization. Companies may also experience internal forces of change, which may often be related to external forces but are significant enough to be considered separately. The internal forces of change arise within the organization and are related to the internal functioning of the organization. Changes in the environment automatically affect changes in the organization. The COVID-19 crisis has generated unprecedented demands for immediate and far-reaching organizational changes in all areas. The field and practice of organizational change are being seriously tested in terms of the need for change and the pressure needed to make it happen faster than ever. This article aims to identify the main forces driving change during a pandemic The ability to recognize the need for change in organizations should be one of the most significant skills because if you don't have a good knowledge of all internal and external forces that drive change, then you won't be able to identify them when they appear. The paper is structured as follows: in the first section, dedicated to the literature review, the issues referring to internal and external forces of change, resistance to change management were highlighted; the second section describes the research methodology and tools; in last section, presented the main findings and the conclusions, its practical implications and the guidelines for the future research agenda.

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2 Literature Review

2.1 Internal and external forces

There are many theories about the most important drivers of change and how they affect companies. Various studies have shown that exposure to a specific force can produce both positive and negative effects. Advanced technologies have changed the ways of communication, markets and led to the growth of the online industry. Due to widespread digitalization, as well as the transition to a remote work format, geography has narrowed and the world is now viewed as a single community. Despite various factors at the global and local level, there is growing competition in various markets. The next reason is the introduction of new ways of doing business and new practices, which has become another reason - an increase in business speed caused by technological changes. also, do not forget about the complexity of working in organizations that require faster and more effective solutions.

Some researchers argue that the influence of competitors and the accelerating pace of change in the external environment are the most important factors of change (Pascale et al., 1997), while other scientists argue that the foremost noteworthy drive of alter is the constrained competition which forces the acceleration of the process of change (Jick, 1995).

The most rapidly changing sphere is the IT industry, innovative tools, and new devices appear every day, for this reason, technology is also important (Kemelgor, Johnson, & Srinivasan, 2000). Organizational changes are based on the following fundamental directions: strategic decisions caused by mergers and acquisitions or globalization; processes, for example, fintech and other innovations, new technologies, process reengineering; and other factors such as failure to meet sales targets or decline in market share (Stanleigh, 2008).

Traditional business approaches and tools do not work in today's realities, and if business owners, shareholders, managers want their business to stay afloat and develop further, they must focus on three basic pillars: clients, market competition, and changes around them. (Hammer & Champy, 1996). Drivers of change arise both internally and externally. The ability to change is becoming a key success factor for an organization. Shortly, the most successful organizations will be those in which management can timely notice the need for changes, actively initiate them, and no less rapidly and effectively implement fundamental and long-term organizational changes. As stated above, changes can be external and do not depend on the internal processes in the organization; and internal, arising within the company itself. Often, the internal forces of change are associated with external forces, and they are quite significant, for example, the forced transition to teleworking and changes in processes within the company and a change in the staff structure due to a pandemic

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that has arisen from outside as an external force of change. If the management did not respond in time to changes in external forces, then there are gaps between the adopted strategy and the changing market demand; organizational goals and changing consumer preferences; the expectations and results of the functioning of the organization. As a result, the internal forces of change affect the level of productivity and efficiency of the organization, low satisfaction of internal customers, resistance, conflict situations or the introduction of a new mission, a new system of work of the organization, to ensure the introduction of innovations, the source of which can be the initiative of individual employees, teams or management.

Karmarkar (2004) pointed out the positive direct relationship between organizational change and the achievement of an organization's strategic goals. His research highlights the importance of careful planning to ensure that corporate goals and objectives are met, as well as the ability to achieve a competitive advantage. The COVID-19 crisis has created unprecedented demands for immediate and far-reaching organizational change in every area. The field and practices of organizational change are being heavily challenged in terms of needs for change and pressures to make it happen more quickly than ever.

2.2 Resistance of change management

According to Fincham and Rhodes (2006), “change management is the leadership and direction of the process of organizational transformation, especially about human aspects and overcoming resistance to change”. Concurring to Lewin’s recorded hypothesis, driving forces incorporate declining income and benefits, expanded work tact, new challenges within the work, need for organizational structure (Lewin, 1947). Several strengths too exist in organizations that battle withstands up to alter. Controlling powers incorporate company culture, fear of less control, uneasiness approximately works security, and organizational bureaucracy (Lewin, 1947). Knowing the forces can help to make a higher understanding of arranged alter and let the organization know the need got to change. The reason why workers are resistant to alter is since they are perplexed by the obscure (Prokesch, 2009). That's, they feel stress approximately how the to alter will affect them. For illustration, the alter seem to influence their work execution and their relationship with other colleagues (Vermeulen et al, 2010). The current state has a huge deterrent force, and uncertainty about success and fear of the unknown can block change and create resistance. These physical and emotional reactions themselves are strong enough to create resistance to change. But resistance is more than just an emotional reaction. According to the Change Management Report (Procsi, 2021), we need to examine the factors that influence an employee's resistance to change, such as the trust of people reporting changes.; personal factors, including finances, age, health, mobility, and marital status; compliance of changes with their value system, when people and groups under influence can adjust changes according to their interface

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and belief frameworks, instability around victory, and fear of the unclear remain critical boundaries for change..

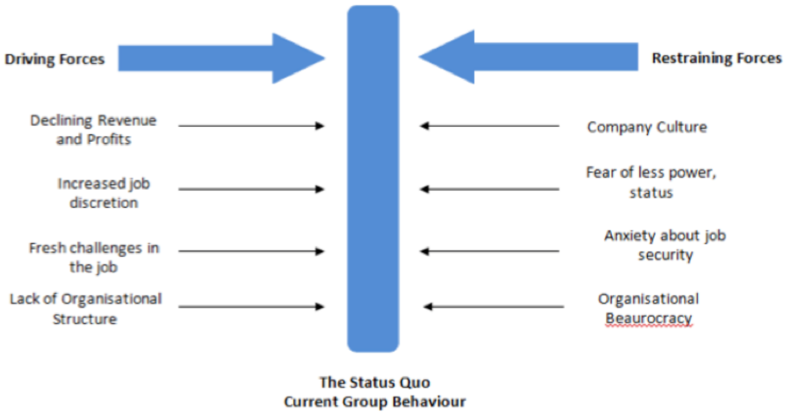

Figure 1 Lewin`s force field analysis (Lewin, 1947 pp.5-41)

As long as the effects of these two groups of forces are equal (Figure 1), a change in the current state is unlikely. A shift will occur if the following happens: the power of the driving forces increases or new forces are added to them (reserves of changes); the power of the restraining forces decreases or some of them are eliminated. Organizations can use the framework to collaborate with stakeholders and respond to their needs (Deloitte, 2020):

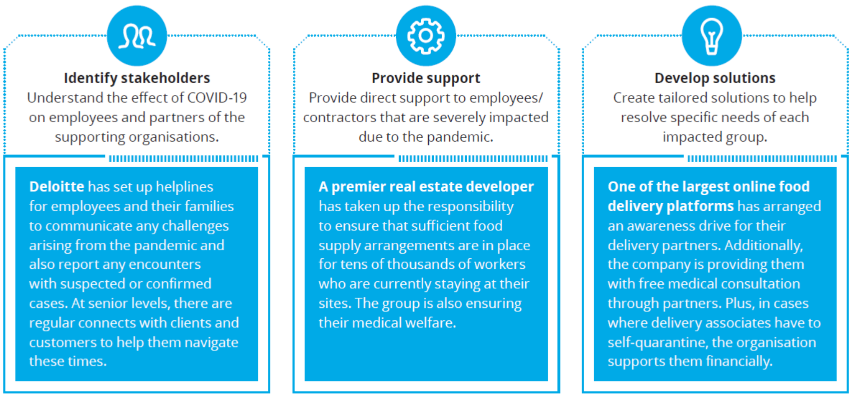

Figure 2 Collaboration framework with stakeholders (Deloitte, 2020)

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3 Methodology

The article has two pillars: first, it contains a comprehensive literature review, which analyzes the literature used, formulates the main ideas, trends, uses the material to define change management and driving force. To this end, the following online databases were searched: Scopus and Emerald, which host a large number of research-relevant publications on management research. The descriptors used were “Change Management” combined with others such as: “The Forces of Change Management”, “Change”, “Business Transformation”, “The Forces of Organizational Change.” Inclusion criteria were adopted: articles in English with thematic driving forces change management, with a publication year from 2013 to 2021. The exclusion criteria were: duplicate articles, articles outside the topic, articles in other languages, articles with non-public access. 38 journal articles were identified, and additional reports from Prosci, Deloitte were taken into account.

As the second supporting pillar, the article is backed up by a qualitative approach: 3 semi-structured interviews to establish a practical viewpoint of change management and driving forces during a pandemic.

4 Results

The COVID-19 outbreak highlighted how important external stimuli are in driving forces and raised awareness of the roadblock to resilience and the familiar pattern of daily routines in response to an external event or crisis. This forces us to take a fresh look at organizational change management. (Lozano and Garcia, 2020). According to the Prosci Best Practice Report (Prosci, 2021), the most active resistance to chance is line managers as the group of greatest resistance (42%). The group of ordinary employees was in second place (27%), and directors have (16%). The main reasons for resistance from employees were identified misunderstanding of the purpose and reasons for the changes; changes in job functions; fear of possible job loss or pay cut; lack of support from management or mistrust of them and lack of involvement in change. The reaction of employees to any kind of change in the usual structure of the organization is different. Some express resistances, under which lies the fear of ambiguity and the fear of losing control that they had previously; others are trying to advance their personal interests and position, to defend their borders (Cox and Schleier, 2010). Identifying stakeholders is crucial to minimize negative impacts, maintain control, and provide support to advance the organization.

An important point of change management, without which it is impossible to complete this entire process, is a change leader with the proper level of competition and communication skills (Zulch, 2014). Because of the volatile state and constantly changing environment, organizations must respond appropriately and quickly adapt

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to the situation. At this stage, it is important to communicate uncertainties and competently convey information to employees in an accessible and understandable way (Ecklebe, Loffler, 2021). HR departments take a key role and are responsible for the provision and development of new skills, to attract employees with the necessary, rare competency profiles that will help the organization not to be left behind in times of turbulence (El-Khoury, 2017). All forces can be divided into two groups: external and internal:

Figure 3 External and internal forces (created by the author)

To establish a practical viewpoint of change management and driving forces during pandemic 3 semi-structured interviews were conducted. Respondents have managerial positions with a high level of proficiency in HR (Respondent 1), insurance (Respondent 2), and banking sector (Respondent 3). Respondents shared their experience of working processes before and during a pandemic. Before COVID-19 employees were traveling a lot, had meetings, workshops with partners, colleagues, agencies. When the pandemic started, the working processes and activities transformed into digital, remote work increased amount of meetings because people are more accessible; starting online meetings is easier. The respondents emphasize that the biggest change has been the loss of physical interactions between the partners, who were involved in common projects. Which in turn have affected communication and networking. The respondents felt that the increased intensity of the meetings makes it hard since they do not have the energy to sit in meetings all day and it is hard to have a border between remote work and private life. Respondent 1 said that the digital way of conducting work is manageable but meetings in person and visiting the office are more emotionally effective and productive. Also, Respondent 2 states that "Because of the new restrictions from the government side and changes in how networking activities are conducted, it is harder to meet up with other entrepreneurs to share new ideas and connect with potential clients." But when organizations were asked employees back to offices, most of them prefer remote work. People do not want back to the office, because 'less time spent on traveling and more time for preparations which has made the workdays in some ways more effective. Respondent 1 shared his experience: "At the company, we focus on training programs that include e-learning

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modules, simulations, videos, and social collaboration tools". Respondent 2 believes that curre the level of uncertainty in the attitude of the future has grown exponentially. And the ability of organizations to change dynamically has become particularly important. But when the epidemic first began, he was categorically against the remote office and offered maximum resistance to all change management processes. During a pandemic and working with change management, Respondent 2 agrees to all changes and "does not want to go back to the office". In general, the situation with COVID-19 has raised the issue of the importance of corporate offices. Remote work has proven that it can complement office work when needed, the scale of the pandemic and the associated implementation of work from home programs have forced re-thinking about the practicality of the usability of offices and questioned the role of traditional office space (Pataki-Bitto and Kapusy K., 2021). Respondent 3 supports the idea that the pandemic is the main driving force behind change management today: "We have made changes to traditional business models, got new ways and tools to work, and improved the mindset of digital culture in an exceptionally brief peri just because during the pandemic we pushed a business that desperately needs these changes to exist. As the results of the interviews show, employees in organizations, regardless of the type of activity, try to adapt to the change. However, most of them undergo a series of reactions, as shown in the "COVID-19 curve":

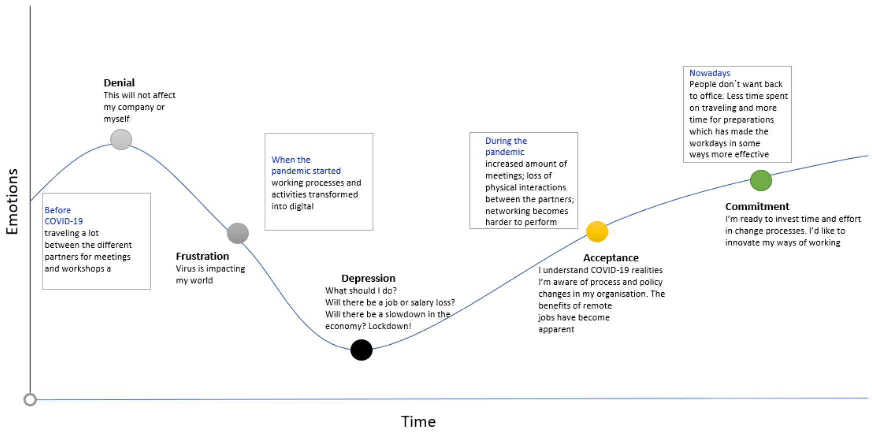

Figure 4 COVID-19 curve, adapted from Kubler-Ross change curve (created by the author).

Organizations must proactively train their employees through the stages of the curve by providing a wealth of information through their preferred communication methods. To implement changes, it is necessary to reduce the risks of resistance, since, with a small resistance level, it is easier and more efficient to implement changes. Changes occur in the internal environment of the organization, which means they affect the organizational culture. Leaders are a significant element in

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change management, and attracting influential and influential people in the organization to their side also has a positive effect on the level of individual resistance to change. To minimize the degree of resistance adequate strategies should be applied, which requires leaders to be careful and attentive in any decisions related to changes. Organizations have more control over proactive changes that take place within the company than over-reactive changes that come from outside (DeSimone, 2000; Lozano, 2013). Scheduled internal changes (as shown in figure 3) are aimed at violation of the controlled contribution to the preservation of the status quo and help to move towards a more sustainable state. In this process, the whole system (communication, human resources, strategy, management, organizational systems, etc.), the driving forces, and obstacles to changing needs should be understood and addressed correctly. Since the onset of the pandemic, many industries at the global level have been forced to work remotely, with the result that approximately 40% of workers work remotely (Boland et al., 2020). Organizations need to rethink the pandemic, reap the benefits and adopt a more humanistic approach with a focus on employees, in harmony with smart industry and management approaches, environmental principles, and social needs of society (Lozano, Barreiro-Gen, 2021). The crisis caused by the pandemic is the incentive that forced us to abandon old habits, adjusts norms by the situation, and become a driver of development (Satish et al., 2021).

5 Conclusion

Organizations are working to become more agile and are looking for drivers for change both internally and externally. The COVID-19 outbreak is a tremendous opportunity to analyze the necessary changes caused by an external event to ensure the resilience of organizations as they transform from traditional business models to new realities. This article gives an idea of this. The phenomenon when an external event or crisis disrupts the status quo of an organization and forces it is to react. Based on the literature review and interviews, a curve was developed to find out how COVID-19 has impacted organizations and what milestones workers have gone through. Results of the interviews show, employees in organizations, regardless of the type of activity, try to adapt to the change. As the results of the review of empirical data and expert opinion show, external stimuli such as COVID-19 influence factors and become an obstacle on the way to habitual parameters of resilience and forcing organizations to move to new changes, to abandon old foundations. The changes depend on the type of organization. In unexpected situations that have occurred in connection with a pandemic, this can be a different aspect that will determine the success of how correctly and promptly the organization responded to the consequences of the failure (Frederico G, 2021). In general, the drivers of change management are the forces of change and resistance. The pandemic is one of the driving forces behind change management. Curve

"Covid 19" can help organizations better understand the reasons for resisting change, actively educate their employees at the stages of the curve and get them out of the points of "frustration and depression" so that they are better prepared for external events or crises, understand the need for change and improve their contribution to resilience even in the face of a pandemic. The theoretical information discussed is presented in the appropriate sequences and supported by data obtained from the semi-structured interview. Studying this topic in the context of a pandemic will contribute to the formation of a sufficiently deep understanding of the current state of the driving forces of change management from the perspective of further research.

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Impact of the coronavirus pandemic on the marketing approach of Hungarian entrepreneurs in Slovakia

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Abstract: In our research, we sought to to find out how Hungarian-speaking owners of businesses in Slovakia approach marketing and answer the question of the impact and consequences of the coronavirus pandemic on self-employed individuals and micro-enterprises in Slovakia. We also look at the changing marketing approach of businesses, highlighting the increasing importance of online marketing. Our primary questionnaire research was based on an online, anonymous questionnaire with a sample of 122 items. For responding entrepreneurs, the COVID-19 has clearly brought economic difficulties. Half of the businesses surveyed expect their profits to fall in 2021 compared to 2020, and their situation is worse compared to 2019. A quarter of respondents do not carry out any marketing activities. Typically, they do market research, price research, product research, usually the whole marketing activity, individually. For 29.5% of respondents, marketing expenditure is a revenue generator and an investment in the future of the company with a gradual return. 62.3% are taking advantage of new opportunities by using the online space for marketing and sales. Because of the economic impact of COVID-19, 52.5% would make changes to the marketing of their own business: by strengthening online marketing.

Keywords: small business; marketing; online marketing; coronavirus; Slovakia

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1 Introduction

Years 2020 and 2021 are both considered the years affected by the coronavirus pandemic because the impact of the pandemic is felt in different areas of life worldwide. Our research focused on the group of self-employed and micro-enterprises affected by the coronavirus's impact. Industry difficulties can be clearly defined and opportunities, which some businesses have been able to take advantage of, while others have faced closure or closure. It is here that various supply chain problems should be mentioned and the exploitation of the potential of new ways of meeting consumer needs, and the monitoring and use of state aids as an opportunity. The changes in the economy and the opportunities offered have also brought changes in marketing. Therefore, research on traditional and online marketing and sales is relevant. The focus of our study is to analyze the economic situation and the marketing approach of the entrepreneurs we studied. Emphasis will be placed on offline and online marketing tools and the perception of marketing activities in the wake of the epidemic.

2 Literature Review

2.1 Characterisation of enterprises and theoretical background

The marketing activities of SMEs depend on several factors: ownership or managerial characteristics, size and stage of development of the enterprise, different financial, time and marketing knowledge constraints (Gilmore et al., 2001).

The failure of SMEs is often due to a lack of market clarity, poor cash flow, or limited marketing activity. As they grow, marketing activity is increasingly trying and may use various techniques to promote products or services (Gilmore-Carson, 2018). In the case of family businesses, where professional managers are mostly lacking, developing the owner's education and skills is one of the prerequisites for successful business operations (Virglerova et al., 2017).

Current practice emphasizes social media as a modern technique in marketing, but a vital control element is needed for business effectiveness. Social media has many uncontrolled elements, a challenge for many SMEs. As the business becomes more stable, the SME owner-manager develops its unique marketing style and practices and becomes aware of what works for the business (Gilmore-Carson, 2018).

Practical experience shows that companies need to focus more on marketing activities as they can be the key to the survival, progress, and overall development of the (family) business. Marketing has already proven to be an essential catalyst for the revitalization of entrepreneurial and commercial activity in the earlier period of the economic crisis (Mura, 2020). The development of the business under current conditions requires applying the tools offered by marketing in everyday practice, whether in the field of products or marketing services (Prokopenko-Omelyanenko, 2018).

The company's processes can be divided into two main components (1) which add value to the product, and (2) which do not add value to the customer. Product value is increased by adding attributes to the product such as functionality, aesthetics, corporate brand, and similar aspects that are important to the customer - this helps to sell it at a higher selling price relative to the total cost (Prokopenko et al., 2020).

2.1.1 Data relating to enterprises

In the case of small and medium-sized enterprises (SMEs), the three main factors in the European Union's definition are staff numbers, financial parameters, and independence/ownership (European Commission, 2003). Thus, a distinction is made between micro-enterprises (number of employees <10 persons; annual net turnover ≤2 million € or balance sheet total ≤2 million €), small enterprises (number of employees <50 persons; annual net turnover ≤10 million € or balance sheet total ≤10 million €) and medium-sized enterprises (number of employees <250 persons; annual net turnover ≤50 million € or balance sheet total ≤43 million €). As of 31.12.2019, the number of active enterprises in Slovakia is shown in Table 1. Micro-enterprises (0-9 persons) were the most numerous (557 827 in total - 96.9% of all active enterprises in Slovakia) (SBA, 2020; Szigeti-Józsa, 2021).

Table 1 Situation of SMEs in Slovakia

	Enterprise	**Individual entrepreneur**	**Freelancer**	**SHR**	***TOTAL***
Micro-enterprises	230054	322678	21391	3704	*577827*
Small enterprises	13399	1174	13	15	*14601*
Medium-sized enterprises	2900	42	1	0	*2943*
SMEs in total	*246353*	*323894*	*21405*	*3719*	*595371*

Source: SBA, 2020

2.1.2 COVID-19 pandemic and its effects in Slovakia

Our research occurred during the COVID-19 epidemic period, specifically in early 2021 (January - April), when Slovakia was experiencing its second major epidemic wave (Garaiová, 2021). The coronavirus outbreak affected Slovakia's GDP growth rate, which was 2.3% in 2019 (compared to 2018) but fell to -5.2% in 2020 (compared to 2019) (Statista.com, 2021a). In addition, the unemployment rate increased from a record low of 5.75% (2019) to 6.79% (2020) (Statista.com, 2021b).

The Association of Hungarian Entrepreneurs in Slovakia has carried out questionnaire surveys of Hungarian businesses in Slovakia, from which some of the main findings are as follows: 69% of the 530 entrepreneurs surveyed had an unfavorable assessment of the second half of 2020, with the very unfavorable assessment being held by those operating in the accommodation services, personal services, and tourism sectors. Furthermore, 89% of the entrepreneurs see the epidemic situation as a factor that will worsen their business prospects, and only 10% are neutral (they are not affected by the epidemic) - representatives of the agriculture, food, and construction sectors.

Almost two-thirds of respondents had experienced a more severe problem with a negative impact on their business's day-to-day running, and three-quarters did not have a contingency plan to prepare for such a situation. On the other hand, 60% of respondents had at most two months of financial reserves in 2020, and 55% predicted a return to original turnover in six months (Association of Hungarian Entrepreneurs in Slovakia, 2020). In the survey, repeated in 2021, the Association of Hungarian Entrepreneurs in Slovakia pointed out that 72% of Hungarian businesses in the Highlands were negatively affected by the first wave of the COVID-19 epidemic and that the second wave showed an increase of 6 percentage points (78%), while 5% had a positive impact during the first wave, which decreased to 3% after the second wave. Furthermore, 82% of the 869 responding entrepreneurs expect adverse impacts on their business in the future (Association of Hungarian Entrepreneurs in Slovakia, 2021).

3 Material and methodology

3.1 Research

In our scientific research, we collected primary data. The anonymous online questionnaire included Likert scale questions (we used 1-5 and 1-10 intervals), closed questions, and semi-closed questions. The questionnaire started with general demographic questions about the business, followed by questions on the market and financial situation, marketing and sales, and ended with questions on marketing activities, planning, and measurement. Responses were collected between January and April 2021 using a snowball sampling method - non-probability sampling. As a result, the sample is not representative and therefore represents the views of the surveyed entrepreneurs, but trends can be identified. A total of 122 valid responses to the online questionnaire were received.

We aimed to find answers to the impact of the COVID-19 epidemic, its consequences, how the marketing approach of the surveyed businesses has changed, and whether online marketing has been enhanced as a result of the epidemic.

Statistical methodology:

the digital data were processed, organized, and cleaned using Microsoft Excel software, and the organized data were analyzed using IBM SPSS Statistics 24 software. Our results were considered significant at a 0.05 p-value. Descriptive statistical analysis was used to examine the general characteristics of the respondents who completed the questionnaire. Frequency values were also used. The parameters studied were recorded as mean, median, standard deviation (SD). In addition, nominal variables were subjected to cross-tabulation analysis to explore the relationship between responses, where Phi, Cramer-V, and Pearson's Chi-square test values were also examined. The results are presented in tabular form and bar charts.

Research questions:

Q1: Do the surveyed companies carry out their marketing activities independently?

Q2: Is marketing expenditure a waste of money?

Q3: Do the surveyed enterprises negatively assess the situation of their business as a result of the COVID-19 pandemic?

Q4: Have businesses adopted online marketing and sales tools over traditional tools as a result of the COVID-19 outbreak?

Sample characteristics:

The gender distribution of respondents was as follows: male 63.9%, female 36.1%. The age distribution by age group as recorded in the questionnaire was as follows: 18-23 years (2.5%), 24-29 years (13.1%), 30-35 years (23.0%), 36-41 years (16.4%), 42-47 years (22.1%), 48-53 years (10.7%), 54-59 years (8.2%) and over 60 years (4.1%). Based on the responses to the questionnaire sent out during the survey, self-employed persons represented 56.6% of the sample and micro-enterprises (under ten persons) 43.4%. The registered offices of enterprises are located in different counties of Slovakia: Nitra county (50.8%), Banská Bystrica county (20.5%), Sibiu county (18.0%), Kosice county (5.7%), Bratislava county (4.1%), and Zsolna county (0.8%). 21.3% of the respondents are active in construction, 18.1% in trade, 12.3% in food, and 6.6% in tourism and catering. The highest educational qualifications of the respondents in the questionnaire were a college or university degree (36.1%), a vocational secondary school leaving certificate (35.2%), a vocational school leaving certificate (18.9%), and a high school leaving certificate (9.8%). Respondents sell their products and services in the following markets.

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3.2 Results

3.2.1 Results for marketing activities

Table 2 Use of marketing (N=122)

	Market research	Price research	Product research	Full marketing activity
Individually	58,2%	52,5%	37,7%	30,3%
We do not make	23,0%	23,0%	19,7%	25,4%
External marketing agency	4,1%	3,3%	2,5%	4,1%
External marketing specialist	1,6%	3,3%	2,5%	5,7%
In-house colleague (non-marketing professional)	4,1%	4,9%	3,3%	1,6%
In-house marketing professional	4,1%	7,4%	4,1%	4,9%

Source: own research, 2021

The primary responses of respondents on the topics of market research, price research, product research, and carrying out or have carried out a total marketing activity are presented systematically in Table 2. Typically, the four activities surveyed are carried out individually or not.

Marketing expenditure is seen by 29.5% of the responding entrepreneurs as a revenue enhancer and an investment in the company's future with a gradual return. According to the cross-tabulation analysis, respondents who ticked these two boxes are more conscious of using online marketing tools, but only 18% of them run an online shop. The following most popular opinion is "money wasted" (14.8%), followed by "regular cost factor" (12.3%) and "market share increase factor" at 9.8%.

3.2.2 Market situation and outlook

Compared to 2019, respondents (N=122) gave an average rating of 2.78 (median 3; standard deviation 1.24) to their business position on a Likert scale of 1-5 (1=Very poor; 5=Very good) at the time of completing the questionnaire. Responding entrepreneurs rated their business situation as close to medium, rather negative. In response to the question "On a Likert scale of 1 to 5 (1=Very unfavorable; 5=Very favorable), the calculated mean value for the business outlook of your company in 2021 compared to 2020 was 2.91 (median 3; standard deviation 1.22), i.e., a moderately favorable outlook for 2021.

The existence of marketing changes in response to the economic impact of the Crown virus was examined in our next question. The main areas of change are:

strengthening online marketing (52.5%); new market research, price research, product research (36.1%); conscious marketing planning (25.4%); strengthening offline marketing (11.5%).

Further disaggregating the results, we conclude that out of the 122 respondents, a total of 76 entrepreneurs (62.3% of respondents) have used an online marketing tool or an online sales tool in their business. This number is split equally between self-employed and micro-enterprise respondents. The 76 entrepreneurs who use online marketing or sales tool indicated a Likert scale of 1-10 (1=Not at all; 10=To a large extent) that online sales have been affected by the epidemic, with an average score of 5.54 (median 6; standard deviation 2.86). The online form was, therefore, the most pronounced. In a follow-up control question ("In your own business, what proportion of sales will be online versus traditional sales in 2020?"), the calculated mean on a Likert scale of 1-10 (1=100% Traditional sales; 10=100% Online sales) was 4.73 (median 5; standard deviation 2.88). In this case, the response rate is slightly skewed towards traditional sales.

Conclusions

In our research, we have shown that the impact of the COVID-19 epidemic is real for Hungarian self-employed and micro-enterprises in Slovakia:

The impact of COVID-19 was noticeable (some self-employed respondents had ceased their activities and survived the epidemic as employees or unemployed). Financial difficulties (decrease in turnover and profit) were observed in the enterprises - which can be paralleled with the results published by the Association of Hungarian Entrepreneurs in Slovakia (2020-2021), but many micro-enterprises also showed an increase in profit - based on the responses received. The responding entrepreneurs assessed the situation of their businesses as medium and foresaw a relatively positive outlook for 2021.

A quarter of respondents do not carry out any marketing activities. Typically, they carry out market research, price research, product research, and all marketing activities individually. For 29.5% of respondents, marketing expenditure is a revenue generator and an investment in the company's future with a gradual return. They are more conscious of their use of online marketing tools! (Only 18% have an online shop.) 62.3% do online marketing. 52.5% would make changes to their business marketing due to the economic impact of the QEO: strengthening online marketing.

Q1: Do the surveyed companies carry out their marketing activities independently?

This assumption is confirmed by the results summarised in Table 3, i.e., they carry out market research (58.2%), price research (52.5%), product research (37.7%), and all marketing activities (30.3%) individually.

Q2: Is marketing expenditure a waste of money?

14.8% of respondents considered that marketing expenditure is money wasted in their business. So our assumption was not confirmed.

Q3: Do the surveyed enterprises negatively assess the situation of their business as a result of the COVID-19 pandemic?

Regarding our third hypothesis, the respondents rated their business situation as almost medium, rather negative (mean 2.78), so our hypothesis was confirmed.

Q4: Have businesses adopted online marketing and sales tools over traditional tools as a result of the COVID-19 outbreak?

We could not provide a clear answer to this hypothesis, like businesses using traditional and online tools. Instead, we obtained different results in response to two different questions, with the calculated average skewed towards online and traditional.

The conclusion is that businesses have tried different solutions to survive the coronavirus epidemic's consequences, but these solutions have tended to be more of an idea-based approach, with little awareness of planning. This is what needs to be changed most in the period ahead.

Summary

Our research aimed to find out about the impact of the COVID-19 epidemic, its consequences, how the marketing approach of the surveyed companies has changed, and whether online marketing has been valorized as a result of the epidemic. We pointed out that the impact of the COVID-19 epidemic was present and felt and real among Hungarian self-employed individuals and micro-enterprises in Slovakia. Financial difficulties (decrease in turnover and profit) were observed in the enterprises, which can be paralleled with the results published by the Association of Hungarian Entrepreneurs in Slovakia (2020-2021), but an increase in profit was also observed in many micro-enterprises - according to the responses received. The responding entrepreneurs assessed the situation of their businesses as medium and foresaw a relatively positive outlook for 2021.

A quarter of respondents do not carry out any marketing activities. Typically, they carry out market research, price research, product research, and all marketing activities individually. However, due to the economic impact of the QE, 52.5% of businesses would make changes to the marketing of their own business: by strengthening online marketing. Here it is helpful to consider the ideas noted by Prokopenko and Omelyanenko (2018): to improve business activity; it is necessary to apply the tools offered by marketing in everyday practice, whether in the field of products or marketing services. As for social media marketing on the online platform, we share the ideas of Gilmore and Carson (2018): the practice emphasizes social media as a modern technique in marketing, but for business effectiveness, a robust control element is also needed, it is helpful for the SME owner-manager to develop his/her unique marketing style and practices, and in addition to being aware of what works for the business.

Businesses have tried different solutions to survive the aftermath of the coronavirus outbreak, with little planning awareness. It is recommended that conscious marketing planning activities be undertaken and carried out in the future. With the rise of online marketing, which is also booming due to the COVID-19 epidemic, it is worth outsourcing to specialist marketing agencies. A change of mindset is needed for businesses to understand and experience the impact of marketing activities.

The limitations of the research were the low number of items returned from the respondents during the COVID-19 epidemic period, and we were able to work with this to assess current trends and compare them with the results of other surveys and research. In the future, we would like to increase the sample size, as increasing the proportion of small businesses would make the survey more relevant. Shortly, it would also be helpful to carry out surveys after the end of the COVID-19 epidemic, which will give an idea of the period of the lifting of the epidemic restrictions and the effectiveness of the recovery measures among self-employed and micro-enterprises.

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Digitalisation in the field of tourism marketing

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Abstract: Digitalisation is not a new buzzword in the case of tourism, but its significance has grown during the last few years as not just the COVID-19 pandemic changed the way how people like to travel, but also the experience creation at the destinations changed, had been digitalised with the appearance of new (mobile) technologies.

The aim of the conference paper is to show a literature review including practical solutions too about the recent digitalisation trends in tourism. These trend are mainly based on smartphone technologies, and the appearance of newly developed mobile apps. These applications can provide location-sensitive and time-sensitive experience to the users, which both are important in the case of tourism.

Digitalisation can enhance the offline experience as an additional feature of the sightseeing, but also can mean an alternative touristic experience without even travelling to the destination. So digitalising the experiences can have dual purpose at the same time. Also it is important to notice that in the case of tourism experience the visitors are looking for escapism from their average life which can be reached by digitalised and unique content, but also to reach this several guests would like to be more offline than online during their trip.

Keywords: digitalisation, experience, marketing, mobile technologies, tourism

1 Introduction

In many areas of tourism, the internet has become a key factor as a connecting tool, a source of information and an information sharing platform over the last decade (Navío-Marco et al., 2018). In recent years, the Web has become an essential tool not only in the pre-trip phase, but also in the on-trip phase and post-trip phase, where it plays an important role in sharing experiences (Kang et al., 2019).

Literature suggests that social media platforms (both tourism-specific and general) and online travel agencies (OTAs) are becoming more and more popular every year among all generations. In addition to new sources of information, new technologies have emerged that have transformed not only consumer behaviour and the consumption process in tourism, but also the creation of products and services (Irimiás et al., 2019), for example through co-creation.

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In their literature review (analysing 115,103 references from 404 articles in 15 international scientific journals), Yuan et al. (2019) highlight the ever-increasing importance of information technology and ICTs. Among others, they highlight artificial intelligence, augmented reality, YouTube, Facebook (as major platforms), big data, gamification, smartphones and smart devices, social media, virtual communities and electronic word-of-mouth (eWoM, and electronic Word-of-Mouth-Marketing, eWoMM) as keywords as innovative tools in tourism marketing. In this paper, I focus on digitalisation, also examined by Yulan et al., in the form of secondary research.

2 Methodology

In this paper I present a detailed literature review about the basic themes of digitalisation in tourism as an establishment research. For later researches about specific topics in the field of digitalisation in tourism the better understanding of the basics of eTourism, or digital tourism products can be an inevitable step. ETourism is a rapidly changing part of hospitality management as it is also emphasized by Kazandzhieva and Santana (2019), so academics should understand the basics of it in a deiled way to develop up-to-date primary researches. The goal of this literature review is to emphasise the most important topics that can appear in the case of a research about digitalised goods and systems in tourism. The selection of technologies that are mentioned in this review is based on Yulan et al. (2019) and combined with the suggestions of Buhalis et al. (2019), which review gives a much boarder collection of topics in digitalisation.

3 Literature review

3.1 Definitions of digitalisation

Digitalisation, like other areas of marketing, has played a major role in tourism marketing in recent years. Digital content and processes have not only shaped the image of a destination, but have also significantly transformed the three phases of tourism (the pre-trip, on-trip and post-trip part). According to Lehdonvirta (2012), digitization is built on three pillars:

- Changes in consumer behaviour, based on co-creation, which has become increasingly important for consumers in recent times as they became an active partner in the two-way communication with the service providers and also communicate with each other in the three phases of tourism.
- Changes in online distribution channels and the purchasing process. As the digital buying or reserving of accomodation and flights appeared in the last decade and also nowadays several tourism attractions provide online ticket sales.
- The transformation of the products purchased. As on one hand side virtual travelling and virtual services appeared and on the other hand side several digital services were developed to enhance the (offline) on-site exprerience while travelling.

Agárdi (2018), based on the study by Lehdonvirta (2012), presents three phases of digitalisation. The stages are defined in general for retailers, but these can be applied for service providers in tourism too:

1. online shopping: when the consumer purchases the product through online channels, i.e. the sales channel is digitized.
2. online co-creation: when information gathering and sharing is transferred to the online space, thus digitizing the whole decision process, not only the actual purchase. In many cases, this also means the emergence of user generated content (UGC) and is based on consumer empowerment
3. virtual consumption, digital consumption occurs when virtual or digital goods appear that provide an alternative solution to the consumer's problem. Such solutions were seen, for example, during the first wave of the COVID pandemic, when many tourist attractions were able to offer virtual tours, alternative travel experiences. In tourism, digital products can serve not only as an alternative but also as a complement to the offline, real-life experience. On the technological side, both of these are often addressed through the use of so-called virtual and augmented reality, which will be discussed later in this paper.

3.2 The connections of digitalisation and tourism

Although we have already seen examples of the emergence of digitalisation in tourism in the previous list, there are many sources in the literature focusing on this area. Digital tourism is referred to in the literature in a number of ways: smart tourism, smart tourism and even e-tourism.

Lőrincz and Sulyok (2017) mention digitalisation as one of the ten most important tourism trends. Besides digitalisation the top ten include demographic changes, the emergence of new transport technologies and the increasing demand for and importance of sustainability. Buhalis and Sinarta (2019) also link the digitalisation of tourism to the emergence of real-time marketing and real-time co-creation. They argue that enhancing experiences, consumer-centricity of service providers and the use of data-driven decisions play an important role in this.

Real-time can also be important in the pre-trip phase, for example, when price comparison sites are constantly changing their dynamic offers, but it is also an important factor when travelling, for example, for personalised offers or re-planning. Neuhofer et al. (2012), in addition to mentioning the pre-trip and on-trip phases, also point out that the entire tourism consumption process is encompassed by digitalisation and infocommunication tools, which also means that the classic on-site experience creation can be extended to the pre-trip and post-trip phases in the form of virtual experience creation, and that the on-site experience is now also created from a combination of physical and virtual experiences.

With the emergence of *online travel agencies (OTAs)* and online review sites, as well as online travel communities (like TripAdvisor), online shopping, reservation in tourism has also become not just reality but part of the decision process of the travellers. Furthermore, online co-creation began to transform the entire consumer process. The third phase of digitalisation (by Agárdi, 2018), the consumption of virtual or digitized goods, can be understood in the form of virtual tourism (also accessible from the comfort of home), which has become increasingly vocal since the pandemic broke out. On the other hand, we can include, for example, smart hotels (like the one in Kőrösladány – see the webpage here: http://www.hotelsmart.hu/hu/), virtual guided tours via smartphones or mobile app experiences used by attractions (museums, zoos, etc.) in addition to offline experiences. Happ et al. (2020) also point out that while a few years ago only the first phase of digitalisation - mentioned by Agárdi (2018) - was implemented, for example with the purchase of online airline tickets, today co-creation, digital communication and mass customisation have completely transformed consumer behaviour and the entire consumer life-cycle in tourism.

The online shopping phase was implemented by online travel agencies (OTAs) at the moment of their emergence. Nowadays, OTA sites are more like meta-search engines and, with the help of artificial intelligence and big data analytics, they can provide price comparisons that not only enable online shopping but also significantly transform the purchase decision process (Christodoulidou et al., 2010). All of these sites can be combined with online review sites and online travel communities in online co-creation. In many cases, OTA sites also integrate consumer content (e.g. ratings, feedback) similarly to social media, which also shifts the role of the service providers in digitalisation towards co-creation and creates much more complex systems.

It can therefore be seen that digital or smart tourism is created by the emergence of several elements separately and then later on by their interaction. We can associate a number of technological solutions to digital tourism, for which, for example, Wang et al. (2016b) identify the following categories:

- Tracking and coordinating personal travel preferences and schedules;
- time estimation by reducing waits and delays through optimised traffic flows;
- availability of travel information via the Internet;
- online booking of tickets and rooms and online shopping for additional tourism products (e.g. entrance tickets);
- price comparison on different travel websites;
- communication in virtual travel communities;
- using electronic complaint handling systems, speeding up problem handling;
- providing multimedia services, mobile devices and applications and technical facilities (e.g. wifi).

In addition to these, they also mention solutions such as the running of virtual tourist attractions, smart forecasting (whether for tourist movements or queuing times, for example) and smart sightseeing (which includes personalised recommendations, route planning, guided tours) (Wang et al., 2016b).

Kontogianni and Alepis (2020), analysing studies focusing on smart tourism published between 2013 and 2019, have published a compilation similar to Wang's list, where they also collected a number of practical implementations. A significant number of these were launched between 2017 and 2019 and mostly include mobile apps, augmented reality, personalised recommendation systems.

Based on the five characteristics (interactions, information reliability, accessibility, security and personalisation) of online tourism websites (focusing on the online shopping phase) developed by No and Kim (2015), Huang et al. (2017) derived four characteristic features of smart tourism technology (STT). Based on SEM modelling, all four attributes show significant relationships as a result of their primary research:

- Informativeness: which can be interpreted as a combination of quality and reliability of information.
- Accessibility: which shows how easily a user can obtain the right information and use the online tourism site.
- Interactivity: which shows whether the consumer receives immediate interactions (e.g. real-time feedback, active two-way communication options) when using the STT-based site.

- Personalisation: which shows the extent to which the traveller can gather information tailored to his/her individual travel needs.

Together, the technologies mentioned by Wang et al. (2016b) can form a so-called smart tourism ecosystem, as defined by for example Pinke-Sziva and Keller (2021). They refer to a tourism system as a smart tourism ecosystem "that takes advantage of digital technology to create, manage and administer smart tourism services and experiences, and is characterized by intensive information sharing and value creation." (Pinke-Sziva - Keller, 2021:34.) In terms of value creation and information sharing, the system also plays a two-way intermediary role: it can generate value and information not only for the consumer but also for the service provider, as it can collect a range of relevant data that can be used later.

The two-way value creation process identified by Pinke-Sziva and Keller is also in accordance with the grouping of Happ et al. (2020). According to them, the digital tourism ecosystem encompasses all infocommunication tools and information technology solutions that can assist the visitor or tourist and contribute to meeting the needs of the destination and increase the competitiveness of the place.

Happ et al. (2020), based on the 7P model of services, mention a number of tools that can be linked to smart tourism. Examples include dynamic package configuration, crowdsourcing (i.e. community financing of products), dynamic pricing (e.g. for accommodation or transport) and yield management (i.e. managing bookings by matching supply and demand). These are complemented by online booking and distribution systems, web 2.0 and social media sites based on web 2.0, where the consumer becomes an active participant in the communication.

By adding a further 3P to the classic 4P model, it is possible to extend the digitalisation of tourism marketing as a specific service solution to new elements of service marketing: online booking systems and online payment solutions can be linked to the process mix element, and non-stop automation (e.g. the emergence of chatbots or online check-in solutions - also closely linked to the process mix element) can be connected to the people mix element, replacing human labour. To the physical evidence mix element we can also relate virtual tours, virtual product demonstrations and online branding and visibility.

3.3 The role of smartphones in the digitalisation of tourism

Among the technological solutions, many are now very widespread in the tourism sector. Among the smart devices, the smartphone stands out, where WANG et al. (2012) emphasise that it can not only enrich the experience, but can also help tourists to visit more places and attractions, optimising their itineraries, which can be an important aspect for the visitor, given the limited time available for the tourist trip and the unfamiliarity of the place.

However, research by Wang et al. (2012) also shows that smartphones have a mediating effect throughout the entire tourism consumption process, not only during the trip. In their research, they examined reviews written for different smartphone apps and developed five possible scenarios using storytelling. They point out that phone-based software can be effective not only in providing travel information, but can also contribute to a hedonistic, aesthetic and social experience through innovative solutions. It has been observed that these apps can increase the efficiency of tourists' trips, and that consumers can create more value when travelling or using services by providing immediate, up-to-date and usually location-specific information. Scenarios were created for both pre-trip and post-trip phases, where consumers shared their experiences and were inspired to plan their trip using their smartphone. Smart travel systems can enhance the content, personalisation and uniqueness of the experience through the features identified by the smartphone Wang (Kontogianni - Alepis 2020).

3.3.1 Smartphones in the process of tourism

Although the penetration of smartphones is widespread in the whole society, their use in the tourism sector is still uneven. According to Kang et al. (2019), significant differences in age, income, education and employment data can be detected between those who use and those who do not use smartphones to search for travel-related information during the pre-trip phase. In addition, thanks to smart devices and the spread of roaming internet, the information seeking of the tourists continues during the on-trip phase. Both pre-trip and on-trip information about the location itself (35.5%), restaurants (65.2%), attractions (45.8%) and activities (36.8%) were also sought by visitors, according to surveys by Kang et al. (2019).

Over the last decade, smartphones have become one of the most important tools for STT, or smart tourism technologies, which also plays an important role in blurring the boundaries between the three traditional phases of tourism. Gretzel et al. (2006) point out a number of important infocommunication functions that can appear in the three phases. Wang et al. (2014) identify four core functions of smart tourism technologies: communication, entertainment, information seeking and facilitation or assistance. They also point out that the functions previously identified by Gretzel et al. (2006) are increasingly merging and that the traditionally pre-trip function of information seeking and the classically post-trip function of experience sharing already become more dominant in the on-trip phase (see Figure 1, where the main components of the overlaps are highlighted).

Apps and smart devices are not only blurring the boundaries between the different phases, but also the boundaries increasingly blurring between everyday life and the escape from it, the temporary change of location such as tourism (Hannam et al., 2006). For example, a local resident can be a tourist without changing location, and can experience travel-like activities in his or her own living environment thanks to smart devices.Consumers can use both 'work-related' and 'tourism-related' functions through smart devices, even when they are in their own residential area and when they are in a completely different surrounding, stepping out of their usual lifestyle (and therefore taking a tourist trip in the traditional sense) (Wang et al., 2016a).

3.3.2 Marketing communication solutions of smartphones in the process of tourism

Thanks to the continuous development of mobile devices, a number of marketing solutions have emerged in recent years, which Kaplan (2012) refers to as mobile marketing, but given the technological background, we can now also call it smartphone marketing. According to Kaplan, mobile marketing includes "all marketing activities conducted through a ubiquitous network (Internet of Things - IoT) to which consumers are continuously connected through their personal mobile devices (such as their smartphones)" (Kaplan, 2012:130).

Kaplan (2012) not only defines mobile marketing solutions, but also identifies four distinct categories along the following two dimensions:

- Information about consumers, degree of knowledge: this dimension shows how much information we have about the consumer when creating a marketing communication message, i.e. it highlights the extent to which we can personalise the content we want to communicate. Depending on the complexity of the software developed, the personalisation of content on smart devices can be automated, similar to the solutions based on artificial intelligence and machine learning of the semantic web (web 3.0). But of course, for simpler and more cost-effective developments, there is still the possibility to create mass, impersonal messages similar to traditional advertising as a communication tool. It is also possible to integrate a so-called onboarding process in between the two solutions, which collect some information about the user, for example during the first use of the application.
- The push and pull way of mobile marketing: this dimension shows which party initiates (triggers) the communication. Although basically in the online world it is the pull type of communication, initiated by the consumer. The notifications provided by smart devices or emails offer the possibility to display and use push communication too.

Although, according to Kaplan (2012), mobile marketing can cover a wide range of mobile devices, such as SMS, email, BlueTooth, NFC chip or MMS, in recent years it has been mostly mobile apps, websites optimised for mobile (or created with a mobile-frist solution) and the so-called progressive web apps that can be placed in between, that are considered part of mobile marketing.

These mobile apps can be grouped along several dimensions. For example, the following categories can be developed for tourism apps, which may overlap:

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navigation, social interaction, mobile marketing, security, information, entertainment and shopping/transaction apps (Kennedy-Eden - Gretzel 2012). Several other classifications of mobile apps and tourism apps can be found in, for example, Dombroviak and Ramnath (2007), Heinonnen and Pura (2006) and Nickerson et al. (2009). These classifications are generally based on the characteristics of the applications, the degree of interaction with consumers and the degree of consumer orientation. Important factors may include whether the content is linked to a user profile, whether it is based on individual or group content delivery, the direction of communication within the application and the possibility of transactions (Nickerson et al., 2009).

Kaplan (2012) classifies the above-mentioned mobile marketing apps, independently of the commonly used mobile marketing classification, into four further groups based on the extent to which the apps behave in a location and time-dependent manner (see Figure 1 for links to the models of Gretzel et al., 2006 and Wang et al., 2014):

- "quick timers" are solutions with essentially time-dependent content, but independent of location. This includes many classic social media platforms, such as Facebook or Twitter, where it is crucial that consumers receive up-to-date information, as content quickly becomes outdated and new elements are added.
- Slow timers" are also time- and location-independent, and include social media that provide content that is always relevant, such as YouTube in many cases.
- Space-timers" are applications that depend on both location and time. These can be particularly important for tourism solutions, where both location and time can help personalise the content.
- In the case of "space-locators", the consumer can always be exposed to relevant content that does not change over time, or changes very slowly, infrequently, but is highly location-dependent, which can be important for tourism apps, especially for tour guides and software that complements offline experiences, as mentioned earlier in the study.
- Smartphone apps in tourism marketing can be basically location-based, but they can appear in all four categories of Kaplan's classification. For events such as festivals, time-relatedness can become significant, but similarly, the presentation of time-related information can be an important factor for news and transport events. Attractions, although largely time-independent, are always relevant content, but it is also worth mentioning, for example, temporary exhibitions or experience-enhancing programmes that are also closely linked to attractions. It is also important to highlight the fact that many applications have multiple functions, which can be grouped into different categories. In addition, there are of course a number

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of applications that are not designed for mobile marketing, but which are both suitable and used by tourism destination management organisations for marketing communication purposes, in addition to providing local people and visitors with a wide range of information about the destination (Lu et al., 2015).

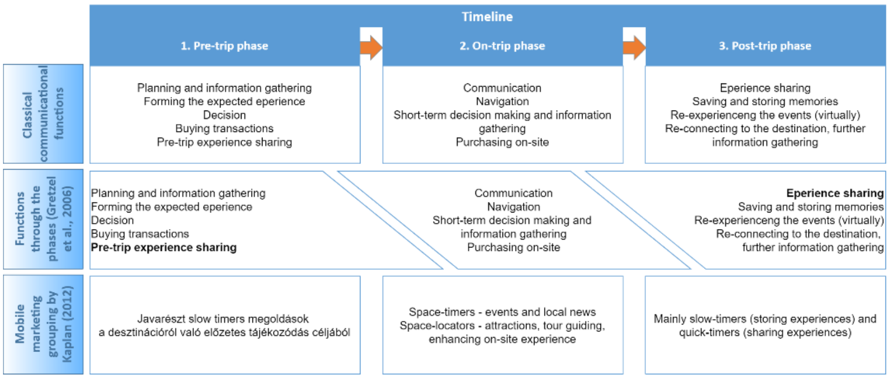

Figure 1 Digitalised solutions during the tourism process
Source: authors own edit based on Kaplan, 2012, Gretzel et al., 2006

3.3.3 Virtual and augmented reality in tourism as a smartphone function

In the case of digitalisation, it has also been shown that it can provide alternative tourism solutions, especially since the beginning of the pandemic. We also encountered virtual events, festivals, online guided tours of museums and self-guided 3D tours. This technology, which provides a fully online experience, is called virtual reality (VR). Azuma et al. (2001) describe augmented reality (AR) as a transition between the continuum of reality and virtual reality, where, for example, a monitor (smartphone) placed in front of your eyes or a helmet placed on your head mixes the camera image of reality with virtual information. While an important aspect of AR is that you have to be present at the location and the screen displays the extra information, with VR you don't have to visit the location. On this basis, even before the pandemic began, Gerdesics et al. (2019) pointed out that tourism professionals fear this solution because it could become a substitute product and its increasing use could lead to no-tourism. They stress, however, that this fear is not necessarily real and point out that virtual technologies can also be used to create an identity, an image for the destination.

Nagy and Gerdesics (2020), already after the pandemic had begun, focused specifically on VR as an alternative tourism service. As a result of their research, they showed that openness to VR has a positive impact on perceived usefulness and, through this, on behavioural intention, i.e. the desire to see the attractions in real life after use. However, it should also be pointed out that the opposite effect to perceived usefulness was found for the intention to substitute, so that for the most part VR can be seen as an additional experience element to the on-site, live tourist experience, or as a part of the information gathering period before or during the on-site, live tourist experience. In the latter case, the VR experience helps the consumer to develop the expected experience against which he/she will later compare the perceived experience during the trip. Bec et al. (2021) also consider VR solutions as a so-called "second chance tourism" element, i.e. a tool to make tourist attractions and objects that no longer exist, have been destroyed or have ceased to exist, still visitable. They argue that AR solutions, 3D printing and robotic technologies can enhance the second chance tourism of different sites alongside VR. Their results are very close to those presented by Nagy and Gerdesics (2020).

Bec et al. also distinguish between two types of virtual tourism: in the case of so-called in-situ virtual tourism, VR emerges as a complementary element as mentioned above, while in the ex-situ case, the use of VR devices emerges as a substitute product providing an alternative tourism experience. This ex-situ solution was also investigated by Vishwakarma et al. (2020). In their results, they highlight that both the complexity of the VR device and the physical risk associated with travel have a significant positive impact on the perceived value provided by VR and, through this, on the openness to use. They also highlight that the perceived richness of the VR world (i.e. how developed the virtual experience and virtual space is) is one of the strongest factors in the formation of perceived value of VR.

Discussion and conclusions

In this study, I investigated some up-to-date aspects of digitalisation in tourism through secondary research. Literature sources show many examples of the significant impact of digitalisation on traditional tourism products, both in terms of sales and consumer behaviour, and even the potential for these technologies to become substitutes by consuming virtual goods. Nevertheless, most of the solutions can help to enhance and deepen the classic, offline tourism experience, for which smartphones and their apps, as well as websites optimised for smartphones, can be the most important tools for tourism service providers during the travel process. The mentioned topics in this article are among the most important in the field of tourism digitalisation, that can be the basics of further primary researches. These topics are collected together in Table 1.

However, it is also important to emphasise that, while smart tourism solutions and services can stand on their own, the shift towards smart tourism is about organising the different tools into a so-called smart tourism ecosystem using a holistic approach. These can incorporate a range of technologies and tourism services based on them, which can then enhance the consumer experience in a more holistic way, activate co-creation, make sales more efficient and integrate virtual goods alongside or instead of the live tourism experience.

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Table 1. The most important topics mentioned in the article

Topics	Mentioned references
Digitalised systems in tourism	Christodoulidou et al., 2010 – OTA websites as part of the smart tourism system Pinke-Sziva – Keller, 2021 – Examples of smart tourism systems Kontogianni – Alepis, 2020 – Smart tourism topics Happ et al., 2020 – digitalisation as a tourism system Buhalis – Sinarta, 2019; Buhalis et al., 2019; Yuan et al., 2019 – Most important topics of tourism digitalisation
Smartphones as main part of digitalisation in tourism	Azuma et al., 2001 – Augmented reality and virtual reality Bec et al., 2021; Vishwakarma et al.2020 – AR and VR in tourism Gerdesics et al., 2019 – VR in tourism Hannam et al., 2006; Wang et al., 2016a – Digitalised tourism process Kang et al., 2019; Wang et al., 2014; Wang et al., 2016b – Touristic functions of smartphones
Smartphone marketing and applications	Dombroviak – Rammath, 2007; Heinonen – Pura, 2006; Kennedy-Eden – Gretzel, 2012; Nickerson et al., 2013 – Taxonomies of smartphone apps Kaplan, 2012 – Classification of mobil apps and mobile marketing Gretzel et al., 2006 – Functions of smartphones in the tourism process Lu et al., 2015 – Travelling applications

Source: Author's construction

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Consumer habits and autonomous vehicles

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Abstract: *Eco-friendly technologies are everywhere in the world, including in transport. The future belongs to the electric car. Nothing proves this better than the change that has taken place in Hungary since the introduction of the green license plate. Anyone with open eyes and watching the cars standing on the street may have noticed that green license plates have started to appear scattered since 2010. Not much time passed and the rarely seen green license plate became a mass article. Car splitters appeared who, taking advantage of free parking, scattered the city full of electric car fleets. Environmentally conscious transport has become a trend. The aim of our dissertation is to examine these consumer preferences in Hungary. We would like to get a unified picture of the opinions of Hungarian electric and hybrid car users, their user experience and their satisfaction with the extent to which this technology can be used in Hungary today, as opposed to internal combustion motor cars*

Keywords: consumer habits, hybrid technology, electric car,Internal combustion engine car

1 Introduction

The automobile has undeniably changed our everyday lives and has become one of the most important technological inventions of the past century. Automobiles have altered our lives so much that it would be impossible to imagine our society without them. Automobile manufacturing companies have gained a significant role in global economic development and now are even considered as macroeconomic indicators of economic growth.

The automotive industry has always been innovation-oriented. It is enough to compare the efficiency of early commercially available models, like the Ford Model T with one of the most technologically advanced cars nowadays, like the Tesla Model X, to understand the incredible level of progress all within a century. Though

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the first flying cars are still a fascinating futuristic idea, it is clear that the present offers opportunities that are no less interesting and innovative. Day by day, car manufacturers are making more and more developments and we are moving more and more towards the development of a truly autonomous vehicle.

Before the new era of autonomous cars begins through commercialization, manufacturers must focus on improving the efficiency of electric cars. The diversification of electric vehicles has allowed manufacturers to create models for narrower price segments, thus enlargening the market and making them more available for the public. Thus, nowadays, anyone can find an electric car for a specific price segment. Nonetheless, people still have a lot of doubts and a lot of questions: Is the range right? Is the compromise acceptable? Isn't charging a problem? Which brand is trustworthy?

These are the questions we will try to find answers to in our research. We'll take a closer look at the segment, its future, and its potential. We will discover the best-sellers in Hungary, find out which batteries produce the best range, and discuss the specificities of charging. We will also discuss the issue of whether the range of an electric car is indeed a conclusive factor in making a purchasing decision. The results reveal that currently order ability and reliability are much more important than either the brand or the range. This is also interpreted as an answer to the many questions that arise in connection with electric cars since if only the scope and the price were the selection criteria, the situation in the market would be significantly -different. In `our research, we will try to shed light on the fact that although the range is important, what is considered to be a decisive factor in purchasing an electric vehicle is brand recognition and prestige.

2 Literature review

Nowadays, autonomous vehicles present the biggest challenges for the automotive industry, as every manufacturer envisions the future of the industry differently. In an autonomous car, the driver no longer has to deal with the operation of the vehicle, as the car will be able to drive following a predetermined route in as efficient, smooth trouble-free, and effective a way as possible.

2.1 Exploration of the concept of autonomous vehicles

In recent years, car manufacturers have developed a wide range of driving assistance systems (DAS) that can already take much of the control from the driver, enhancing the comfort of the ride. Several advanced camera and sensor systems have been developed in the past years that are capable of monitoring the ride and detecting emergencies. Lane departure warning systems, emergency brake assist systems,

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adaptive cruise control, and side assist are all additional features modern vehicles are commonly equipped with. (Daily et al., 2017) The lane departure warning system, for instance, indicates if the vehicle is within the passage between two lanes. If the vehicle slips into another lane, the sensors will indicate it to the central processing unit, which in turn, will adjust the direction of the vehicle, so that it remains within the predefined lanes. (Lee et al.,2017) Even though DASs aid the driver making their ride less stressful and much easier, the complete and undivided attention of the driver is still essential. (Hecht, 2018)

In 2018 the technological development of self-driving vehicles reached the level of automation that would allow a vehicle of a higher level of automation to be driven on the streets. As of now, the only obstacle to this is government regulation, since only under a specifically defined law driver can let go of the wheel even for seemingly insignificant periods. (Badue, 2021) Yet the responsibility of the drivers doesn't decrease, as there is always the possibility of malfunction. In practice, while driving the Tesla Model S electric vehicle, a typical highway ride is much more comfortable, as neither the constant presence of the hand on the wheel nor the foot on the pedal is required to maintain speed and direction of the vehicle although the driver has to grab the steering wheel every three minutes to indicate that they are alert and are controlling the vehicle. (Kim& Park, 2017)

Self-driving cars will continue to develop in the coming years. Sooner or later, we will get to the point where self-driving cars will be common on roads. According to experts, this will first happen on highways, where the drivers will be able to give control to the vehicle in designated sections. (Acheampong&Cugurullo, 2021) Autonomous cars will be equipped with sensors, lasers, and radars that will enable them to get an accurate picture of the surrounding environment and road conditions. The vehicle will be able to steer, brake, and accelerate on its own on designated road or highway sections. (Raue et al., 2019) If the future of automation won't favor the emergence of fully self-driving cars on the roads and highways, it is expected that at the very least future automobiles will be equipped with more advanced DASs than now, so that they will even be able to predict and solve difficult traffic conditions (Borenstein et al., 2019)

Nevertheless, Chet et al., (2017) point out that in about a decade the automotive industry will reach a level where cars will transport us from point A to B on their own. It is further projected that cars will be able to handle traffic not only on certain designated sections of motorways but on the entire motorway network. Neither traffic lights, nor intersections, nor roundabouts will be a problem for the vehicle, as the cars will be in contact with each other, therefore, they will predict and project potential unfavorable traffic situations and be able to avoid them. If there is a traffic jam somewhere, the vehicles will be able to take a detour and choose the best route for the journey. (Gambi et al., 2019) Ndikumana et al., (2020) project that by 2030 there will be models of vehicles devoid of a steering wheel, so the driving experience as such will slowly disappear completely since as soon as we get in the

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vehicle will take us to our destination. The riding experience will be similar to that of a taxi, where the taxi driver doesn't communicate with the passenger.

3 Methodology

The automotive industry has undergone significant change in recent years, as conventional energy sources derived from fossil fuels continue to become more expensive and their impact on the environment continues to be more devastating. We can observe the paradigm shift based on recent news on the count of the so-called "diesel scandal", and a growing number of people looking for alternatives.

In our research, we wanted to find the answer to what extent are consumers familiar with electric vehicles and what is their opinion about them. We further asserted if consumers are willing to pay more for an electric car than for a traditional car and whether the selection criteria are significantly different in comparison with conventional models. Lastly, we evaluate how important the brand is when buying an electric vehicle.

In our primary research, we used a quantitative method in the form of an online questionnaire. The choice of the method was obvious since a questionnaire survey collects information by interviewing a small portion of a group of individuals selected through scientific sampling.

There were several types of questions in the questionnaire. In addition to the open-ended questions, we also used several open-ended and closed-ended questions. As for inquiries that required a spectrum of answers, dichotomous multi-outcome questions were formulated.

We chose the online questionnaire specifically because it was the easiest way to reach as many people as possible, as we only had to share the link for them to complete it. Using this method, we were able to successfully filter out the responses which provided valuable data from those that were irrelevant.

Our questionnaire was completed by 316 people in two weeks. This number is statistically representative, and therefore, statistical inferences can be made about the dataset in question.

4 Results

We strongly believed that it was important to talk about how much money people would realistically spend on an electric car. After asking how much they would

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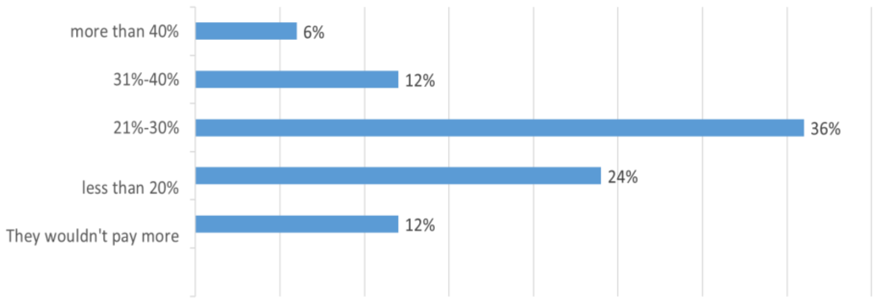
spend on buying a conventional car, we calculated the markup which consumers are willing to pay additionally if the car were electric.

Nearly half of the respondents indicated a range of 21% to 30%, but there were also those who were not willing to pay more for an electric car (Figure 1). This result may be of interest to car manufacturers, as their revenue stems from people's willingness to pay a surcharge. The sales of used electric cars in Hungary have significantly increased in past – this is supported by two arguments: (i) the price of electric vehicles is still significantly higher than that of conventional vehicles, and (ii) the residual value of the electric car is, therefore, also higher.

In addition to general questions about electric cars, we also asked them which brand they would choose, and then explain why they chose it.



1. Figure How much would respondents be willing to pay more for an autonomous vehicle in comparison to a traditional car? (N = 316)
Source own research

Figure 2 illustrates that 35% of the respondents consider Tesla their electric vehicle of choice. It is followed by Renault and BMW in equal proportions sharing 20% of the respondents. The result is interesting from the perspective that Tesla Motors is the only company listed that doesn't sell cars in Hungary at the moment. Though, it is possible to order them from the United States or choose from pre-owned models. Nevertheless, this brand was still nominated by most of the respondents. This choice is most likely attributed to the brand awareness the company gained over the last decade, thanks to its chief executive officer. Another valuable result derived from the research is that Japanese car manufacturers like Nissan have been chosen by the respondents relatively few times, even though, according to statistics, Japanese brands lead the sales in Hungary, followed by Volkswagen, BMW, and Renault.

To have a better overview of the market and to determine the defining reasons for the particular choice of the respondents, we highlight a few open-ended responses.

The criteria that made the respondents choose Tesla included (i) the most efficient batteries, producing the longest range, and (ii) the autopilot functionality. The company has been on the market for years and has been a market leader in driving

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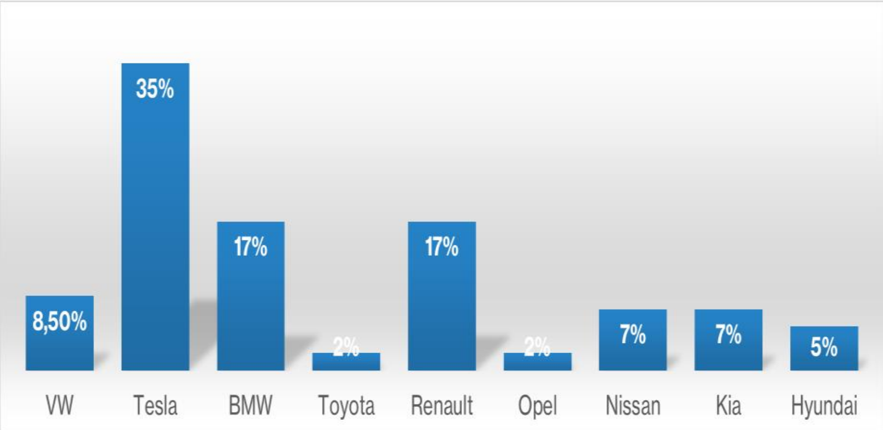
range, and is famous for being a pioneer in autonomous driving. The biggest problem is the price and the long delivery time. Of course, newer models, such as the Tesla Model 3 are now much cheaper than their predecessors (Model S and Model X), yet the delivery time can be up to one year, which for many is unacceptable.

BMW and Volswagen were chosen by respondents mainly because of their association with reliability, a good brand recognition and the nations long-term appreciation of German-made cars.



2. Figure Preferred car brand? (N = 316)
Source: Own research

While the choice of Hyundai and KIA were explained by the reliability of both of the brands, the choice of the French Renault was backed by the concept of value for money. The Renault ZOE model has just won an award in this category, therfore the manufacturer communicates its vision of the future of electric cars quite vividly.

The next two questions cocnerned the average distance traveled per day by respondents and the range expected from an electric car.

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		Value	Asymp. Std. Errora	Approx. Tb	Approx. Sig.
Interval by Interval	Pearson's R	,260	,078	2,878	,005c
Ordinal by Ordinal	Spearman Correlation	,226	,091	2,472	,015c
N of Valid Cases		116			

3. Figure Symmetric Measures
Source: Own research

With the help of the SPSS program we examined the two questions through Pearsons't index, which in this case was 0.260. We interpret this as a weak but significant relationship between the two criteria, i.e. it cannot be said that only those who drive longer distances per day on average chose the range as a significant factor. Since the p-value is 0, this statement is definite with a probability of 99.9%.

5 Conclusion

The primary research was planned well in advance, and its execution aimed to get the best possible picture of the consumer market for electric cars. Overall, we obtained the results we predicted in the secondary research. People are still generally reluctant to purchase electric vehicles. From the questionnaire, we can see that the consumers are willing to pay more for an electric motor version than a conventional one.

We believed it to be important to examine which brands and models the respondents were aware of, therefore, we determined the criteria and the reasons for the choice. In the list of possible reasons, the brand was the most common choice. According to the respondents, the brand plays a significantly more important role than the range. The respondents did not choose the most successful brand in Hungary by sales as their electric vehicle of choice, instead, they stood by vehicles with a reputation and good brand recognition. An example is Tesla Motors. While it's impossible to buy a Tesla through a dealership, buying it second-hand is an alternative option exercised by many. Tesla's reputation, its market-leading range, and constant strive for innovation make it instantly recognizable and a popular choice of many consumers.

Looking ahead, it is evident what kind of cars we will be driving on public roads. The future is indeed electric. This is progress none of the giant corporations can stop, only alter.

Self-driving cars will relieve us from the process of operating the vehicle, thus making our ride more comfortable, stress-free, and as safe as possible. The more cars have the self-driving feature, the more likely it is that a network will emerge. Such a network will enable the vehicle to determine the most optimal route for the journey, avoiding difficult traffic. Autonomous vehicles will not make incorrect turns, won’t forget to use the turn signal, and most importantly, they won’t get tired and won’t make mistakes as a result.

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Analysis of the Reason for Postponement of the Departure of the Hungarian Young Generation from Home

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Abstract: Based on the data shared by KSH, in Hungary, young people leave their parental home at an average age of 27, and 62% of the young generation between the ages of 18 and 34 still live at home. The aim of the research is to reveal the facts and reasons that lead young people to stay at home, within the framework of a literature review. In the course of qualitative semi-structured, in-depth interview research, students currently studying in Hungarian higher education are asked about the benefits of staying at home and the factors hindering moving out. The research concludes with an analysis of the results based on the in-depth interviews and a systematic summary of the factors that help and hinder the decision to move.

Keywords: Moving out; Living at home; Young generation; Studying

1 Introduction

The Central Statistics Office published a study in 2021 about young adults leaving the parental house at a more and more old age. The headline of the research highlighted that in Hungary the young generation lives in the parental household until the age of 27, and considering the age group of 18 to 34, 62% of young adults are still living with their parents. The aim of the research was to explore the influencing factors that may facilitate or hinder young adult's commitment in moving out from home. However, it was important to not only present the factors previously explored in the literature review, but to interview Hungarian university students and to explore their view, mindset on the subject, and those factors that may not appear in the literature research, while they may be present, affecting their everyday life and the motivation behind leaving the parental house.

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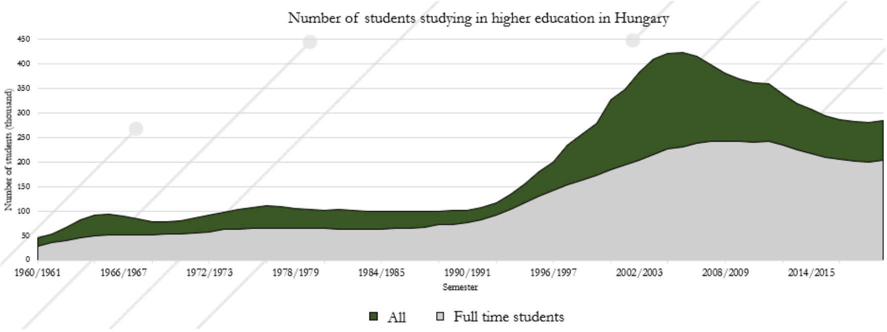
The methodology of the research consists of an extensive Hungarian and international literature review which highlights the most common influencing aspects of the researched topic both in Hungary and in neighboring European countries, the United Kingdom, and the United States. The primary research was conducted in the framework of an in-depth, semi-structured interview in which Hungarian University students were interviewed. The goal of the interview was to allow students to freely express their mindset and thoughts about the researched subject. This may not have been possible in a form of a quantitative research. The aim was to discover new, earlier in the literature review unseen influencing aspects of moving out.

2 Literature review

The literature highlighted that for young adults in higher education, employment can be delayed until their mid-twenties. The first graph also shows that the number of university students fluctuated and significantly did not change between 1960 and 1990, but the number of students in higher education more than quadrupled between 1990 and 2006. The significant increase in the student's number in higher education can be traced back to the change in the Hungarian government after the 1990s. Older generations who could not enter higher education before, also appeared mostly in universities correspondence training. However, after graduating, the number of participants in correspondence training started to decrease again. There has been no significant decline in full-time training in recent years. Looking back to 2020, 75.230 students continued their studies at universities. (KSH, 2019) Based on this phenomenon, the average study time has risen from 13,8 years to 17,8 years in the country. The average student who starts their studies at the age of 7, completes higher education at the age of 24. (Kozma, 2010, OECD, 2000; OECD, 2010)



4. Figure: Number of students studying in higher education in Hungary
Source: KSH, 2021; Own editing

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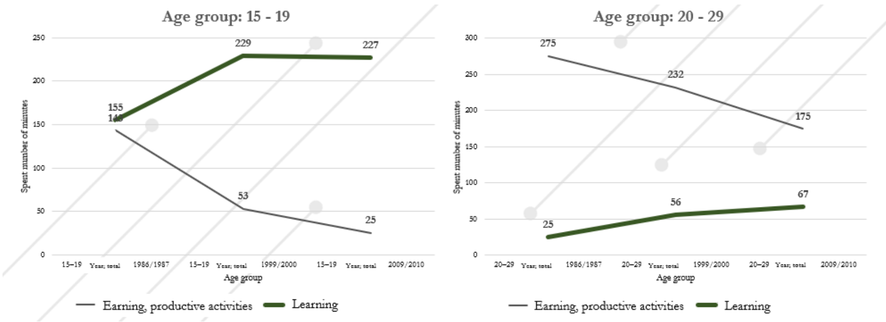
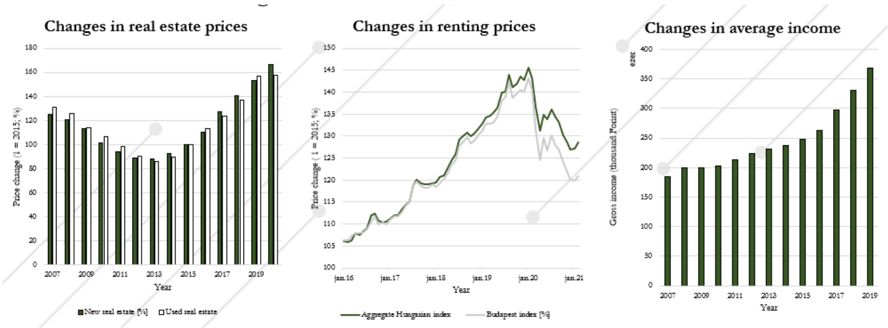
Due to the prolongation of studies, young adults are working less and less at full time jobs. Bad experiences in the labor market for young people can be even more demotivating. For many, the idea that they will have to work 40 years after the completion of their studies can be very daunting. (Wolbers, 2007) The first graph shows a significant increase in learning and self-education, as well as a drastic decrease in earning and productive activities among 15- and 19-year-olds. The second diagram shows the age group between 20 and 29 in the same respect. We can see that earning and productive activities has declined in the case of the younger generations, and more and more people want to continue learning from this age group. (Takács-Murinkó, 2013)



5. Figure: Time spent on learning and working by different age groups

Source: KSH, 2021; Own editing

Other important aspect of young adults not leaving the parental house is the significant changes in the Hungarian real estate market. Market prices have risen significantly and steadily since 2013. Based on the year 2015, an increase of 66.4% can be found for new apartments and 57.2% for second-hand houses. (KSH, c, 2020) The development of rents before the pandemic period shows a similarly stable increase, reaching 45% based on 2016. Examining the same period, the average gross wages available in Hungary increased by 48.3%, while the minimum wages increased by 50.8%. (KSH, d, 2020) Unfortunately, it can be stated that if someone decides to rent an apartment alone and pays all the costs of the apartment on their own, they may not be able to set aside money from which they can later buy their own house or apartment. That is why a lot of young adults do not leave the parental house even after finishing their studies. Living at home allows them the build savings for their future. (Spéder, 2013)



6. Figure: Changes in real estate prices, renting prices, average income
Source: KSH, 2021; Own editing

Based on previous surveys, the postponement of leaving the parental home may be influenced by the entry into the adulthood later as well. This new phenomenon called postadolescence is becoming more and more common among young adults. The transition of the modern generation from the young into the adult age can already be considered as a separate stage of life. This is the period in which a young person has already reached the age of majority and has the legal rights as an adult, but in contrast he or she does not and does not have to make responsible decisions. (Gábor, 2000) Thanks to rising living standards, more and more parents are able to provide their child with preferred living conditions that lead to adherence to childhood and the postponement of the need for moving out. Young adults in most cases would not be able to provide themselves the same quality of life that they can live in at home. (De Jong Gierveld, 1991)

Inspecting more soft factors, within the family, it is not only the financial background and the mentality behind education that can affect the independence of young adults. Bad relationships within the family, or the number of siblings, can be factors influencing the move out as well. (Murinkó, 2009) If more than one person lives in a household, it is difficult or even impossible to maintain private space. In the case of young adults who may have to grow up without biological parents or in a foster home, independence, and the need to develop their own private area tends to appear even earlier. Children of divorced parents and single children are much more attached to their caretakers, making them less likely to move out at young ages. (Murinkó, 2009)

More and more young adults are getting married only after setting up an independent household. The pursuit of the first home is significantly related to family building and having a first child. Young people are now increasingly living in independent households when their first child arrives. In contrast, the connection between the early stages of relationships and moving in together is becoming increasingly weakened today. By advancing their careers, more and more people are gaining the opportunity to become independent first, rather than establishing a stable relationship. Overall, based on the literature and earlier research on the field, moving together with loved ones, due to careers, and the mentality of the young adults towards relationships, are postponed as well to the late twenties or early thirties. (Murinkó 2009, 2010b)

It was important to examine the situation in the countries surrounding Hungary, the United Kingdom, and the United States of America. Overall, it is visible that the number of years spent at home by young people is increasing as we move south - east from north - western Europe. Hungary is in the middle of the results for the 18-34 age group with a home living rate of 62%. The earliest appearance of independence is most significant in the Nordic countries, led by Sweden. Only 20-30% of the surveyed population lives with their parents. Hungary is ahead of the neighboring countries in this area, with the average number of years spent at home in Croatia reaching 33 years. 70% of the society between the ages of 18 and 34 does not live in their own household. (Gyimesi, 2019)

Thanks to rising student loans, rents and stagnant salaries, an unprecedented proportion of members of the younger generation are still living at home in the United States and the UK as well. American society is currently facing an earlier unexperienced phenomenon, with an increasing number of young people leaving home to complete their studies. 22% of young adults with a degree are forced to return to their parental house finishing their studies. Overall, in many cases, young people are still unable to start their independent life in the United States. (Min, 2019; Beresin, 2014)

Similar to Hungary, the proportion of young adults living at home in the United Kingdom has started to increase significantly considering the age group of 15- and 34-year-olds. The number of young people still living at home increased by 17% in higher-than-average-income households. Research from the ONS shows that men stay in the parental home on average longer than women. Even in the 20-34 age group, 28% of young adults still live at home. Referring to the results of 2020 estimates, approximately 289.000 men and 97.000 women live with their parents even after the age of 30. (ONS, UK, 2020)

Research by the Pew Research Center in the United States shows that young people between the ages of 25 and 35, whether living with their parents or on their own, move significantly less than members of previous generations. While in 1964, 83% of the surveyed age group answered that they had lived at the same address in the previous year, in 2000 this percentage increased to 86, and in 2016 to 91. The growth illustrates that young adults are facing a much more difficult circumstances than members of previous generations, not only when they move out, but even when they try to move to a new location or living area. Thanks to soaring real estate prices and credit facilities in the United States, opportunities for young people are now much more limited. (Fry, 2017)

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3 Primary research

In the second phase of the research, the factors motivating and hindering moving out from home were explored within the framework of a semi-structured, focus group in-depth interview research. The in-depth interview survey included 16 students who graduated from the University of Óbuda or are still pursuing a master's degree. Considering the grouping examined, 8 of the respondents no longer live in the parental home, while 8 still did not embark on the path of full independence. The research is not representative, its aim was to discover from firsthand, the mind set of young adults and their thoughts on leaving the parental house. The goal was to highlight motivating or demotivating aspects that did not appear in the literature before.

The results show that a significant proportion of respondents do not connect an ideal age to moving away from home at all. The condition of leaving the parental house can be mostly determined by achieving a university degree and a stable financial background. Respondents who also determined a specific age for moving out, had very divisive responses, with the optimal age for relocation ranging from 18 to 30 years. After finishing the studies in higher education, most respondents agreed that it is definitely time for the young generation to start becoming independent. The age of 30 revealed in the secondary research returned again as an absolutely acceptable final limit for moving out from home.

It was clear from the respondents' feedback that overall, they have a good relationship with their parents. According to their own statements, the possible divorce of the parents and the involvement of a new partner in their everyday life did not affect the moving out from home. In several cases, the responses indicated a level of such good relationship with their family that could lead to an extension of years spent at home. In these cases, the young adults interviewed feel comfortable in their home atmosphere. They share the same lifestyle and views as their parents. They do not necessarily feel the need to move out of the home.

All respondents leaving the parental house at an early stage of their lives, did this because they started their studies or work far from their original living place. However, for these subjects, it can be stated that they did not move back to their parents' home after finishing their studies. During their higher education, they learnt and enjoyed independence and they did not want to give up its perks after completing the university. Based on the respondents, it can be stated that living in dormitories can speed up the process of moving away from home at a younger age. In addition, the answers included the factors of pursuit of independence and solitude, the need to break out of the system of parental rules.

Among the respondents, it can be stated that the majority of the respondents received financial support from their parents to help them move out. In several cases, the ownership of the apartment if self in question was financed completely by the caretakers. Interviewees who did not receive support reported having the same good relationship with their parents, so this factor did not affect the issue of financial contribution.

It can be stated that in some cases where the parents have financed the property for their child, the young adult prefers to spend the holidays and the summer period in the parental house. The online education caused by the pandemic and reasons like returning from abroad appear as additional reasons for the issue of returning home temporarily. Overall, although moving home after completing the studies illustrated in the literature review does not appear significantly, high proportion of young people interviewed who have moved away from home in the past have made the decision at least once to return to their parental house temporarily for some reason.

The interviewed students still choose to stay at home due to various reasons. Cheapness, the simplicity of staying at home, and the lack of necessary income to move out appear to be significant reasons. However, in the case of one respondent, the need to postpone adolescence emerges from the literature review. In the case of the interviewed student, it can indeed be said that, according to his own confession, he still wants to enjoy his “childhood”, he does not want to enter the adult life so early and embark on the path of independence. According to the student, the motivation of moving out is hampered by the idea that beyond his studies, only 40 hours of work a week awaits him. He still wants to fully enjoy his remaining university years.

In many cases, therefore, it can be said that young people who move away from home because of their studies love the benefits of separation. When they already have the opportunity to try their independence, they value living at home differently. In contrast, to the in-depth interview research, the opposite of this factor can also be found, although in this case too, the interviewed roommate did not start a completely independent life but moved home because of a negative relationship with a roommate. Therefore, university studies can facilitate the process of self-reliance and lead to earlier relocation from home. However, it is clear that young adults may later be forced to move home because of financial reasons.

In the literature it was common that the relationship with the parents were only considered in a negative manner. Children with bad connection to their care takers tend to leave the household at an earlier stage in their lives. However, the interviews highlighted a more positive aspect of the situation. The questioned students told that because of the great relationship with their parents, they do not plan to leave the household. The primary research showcased that a good relationship with the caretakers can be a demotivational aspect of moving out. Parents were often considered as friends, and the asked student does not have any problem with living home with them.

The asked sample highlighted that being in a relationship is a less and less motivating factor for leaving the parental house. The interviewees often answered that they do not plan to move in with their partners together. They do not see the potential of long-term relationship and do not feel like taking this next step with their partners together, while they do enjoy their company overall, living separately. Based on the research it can be stated that relationships do not motivate the moving out as much as in the past.

Most of the literature on the research topic was created before the pandemic period, but the primary research highlighted a new aspect of influencing factors considering the topic. Asked students stated that under the pandemic period they moved back to their parental house. They had to leave their college, or it was just easier to maintain life and the lockdown from home. These students stated that they enjoyed returning to the parental house. They rediscovered the perks of living at home, and they got used to it again. Under the lockdown period they had to make less significant decisions and they did not have the opportunity to socialize as much as before. The answers showed that the interviewed persons must relearn independence again and they need to socialize after the pandemic period.

4 Results

Within the framework of the in-depth interview research, the factors that motivate and hinder moving away from home were surveyed among university students. The interview allowed the exploration of diverse responses and individual situations that did not necessarily appear in the literature review.

The responses revealed that young adults do not define a specific age they would find suitable for moving. Leaving the parental home is mostly associated with completing their university studies and finding a stable job. Young people who have already moved away from home at a younger age because of their studies find it more acceptable to leave the parental house at an early age and have no plan to move back again after completing their studies.

Respondents who had already moved away from home were often supported financially by the parents. Respondents have a good relationship with their caretakers. This positive connection often demotivated the asked population to move out. They would miss their parents and do not see any problem with living at home.

Based on the results of the survey, being in a relationship does not speed up the process of moving out for a significant proportion of respondents. However, the absence of a reliable partner can make it difficult to break away from the parental home as well. The interviews revealed that the pandemic period affected the living conditions of young people and the process of relocation in several cases. For the sake of simplicity and savings, some respondents moved home and continued their studies from home, and according to their own confession, they rediscovered the perks of living at home. After a pandemic period, they need to re-learn to become independent and take care of themselves. The student reported that during the viral situation, it was quite easy to get used to the benefits provided by the parental home again.

The results of the in-depth interviews undoubtedly show the extended age of leaving the parental home and can the changing mindset of young adults. The absolute final age was set by the respondents at the age of 30 to move out. Based on some responses, they are having difficulties in stepping into adulthood. The respondent is deterred from moving out by the fear of independent life and the decades of work that awaits him. Thus, the attitudes of respondents in the area are divided. A significant proportion of respondents who have already moved away from home do not plan to return after obtaining a qualification in higher education.

5 Conclusion

Concluding the research, it can be stated that the process of independence is becoming increasingly unique. There is no given age anymore where it can be stated that a young adult has to leave the parental house. The primary research showcased that the interviewees connect the leaving of the parental house with the end of their university studies and with achieving fix income. The final date for moving out based on the primary and secondary research is considered to be the year of 30 today.

It must be stated that those students who got the opportunity to leave the parental house early because of work or their studies, stated that they are glad that they learnt independence at an early stage of their lives, and after their studies they do not wish to return to the parental house.

Based on this result, our suggestion is that it would be beneficial for young adults to be able to try independence and living separately even for a short period of time. Where the financial circumstances allow, parents should support their children achieving the basic knowledge of leading a household and by providing the opportunity to try living separately. It was clear that young adults are often demotivated to move out based on fictional fears, and thoughts without real experience to build upon. Even if the experimental moving out is unsuccessful the young adult would have real knowledge of the ups and downs of leaving the parental house and may be more motivated in the future to leave.

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Rural tourism effects on youth employment

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Abstract: In the phase of transitioning from a centralized economy to a market economy system, Albania has been facing a great number of social and economic problems including high rates of external and internal migration; massive emigration of the skilled workforce; an increase in population average age; huge movement of the population from rural towards urban areas. Such movement was geared mainly from the willingness to search for better education, jobs, and betterment of living conditions. The phenomenon of emigration is still present nowadays, especially among young generation who often seek opportunities to study, work and live in another developed country. This article aims to make an analysis of the labour market perspective for youth in Albania and explore tourism and especially rural tourism development as a potential for employment. Tourism is one of the fastest growing sectors in the Albanian economy and the number of foreign tourists has been steadily growing in the past years, not considering the Covid-19 pandemics period. Rural tourism is a sector which has started to receive attention in the last years, and research shows that it can play an important role regarding youth employment.

Keywords: youth employment; labour market; tourism; rural tourism.

1 Introduction

The future of a country is shaped by the capacities and qualities of its youth. Throughout the past thirty years, transitioning from a totalitarian communist regime, towards building a democracy and an open market economy, Albania has been facing a great number of social, economic and political problems. Such difficult years of political unrest, high unemployment, poor health care conditions and struggling for survival, forced many Albanians to emigrate, therefore the labour market faced massive loss of skilled workforce, the so called 'brain drain' phenomena, and huge migration from rural towards urban areas, mainly towards the capital of the country.

Although Albania is holding the status of candidate to the EU from 2014, the country is still experiencing the reminiscences of past problems at the current stage.

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The phenomenon of emigration is still present nowadays, especially among young generation who often seek opportunities to study, work and live in a developed country, either in a country member of EU, USA, Canada or elsewhere.

Although the analysis of societal, economic and political phenomena are interlinked and affect each-other, the purpose of this paper is to focus on the analysis of the labour market dynamics for youth and to explore tourism and especially rural tourism as an engine for employment generation. Albania is a country with a great perspective for tourism development. Its geographic location, the amazing landscape and hospitality of its people are a great attraction for both national and international tourists.

2 Labour market dynamics

The labour market analysis aims to raise a discussion around some important dynamics affecting youth, such as employment, unemployment, education, and business spirit, ability to employ and retain talent, alongside some demographic analysis in order to understand the problem rationale. The focus is placed on youth which as classified by the Albanian Institute of Statistics (INSTAT) belong to the age group of 15-29 years old.

2.1 Demographic movements

The population of Albania, as of 1st of January 2021, records a number of 2.83 million inhabitants, showing a decline of 0.6% compared to the previous year. A great contributor to such decrease in the population number is the net migration, which in 2020 reached the annual value of 16,700 individuals. According to INSTAT (2021) during the last decade, an average of 42,000 Albanians have emigrated annually causing a considerable decrease in the population number and at the young age mainly. As of IOM (2020) about 30% of the Albanian population is living abroad. Such effects on the population strata are illustrated by the population pyramid (figure 1) where the age groups are ranked from 0 to 84 years, bottom up. Figure 1 also makes a visual comparison of the population data in 2011 (shown as border line) and 2021 (shown as solid color).

The graph presented in figure 2, developed by INSTAT (2021) shows the population trend and annual growth rate (all in negative %) in the past twenty years which clearly shows a decline in the Albanian population due to emigration.

As illustrated in figure 2, (source: INSTAT, 2021) from the population annual growth trend line, the rates show an improvement in the years 2008-2011 which is followed by an unstable situation which has deteriorated again in 2020 and 2021. Such population movements reflect the political and economic situation in the

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country. At times of progress the emigration has slowed down, while at other difficult times, emigration number has risen again.

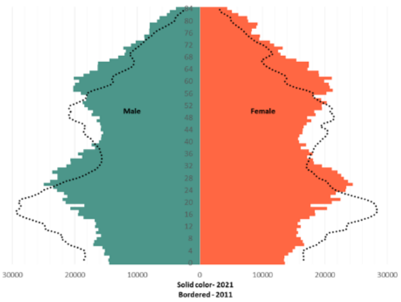

Figure 1. Population pyramid 2011-2021.
Source: INSTAT

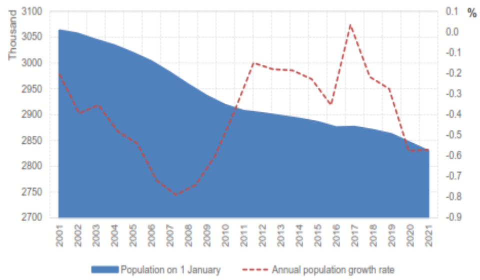

Figure 2
Population and annual growth rate 2001-2021
Source: INSTAT

Another problematic phenomenon in the Albanian society has to do with high rates of internal migration, from rural areas or smaller cities towards the main cities and especially Tirana, the capital, where about 32% of the Albanian population is located. Referring to figure 3, as developed by INSTAT (2021) all districts report a decreasing annual percentage of the population in 2020-2021, while Tirana and Durres report respectively an increase of 0.7% and 0.5%, while on country level a decrease of 0.6% is reported. Since statistical data record a bigger number of new-born compared to the number of deaths, it is due to emigration that the overall population shows a decline.

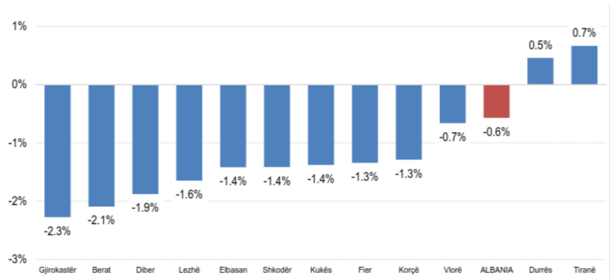

Figure 3. Annual change ratio in population per district 2020-2021
Source: INSTAT

High scale of internal migration towards the capital and the main cities result in unequal distribution of population density, economic, social and infrastructure problems, as well as shifting unemployment from the rural areas towards the urban areas. Such movements of population are geared mainly from the willingness to search for better living conditions, better education, better health care, and job opportunities. The main employment opportunities in rural areas are related to agriculture, which accounts for about 36.1% of employment in Albania, as of the second quarter of 2020, however recording a 6.6% decline from 2020 to 2021 (INSTAT, 2021).

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2.2 Employment overview

Although in 2019, the labour market overall, showed some improvement and employment grew by 42,000 (WIIW, WBG, 2020), the labour market in 2020 faced an increase of unemployment of 0.2% compared to the previous year, reaching the rate of 12.2%. The unemployment of men has decreased while the unemployment of women has increased compared to 2019. The sectors which benefited from more job creation were mainly the service sector and the industry, while the employment in agriculture has decreased by 6.6% in the last year (Instat, 2021). The largest share in employment increase was due to rise in informal employment, which in 2019 reached 56.7% of total employment in Albania. It is the agriculture sector which contributes the most at informal employment (63.9%), followed by wholesale and retail trade (12.6%), construction (7.6%) and accommodation and food (4.2%) (ILO, 2021).

At country level, the service sector and agriculture cover the highest rate of employment respectively 43,4 % and 36,1 % in 2020, while 20.5% of employment is at the industry (INSTAT, 2020). Employment in agriculture has decreased by 6.6% from 2020 to 2021, while the employment in the service sector has increased by 3.1%, while 10.8% is the increase in the industry sector. About 46.1% are employed with a salary, while 33.3% are self-employed and 20.6%, mainly women, are working without a payment at their family business. In the Albanian labour market, men are more active (67.8%) compared to women (53.6%).

The overall rate of unemployment in 2020 has been 12.2%, while for youth category 26.5% with a higher rate for men (27%) compared to women (25.9%). As of INSTAT (2021) the unemployment for youth has decreased by 0.7% (0.8% for men and 0.4% for women) reaching the level of 26.5% in 2020. However, youth unemployment rate has been consistently above the overall unemployment rate, about twice as high in the past 10 years (figure 4).

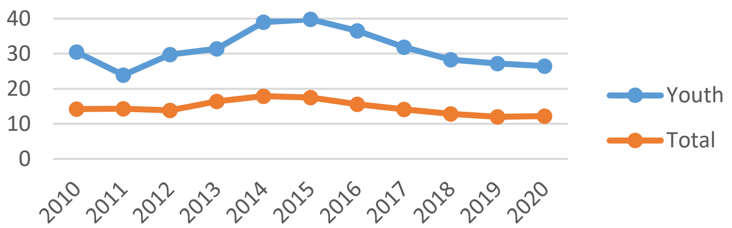

Figure 4 Unemployment rate in %
Source: INSTAT

At this age group, about 27.9% in 2020, are either not employed, nor attending any school or university or professional vocational education (INSTAT, 2021). Out of this group, 35.1 % are classified as unemployed while the rest are not considered as part of the labour market.

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2.3 Business spirit

One important element affecting the labour market is the business spirit in terms of talent attraction and talent retention. Such discussion is made based on the data published from the World Economic Forum in its 'Global Competitiveness Report' for 2015 and 2017. The latest report covering 2017-2018 ranks Albania in the 75th position in the Global Competitive Index among 137 countries, an improved position from the 93rd in 2015-2016.

Out of three stages of development and two of transition, the Albanian economy is ranked in stage two of development "Efficiency-driven", alongside other 30 countries, including Serbia, Montenegro, Bosnia and Herzegovina, North Macedonia, Bulgaria, etc. The focus at this stage of development is put at developing more efficient production processes, increasing of product quality due to higher wages and more fixed prices.

One of the pillars which affect the competitiveness index according to this report is '*Labour market efficiency'* (the 7th pillar) score has remained the same at score level 4 (where 7 is the maximum, showing the most desirable level). In terms of ranking in the list of countries part of the study, Albania has improved its position from 97th to 91st (out of 137 countries) in 2017-2018. Out of the10 factors considered for this pillar, two of them have worsened from 2015-2016 report to 2017-2018:

- the country *capacity to retain talent* has lowered its rank from the 109th to the 116th position;
- while the country *capacity to attract talent* has also improved from 123rd to 121st.

These reports tackle the 'inadequately educated workforce' as one out of 14 problematic factors for doing business in Albania. The factor score has increased from 3.3 in 2015-2016 to 6.9 which shows a poorer result for 2017-2018. (based on WEF reports, 2015 and 2017).

Often inadequate skills are present in the form of over-qualified or under-qualified youth. 'Over qualification' means that often young people work in jobs which do not fit their field of study, or which requires less skills or education. 'Under qualification' is referred to the fact of employing people without adequate skills, as a consequence of shortage of properly skilled people. This is to a large extent a consequence of a mismatch between skills that businesses need and the choice of graduates' fields of study. In Albania, there is a lack of graduates with technical skills at both secondary and tertiary levels, while tertiary education is dominated by humanities and business and finance.

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2.4 Youth education and 'brain drain'

The majority of youth in Albania attend and graduate from the secondary education. As reported by INSTAT (2020 and 2019), in the academic year 2020-2021 the participation of youth in secondary education level is 93.5% compared to 90.7% in the previous academic year. The number of students attending vocational education in 2020 is 11.2% of total number of students following secondary education, and faces a 0.7% decrease compared to the previous year (INSTAT 2020).

The participation of youth in the tertiary education level (higher education) in 2020-2021 has been 59.2% compared to 59.5% in the previous year.

In 2020 a number of 32,889 students have graduated (65.3% are female), compared to 34,891 in 2019. The most favorite field of study for higher education is Business related fields and Law 27.8% in 2019 and 28.7% in 2020, followed by Engineering and construction 20% (preferred mainly by male students) and Medicine and healthcare 16.3% (preferred more by female students).

According to INSTAT statistics for registration in higher education (2021), during the academic year 2020-2021 there were a number of 123,797 students in the entire higher education level (tertiary) which records a decrease of 17% compared to five years earlier and a decrease of 5% compared to the previous academic year.

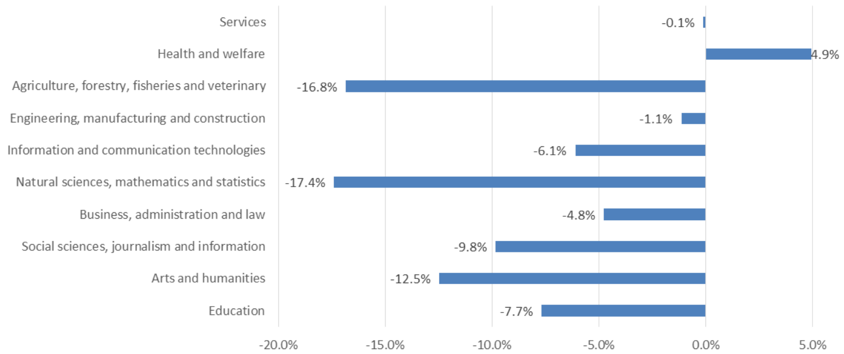

Figure 5
Changes in the number of registered students per academic degree
for the academic year 2020-2021 compared to 2019-2020
Source: INSTAT

Based on INSTAT (2021) as illustrated in figure 5, every academic degree has been facing a decline in the number of students registered: such as agriculture field with 16.8%, natural sciences 17.4%, arts and humanities 12.5%. The only academic field which has continued to be steady, even showing an increase in the number of students registered is health and welfare degrees. Such increase might be related to the need for doctors and nurses within the country but also due to the international demand.

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In the recent years, Albania has been facing a big number of experienced as well as recent graduates doctors and nurses, emigrating to Germany with a labour contract. Such phenomenon has created a gap in the labour market for these professions, resulting in an overall decline in human capacity in the Albanian labour market. According to The Vienna Institute for International Economic Studies (2021) a number of 737 Albanian doctors result to have emigrated to Germany and working there in 2019, while in 2018 a number of 1,008 Albanian nurses have emigrated and are working in Italy while 549 in Germany. Other professions suffering from a loss of human capital are mainly IT specialists, engineers, university lecturers and researchers.

As of World Bank (2016) Albania has suffered from strong emigration and 'brain drain' which hurt the country's productive potential. Besides depriving the country of the productive workforce in general, with important implications for economic growth, emigration is especially worrisome with regard to the migration of highly educated persons and professionals (the so called "brain drain"), being among the top 15 countries in the world by emigration of tertiary educated. Another group are students studying abroad, which in 2016 were 25,000 with a minority of them (up to 5%) intending to return after completing their studies.

Therefore, Albania is facing the risk of losing its human capital and especially the younger age which affects not only currently the development potential of the country but also its future, both socially and economically.

It is up to the policy making entities not only to develop policies but to gear the efforts towards providing employment opportunities for the youth in the country. One of the sectors with a huge economic potential for Albania is the tourism sector which is one of the fastest growing in the Albanian economy and especially rural tourism which has started to receive attention in the last years, based on research it can play an important role regarding youth employment.

3 Tourism potential

Tourism is considered an economic engine, since its positive results affect not only tourism providers but also other businesses interlinked in its value chain. Based on the statistical analysis made by UNWTO (2019), the Southern Mediterranean destinations, where Albania is part of, have continued to lead growth in regard to tourism, with the Balkan destinations showing upbeat results. The analysis is based in the period before the Covid-19 pandemics which has slowed down tourism in general.

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3.1 Tourism potential for employment

ILO defines tourism as a major contributor to employment creation. Tourism is extremely labour intensive and a significant source of employment. It is among the world's top creators of jobs requiring varying degrees of skills and allows for quick entry into the workforce for youth, women and migrant workers (ILO, 2010). According to WTTC, in 2015 tourism worldwide directly created over 107 million jobs or 3.6% of total employment and supported directly and indirectly a total of 284 million jobs, equivalent to 1 out of 11 jobs. By 2026, this ratio is expected to grow to 1 out of 9 jobs worldwide. The sector generates new opportunities not only in cities and developed countries, but also in local communities and across many emerging economies, spreading economic and employment benefits to rural areas.

Tourism supply chain is a network of tourism organizations engaged in various activities, from offering different components of tourism products/services such as flights and accomodation to the distribution and marketing of the final tourism producst at a specific tourism destination, and involves a wide range of participants in both the private and public sectors (Zhang et al., 2009)

Heerschap (2018) defines tourism industry as a collection of industries, which serve visitors when they travel outside their usual environment. These industries include travel agencies, transportation and accommodation services. to food and beverage services, retail trade and information services. Tourism can generate direct and indirect employment. Direct employment is generated from the consumption or spending of visitors.

Tourism and hospitality also supports indirect employment in activities like restaurant suppliers, construction companies that build and maintain tourist facilities, as well as necessary infrastructure, aircraft manufacturers, various handicrafts producers, marketing agencies, accounting services, which are more or less dependent on the companies providing direct employment for their revenues (UNWTO, 2011).

Indirect employment serves to generate inputs for the tourism products/services and often is not easy to be determined, therefore a tourism multiplier is used to expresses the number of indirect employed for each of direct employed person. As defined by ILO (2013) tourism value chain and its significant connections to other sectors such as agriculture, construction, utilities and transport can contribute to poverty reduction. With regard to the supply chain in tourism, one job in the core tourism industry indirectly generates 1.5 additional jobs in the related economy.

Tourism creates employment opportunities mainly for the young people. Examples from different countries illustrate this. Aguilar and Vargas (2016) research about the Spain tourism sector, pointed out that 'in contrast to other industries, employment in hotel, catering and tourism tends to be oriented towards people under 35 years of age. In Spain 43.4% of workers in the sector belong to the age group 25 to 34.

Based on a research conducted by WTTC (2019) studying seven G20 countries (Canada, USA, UK, Turkey, Germany, France and Italy) and three European countries, with relatively high youth and overall unemployment rates (Greece, Spain and Portugal) resulted that not only travel and tourism employ a higher share of youth workers than the overall economy of these countries, but it also employs more young people than any other economic sector. The share of youth employment in travel and tourism is highest in Canada where young people account for 32.4% of the sector's employment, followed by USA and UK, where youth account for 29.4% and 27.8% of employment respectively. Italy and Spain have the lowest share of youth employment in this sectors at 10.2% and 9.4%.

A study made by Heerschap (2018) in the period 2010-2017 the Dutch economy grew with 405,000 jobs while tourism industry created 120,000 more jobs. Since 2010 the number of people employed in the tourism industry grew with 18.9%. It is expected that this growth rate will sustain for the coming years, because the current development of international tourism even will outgrow the forecast of the UNWTO, that is an average growth of 3.3 percent per year until 2030. The workforce in tourism industries in the Netherlands is relatively young where about 51% of the youth aged 15-24 years work in the tourism related industries including accommodation services, and travel agencies.

3.1.1 Rural tourism and employment

UNWTO has emphasized, since quite a long time, the necessity to develop policies to support rural tourism as a potential for an inclusive, sustainable and resilient rural development. UNWTO (2020) considers that such development will ensure the fair distribution of tourism's benefits, enhance job creation, protect natural resources and cultural heritage, promote social inclusion and empower local communities and traditionally disadvantaged groups, particularly women, youth and indigenous people. Tourism has proven to be a tool for economic diversification and a major employment engine with a multiplier effect on other sectors that contribute to rural development.

According to Perales (2002), rural areas have been started to be used for tourism activities in developing countries that have been economically and socially depressed since the 1970s. However, discussions have started from OECD since 1991, and many authors have contributed to such discussion over time, by broadening the definition and incorporating different activities under the rural tourism concept.

Different research has pointed out that there is not a unique definition regarding rural tourism, however some of them listed below pinpoint the key elements of rural tourism. As defined by OECD rural tourism is a form of tourism that takes place in

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rural areas and contains elements of an authentic rural setting on a tourist farm or in a rural hotel.

As defined by Kulcsar (2009) rural tourism interests people who like nature holidays, that it also includes special services such as accommodation, events, festivities, gastronomy, outdoor recreation, production and the sale of handicrafts.

As Clemenson and Lane (1997) have stated, rural tourism is a complex, multifaceted activity. It may have its roots in the farm based or agritourism, but it is much more diverse and continues to diversify. It is a series of niche activities within a larger niche activity.

As defined by Irshad (2010) rural tourism ***makes a valuable contribution to*** rural economies and society, such as job retention, job creation, new business opportunities, opportunities for youth, service retention, community diversification, community pride, preservation of rural culture and heritage, increasing arts and crafts sales, landscape conservation, and environmental improvements.

Rural youth are one of the most vulnerable groups due to the lack of gainful employment and entrepreneurial opportunities in agriculture and related rural economic activities (FAO, 2016). At the same time, they are also the most crucial when addressing rural development (FAO, 2020).

Some researchers have studied the dynamics of rural tourism and some of the findings are briefly presented. The opportunities provided by tourism are crucial for youth retention in rural areas. A research made by Möller (2016) in Sälen, a rural area in Sweden, supported previous research on economic impacts that tourism can provide livelihoods in rural areas with weak labor markets by improving employment and business opportunities. He demonstrated that young adults' entrance into the labour market is facilitated by tourism, which enables them to start working early and be delegated responsibility early in their working lives. Tourism in rural communities substantially affects young adult inhabitants. He also concluded that in rural areas, tourism is found to contribute with social and economic dynamism that is otherwise associated with urban areas. This relates to the claim that Sälen is perceived as a city, which has raised the question of how tourism affects places' images as rural or urban.

As stated in the research by Janković and Jovanović (2020): "annual expenditures in rural tourism amount to around 12 billion euro, and taking into account the added value and multiplier effects, revenues reach a figure of around 26 billion euro. In addition, it is estimated that rural tourism creates about 500,000 jobs. Italy records a growth of over 1 million annual arrivals on agro-tourism farms. Estimates indicate that more than 10% of English farms are involved in some area of ecotourism, while in some regions this share is growing up to 23%, and about 10,000 farms offer bed and breakfast accommodation. The percentage of rural households offering some type of tourist accommodation in Austria is about 10%, which is about 300,000 accommodation units. Also, 8% of farms in Germany and 4% in the Netherlands and France provide tourist services. According to available data from 2017, the largest number of overnight stays in rural areas was registered in France, Germany, Switzerland, Great Britain and Italy. Also, the Czech Republic, Poland, Hungary, Latvia, Estonia and Lithuania record a significant number of visits to rural areas."

3.1.2 Rural tourism in Albania

Rural tourism is a new phenomenon in Albania. Although it is a common practice in the western culture, in Albania it has started few years ago with sporadic individual initiatives, mainly based on culinary services, followed by accommodation services at local guesthouses. The research about rural tourism is very limited in Albania, especially regarding its effect and impact on rural employment. However, different research on rural tourism emphasize the positive effects it can have on rural development in terms of economic, employment and social development. Since tourism sector is mainly attractive for the youth as an employment opportunity, stimulating rural tourism can positively affect the youth retention in rural areas.

Albania has become attractive in terms of tourism services. According to INSTAT (2020), in 2019 foreign tourists in Albania numbered 6.4 million individuals. Such number is about 8.1% more than in 2018 and shows an increase of about twice the number in 2014. About 90.1% of the tourists arrived from European countries, and 47.1% declared to be visiting Albania for vacations. According to WTTC (2019) the tourism sector employs 8.03% of the total labour force in Albania, while it is estimated that by 2029 such figure will rise at 8.9%. The investment in this sector accounted from 7.5% of all investments, while in 2028 it will become 8.2%.

In 2019 the exporting of touristic services *has positively impacted employment in Albania.* About 64,000 new hires were made in businesses offering tourism related services, counting for one job opening for a number of 101 foreign tourists arriving in Albania.

Most tourism activities in Albania are located in the coastal areas, offering activities related to the summer season and closely related to the sea, combined with some organized tours in archaeological sites. All these activities happen to be highly seasonal and often result to be overcrowded.

The tourism potential in Albania is not only related to the current touristic areas located to the coast, but also in the rural areas which offer vast opportunities for local and international tourists. Albania has a high potential to develop some niche tourism in the mountainous areas, adventure tourism and promoting the culture and history of the country. Albania has a lot to offer in terms of activities related to nature, hiking, climbing and other sport tourism. However, the touristic operators organize their touristic packages around established attractions therefore loosing from the potential to tackle a niche touristic potential in the rural areas of the country.

Rural tourism has started to sporadically develop mainly related to accommodation and culinary services, attracting mainly national tourists who prefer to visit and spend their weekend away from urban chaos and close to nature. As of UNWTO (2020) domestic tourism in most large destinations results to be over six times larger than international tourism.

Travelers who are intellectually curious, risk takers, confident explorers and want to explore new and different experiences, have increased (Lane, 2009). Although nationals are the major part of the clients for rural tourism, the potential is to attract also international tourists, especially form the countries in the region but also for other parts of Europe. In the recent years, a growing number of tourists arriving from Poland, Czech Republic and Germany prefer to visit Albania, via land roads and therefore explore most of the country.

As defined by Nulty (2004), rural tourism can bring three main benefits:

- *Economic:* opportunities for job creation; opportunities to sustain existing businesses; benefits to local governments through taxes and rates.
- *Social:* Support for local services; new facilities to local community (museums, restaurants, etc.); cultural exchange; revitalization of traditions, customs and crafts;
- *Environmental:* preserving natural resources.

Therefore, rural tourism has a great potential for economic and social development of rural areas, positively affect the labour market and help to alleviate the social phenomenon of emigration and migration, especially for the youth.

Promoting and supporting rural sustainable tourism development can incentivize niche tourism activities and develop new destinations that generate employment in small businesses that provide accommodation, culinary services and local guides, promoting as such especially the young and women. Innovation in rural tourism is needed in order to promote this sector and increase attractiveness in the region.

Rural tourism in countries like Albania is mainly dominated by small family-owned businesses, resulting in guesthouses, restaurants and local guides (quite a new profession in Albania). Few initiatives related to adventure tourism are also privately developed and attached to rural tourism products. Although the employment of family members in such businesses is informal, it can provide quality employment for the youth, offering them a salary, profit-share and a stake in the business, as it is the young who will inherit the business. Rural tourism is an attractive employment opportunity for the youth. Their inclusion in the business can bring an added value which is linked to the capacity and skills of the youth in terms of technology use, internet, promotion of the business in social platforms, making the business accessible in booking platforms, as well as knowledge of foreign languages to facilitate communication with foreign tourists. The possibility to interact with foreigners and the possibility to grow and inherit the business can contribute to making such employment opportunity a favorite for the youth. Few initiatives are undertaken in the country to promote rural tourism through development projects, however well-established policies must be undertaken to support rural tourism into a sustainable rural tourism.

An innovative initiative for promoting rural tourism in Albania entering a niche market is undertaken by Risi Albania, with a pilot project to introduce the Italian concept of 'Alberghi Difussi', a concept implemented in Italy since twenty years. The purpose is to generate sustainable tourism development and youth employment in the rural areas. Such model aims to transform abandoned villages in authentic touristic centers, where the tourist can experience the culture, history, nature and local lifestyle. Such model aims to refurbish abandoned or vacant buildings into tourist accommodation units in order to revitalize the villages, stimulate economic activities and halt the depopulation of rural areas.

The added value of rural tourism is to attract tourists throughout the year, who stay longer in the touristic locations by travelling to the off-beaten trails, spend more and therefore generate revenue for smaller businesses at rural communities. Such form of tourism not only contributes to the preservation of nature and environment, cultural heritage, but also generate social and economic benefits for the local communities, mainly through employment.

4 Conclusions

Due to continuous emigration in the past thirty years, Albania has 'lost' about one third of its population which is living abroad, and as such has experienced an intensive 'brain drain' phenomena and loss of human capital. The youth is one of the categories which has been mainly exposed to emigration, in search for education, in search for a job and establishment at a developed country, either EU member, Great Britain, USA, Canada, etc. Alongside emigration, high rates of internal migration have also been present in the country, with movements from the rural towards the urban areas, or from smaller urban areas mainly towards the capital and the surroundings. This phenomenon stimulates social, infrastructural and economic problems and transfer unemployment towards urban areas.

In order to alleviate such problems it is crucial to support especially the young with employment opportunities and to offer alternative options for rural communities to generate revenue through business development.

Tourism sector offers great employment opportunities especially for the youth, however seasonal tourism closely related to the coastal areas offers seasonal employment is not very attractive for the youth as a career path. Rural tourism indeed can offer touristic services throughout the year and the employment can be more stable, therefore offering higher job security and income for both small businesses providing accommodation and meals for tourists as well as tour guides, and developing new businesses closely related to offering adventure tourism activities. Promotion of rural tourism can provide benefits for the entire community both in terms of social, economic and environmental benefits. Several authors have supported the importance of rural tourism for development. Tourism is considered a development engine for the economy since it provides growth and development opportunities for all businesses linked in its value chain. Supporting rural tourism through identification of niche markets, developing and promoting adventure tourism, nature sports, tour guides and touristic packages related to nature and what the country has to offer, can promote tourists to stay longer in the country, attract tourists throughout the year, spend more, generate revenue for smaller businesses at rural communities, and therefore generate attractive job opportunities for the youth.

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CRM adoption model in the context of B2B sector

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Abstract: Customer relationship management (CRM) practices have been extensively researched in the business-to-consumer (B2C) framework. The primary association of the term CRM is the interaction between customers and business entities. Consequently, the usage of CRM in business-to-business (B2B) has not been given significant consideration, despite its vast importance in the economy. Firstly, this research aims to bridge the gap by formulating reasons why companies implement CRM systems within the B2B business structure. Secondly, to determine the common characteristics of the B2B companies that adopt CRM based on prior research and case studies. Finally, develop a basic CRM adoption model for B2B to aid businesses' judgement of whether the application of CRM system is necessary or not. An interpretive analysis of the existing literature and a synthesis of the current CRM case studies would give the possibility to extract a basic understanding of the current CRM adoption process. The contribution of this paper is the proposition of a basic CRM adoption model, specifically for the B2B framework.

Keywords: CRM, business-to-business, adoption model, information system, decision-making

1 Introduction

The essence of any successful business on the market is satisfying customer needs at the best of its abilities in order to generate profit (Teece, 2010). The customer plays a vital role in any business transaction, which is why there is little debate over

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the prominence of framing a targeted approach towards establishing a quality relationship. The term customer relationship management (CRM) is about bringing improved and tailored customer experience or product at a better pace (Buttle & Maklan, 2015). It can entail the strategy of the company, cultural approach or even a system that has a sole focus on handling relationships between a business and a customer.

It is important to establish a theoretical framework for the business to business (B2B) commercial model before proceeding to analyze the practice of CRM implementation. In a B2B commercial model, businesses engage in the transaction of goods and services specifically with other businesses. An example would be when one company supplies raw materials for the manufacture of another company (Business to business, 2021). Hadjikhani et. al (2013) further point out that the evolution of the B2B model can be traced back to a primarily economic perspective that in the past 30 years has advanced to include behavioral theories as well. CRM is an inherent part of marketing and, therefore is tightly interconnected with behavioral economics since, after all, it aims to develop a model that would predict consumer sentiment. An interesting correlation observed by the authors was that the four eras in the history of marketing dictated the emergence of both the improvement of B2B strategies and CRM. B2B companies generally account for up to half of any countries' GDP. Thus, their importance can hardly be overstated, yet the field of application of CRMs in B2B businesses is sparsely studied (Hadikhani et. al 2013).

There are several objectives of the project work, allowing the group to achieve the main outcome of the whole research, which is the proposition of the basic CRM adoption model for B2B framework. Firstly, it would be prudent to formulate reasons for companies' decision to implement CRM system in the B2B business structure. Following that, based on prior research and consideration of case studies, the common characteristics of the B2B companies that adopt CRM would be determined. The summary of collected data will be presented as the solid foundation for the completion of the final goal, which is the development of a basic CRM adoption model for B2B business model.

In order to achieve the forementioned goals, different methods of scientific analysis were applied. Interpretive analysis of the existing literature for CRM in B2B [to have a broader view on the current state of the CRM in B2B] was conducted. In addition, the synthesis of the current CRM case studies was required to extract a basic understanding of CRM adoption process.

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2 Reasons

2.1 Contact Management

With the growth of the client base, there arises the need for more sophisticated data management software. Since CRM is a marketing-oriented tool, as defined by (Kotler, 1997), to grasp the widest possible target market, products and services must be tailored to customer segments (King et al., 2008, p. 422). Customer segmentation strategies stem from individual contact management, whereby their loyalty can increase by learning about the customers on a deeper level. Torggler (2009) defines contact management as the storing and recording of client information (in some cases personal sensitive data) as a means of using the data in customer-oriented processes. To contextualize the term, (Chen et al., 2004, p.338) divides CRM benefits into tangible and intangible ones. Closer contact management, increased depth, and effectiveness of customer segmentation, and improved customer service - are intangible benefits. They directly correlate with tangible benefits, which are reflected both on a company's balance sheet and in key performance indicators. In a sample of 125 companies, Torggler found that contact management is by far the most widely used feature of CRM (Torggler, 2009 p. 304).

Modern CRM software enables users to track behavioral data, website visits, clicks, and even the number of times the customer opens an email. In this way a virtual customer profile is created that can be tracked and modeled. However, it is much harder to create a unified model of B2B companies since there are significantly more variables to consider. In this case, in addition to the aforementioned behavioral data, it is necessary to take into account seasonality, the business sector, credit risk and even publicly available microeconomic data to model the needs of B2B companies. Through this model, it is possible to build a marketing strategy and thereby improve the sales process. The Salesforce CRM software, for instance, has a sales funnel mapping function, where system divides the sales cycle into phases and makes it easier to measure (Building..., 2021).

Technology is considered to be a key for companies to achieve a competitive advantage. Müller (2018) points out that small and medium-sized enterprises (SMEs) are known to have a small level of digitalization across Europe. Many SMEs function through a B2B model, and therefore comprise one of the main targets of our study.

2.2 Resolving organizational problems and profound analytics

The main idea of any company is to satisfy the customers' needs by providing the outstanding quality and experience of the suggested services and products. This process is called the 'sales' cycle (Kuprenko, 2020), the profound meaning is 'to guide customers through content that increases company's brand awareness', and

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hence, the cycle ends with a sale. Regarding the B2B sector, it is a challenging task because clients are represented as companies, as the viewpoints and requirements must be fulfilled. Therefore, companies use CRM system to 'enable businesses to better react to their individual needs' (Building Better Business Relationships with B2B CRM, n.d.).

One of the most important factors, that undeniably benefits B2B company, is resolving organizational problems and presenting the profound analysis of the completed work. According to new research (Benefits of CRM for B2B Companies, 2021), most of CRM's strength in this issue comes from the automation and flawless task delegation. This means that company does not need to rely on salespeople to sort the data, but rather automatically capture different types of information (e.g., duplicates' recognition, matching contact information) and have a neat arrangement of the workflow. This could benefit the organization from having a straightforward picture of contacts, leads, inventory, prices, transactions, and ongoing activities. A key benefit from the automation practice, is 'reducing the sales team's administrative burden' (Building Better Business Relationships with B2B CRM, n.d.), thus, increasing efficiency, since the element of error is no longer present. In addition, automatic task delegation contributes to the smooth workflow, as the minor difficulties are eliminated. For example, the system automatically follows defined protocols, such that when one work is completed, it automatically allocates the next to the next person, reminding them of their upcoming responsibilities for a specific task and briefing them on what has been already achieved. Thus, the time management is being followed, resulting in more profit. The automation of the work process also allows the company to see the detailed results of promotional campaigns (Kuprenko, 2020) by reporting the descriptive metrics. It could show which of the advertisement campaigns resulted in high ROI (return on investment) and what sales forecast has to be prepared.

2.3 Managing company's profitability

The inherit reason for the company to acquire any CRM system is directly correlated to the primary goal of any business – gain profits. Profit maximization has been extensively researched from various aspects and even according to the Milton Friedman's doctrine published in New York Times is "a social responsibility of business" (Friedman, 1970). Businesses deal with great number of customers, however, in the case of companies which adopt business-to-business model customers may be representatives of larger corporations putting greater risks at stake. Kumar and Reinartz (2012) explored applicability possibilities of the CRM systems into this model and shed a light into an important reason for companies with enterprise customers to adopt CRM system. CRM systems allow for close management of the business' profits by correctly delegating resources towards customers which generate larger margin share. In agreement with this, CRM is based upon establishing long-haul relationship with the company to ensure stable flow of income by providing reliable service (Degerman et al., 2019). According to the same research, B2B companies can ensure partner companies obtain relevant information or tailored service using CRM to bring better competitive advantage. This entails that this partnership becomes essential to clients, which puts the organization using CRM in the bargaining position. One of the important examples on this is Cisco's usage of CRM system. According to an article by Bhaskar and Yi (2005), Cisco incentivizes interest in its services by actively tracking lead generation metrics. This ensures marketing campaigns do not simply tailor, but actively encourage its customers to engage in the campaign. If the campaign is then turning into profit, a measure is known as a conversion, Cisco can make educated decisions into maintaining or diversifying its customer base. However, this diversifying is not the sole way to benefit the bottom-line of the business. Peppard (2000) says "retained customers are inevitably more profitable", clarifying it with the fact that customer acquisition is frequently cost a premium to a company. Hence, CRM can inherently affect the customer satisfaction in the quality of the services. In turn, this makes corporate customers keen to use services or goods for a longer period. This reduction in cost directly contributes to the positive end margins of the company.

3 Case studies

As it has been established in the previous sections, CRM can significantly influence the company's competitive advantage and success, especially in B2B, where the stakes are substantially higher. Previous chapters have introduced the reasoning behind the implementation of CRM systems, whereas this part of the research will focus on how existing companies in the literature utilize these systems. Towards the end of the chapter similarities and differences are to be identified amongst industries, spheres or individual companies using CRM.

3.1 B2B technological company

The technology industry has had an impact on the development of the customer relationship management, as it allowed to structure it into a systematic discipline. Tech industry stood at the forefront of the creation of CRM in the face of Oracle, SAP and Salesforce developing these technologies (CRM Switch, 2013). Cisco company focuses on providing telecommunication services to numerous companies of different sizes (Cisco, n.d.). Established in 1984 the company claims "85% of Internet traffic travel across Cisco's systems" (Cisco, n.d., para. 4). It is worth mentioning Cisco achieves this by solely providing service to other companies, directly falling under B2B-model company. In addition to this, Cisco correspondingly advanced throughout 1990s in time for CRM system to begin maturing (Lewis, 2017).

The company has introduced "Customer Insight System" as part of the lengthy shift in focus towards customer-oriented marketing (Bhaskar & Yi, 2005). The overall project had been a fortunate, but costly intervention from Cisco's management. The exact cost, however, kept undisclosed for corporate reasons. The CRM system resulted in cutting Cisco's expenditures by $1 million US dollars, making it remarkable success. According to Bhaskar & Yi (2005), the decision to put a CRM system in place came from the large number of sales employees working with resources scattered along an array of internal company applications. This made it nearly impossible to track sales on an aggregated level, narrow down approach for customers with higher profitability, as well as tracking employee return on investment. Last point was specifically hindered by the fact that employees required "15-25% of their time just searching for the right information" (Zupan, 2017). This is significant loss in productivity of sales representatives, since at the scale of Cisco which has around 80,000 sales representatives, it damaged profits. In order to manage this, Cisco had classified its 5 million organizations it had connections with into a CRM system categorically, regionally and lastly according to the business units (Bhaskar & Yi, 2005). This allowed to reinforce the company's private B2B sale model, where each sale is customized and personalized to each business Cisco is partnering with (Wirtz, 2019).

3.2 B2B financial company

Over the years the financial services industry has become more complex and more strictly regulated. This is unsurprising, as the latest financial crisis induced by the collapse of the American housing market resulted in many financial institutions, integral to the world economy and deemed "too big to fail", to go bankrupt. The Basel III accord raised banks' minimum capital requirement and risk exposure, set a backstop leverage ratio, and introduced liquidity requirements – thus tightening the regulation of the financial sector on an international level (Bengtsson, 2013). Nowadays, banks have to find new ways to adjust to changing financial markets, while expanding their customer base. This is especially true for banks which provide services for B2B companies.

With almost 70 million customers, Wells Fargo provides banking and investment services for private clients and for businesses (Wells Fargo, n.d). There are three major ways the CRM software aids the company in its operations. Firstly, Wells Fargo uses Salesforce to keep track of all brand references across multiple social media channels. This allows the company to actually interact with users, answer questions and respond to complaints (Marketing, 2018). With the ability to track the mentions, the company can determine the current customer sentiment. The more people engage in social media interactions, the more accurate the data is, the better the company can predict customer behavior with the help of Salesforce.

The second way CRM has proven itself to be integral for Wells Fargo was in 2007, when its subsidiary Wells Fargo Advisors acquired A. G. Edwards financial services holding company and had to merge 12 million contact and household records and interaction notes, representing 10 years of accumulated data into its database (Wells Fargo…, 2020). Facilitating the merger of the two financial institutions, consolidating various platforms and technologies into a single advisor platform, while integrating AI CRM functionality to support advisors was, at the time a challenge few CRM companies could handle. Wells Fargo Advisors chose NexJ CRM because of its ability to interact smoothly with Wells Fargo's financial systems and third-party applications. The bespoke security model, entitlements engine, operational data store, 3rd party customized advisor platform, batch email delivery system, and an in-house query and reporting tool were all part of this. The adoption of NexJ CRM software has allowed Wells Fargo Advisors to increase customer satisfaction and productivity by saving time and by simplifying the work of the employees.

Before we begin the discussion of the third and final way how CRM software aid Wells Fargo in conducting business with B2B companies, it is important to mention some of the most frequent complaints Wells Fargo receives. Aho (2012), noted that since 2010 the main customer complaints included fraud-related/identity theft incidents, late fees and billing disputes. Most of these shortcomings are a result of accounting software mistakes, front and back-office miscommunications, missing deadlines and human error. One way to solve the problem is to integrate a ticket support system, as proposed by (Free…, 2021) that would facilitate a seamless communication process with the back and front offices. Zendesk allows for this process to be digitalized by integrating with other application such as Google Analytics and salesforce features. It could also be found on the Appstore and Play market.

Whether a business is going through a merger, looking to reach out to potential customers via social media, or trying to resolve the most frequent customer complaints, the adoption of a CRM software is absolutely integral.

3.3 B2B production company

As the previous case studies analyzed companies discussing the use of CRM in technological and financial oriented contexts, it would be essential to consider the example of a manufacturing company and present the implementation of CRM within the operations of the company.

One of the major international companies that has considerable weight in the manufacturing sphere is Volvo Construction Equipment (or Volvo CE). The subsidiary of the 'Volvo Group' multinational corporation, manufactures and sells different types of equipment for the construction industry (Wikipedia contributors, 2021). Although the company does not completely operate according to the B2B model, rather it shifted its activity to the integration of "B2B+B2C" business model. Volvo undertook 'a deep transformation in its business model leveraging digital technologies' and started 'building digital capabilities at the global level' (Volvo Cars Corporation: Shifting from a B2B to a "B2B+B2C" Business Model, 2017). Even before the beginning of transformation, Volvo CE would only use online website for attracting customers where there was product information and leads were submitted through online forms, and later those leads were stored in Excel files and distributed to dealers manually. However, in 2011, Volvo recorded global sales of 449,255 cars, an increase of 20. 3% compared to 2010. The evidence could show the fact that the previous marketing strategy seemed to work, but the growing number of competitors provoked the profound change of direction. In addition, it was also inconvenient for the managers of the company to observe of the results, where 'extremely limited feedback from dealers on the results of leads' were given and the number of leads collected on the company's website was the only indicator to track the KPIs. Hence, the company decided that the global change was needed in order to create a worth product value for businesses and customers alike.

After the CRM and automation initiatives took place in the organization, real-time reporting of campaign results and automatic tracking of ROI (increased sales matches by ~15-30%...). It became possible to have a dynamic list or a campaign generation for email and social media, while there was also an easier integration with Volvo CE dealer systems and databases. The biggest strategy that aided to the customers' attraction and sales rates' increase was the use of the 'triangle offense of digital marketing', which facilitated the implementation of CRM and automation concepts into the operation of the company. The company simultaneously targeted three basic platforms of online and offline marketing, including email, social media, and mobile apps use. As for now, customers are offered solutions that are tailored to their business, whether it is a single product or a full solution. Products, services, and full solutions are developed in close collaboration with customers with the purpose of assisting them in increasing their productivity and profitability, thereby adding more value to their business. According to the data from the Volvo Group company official website, the total net sales of the company for the nine months of 2021 is around 270 thousand SEK (Swedish Krona), which is 12% higher than that of 2020 (Invitation to the Volvo Group Report on the Third Quarter 2021, 2021).

Volvo is attempting to expand the penetration and proportion of sales derived from services and soft products by providing finance, insurance, various types of service contracts, spare parts, superstructures, and attachments. The company has already taken several initiatives toward digital transformation. It is developing the "embedded devices" field with connected cars and gaining proximity with end-customers through social media web portals and mobile apps.

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Summing up all the information received from the analysis of various types of B2B organizations, several common characteristics of the companies adopting CRM in B2B sector could be identified. The most obvious feature that companies share is the better understanding of customers, the application of which usually results in improved marketing strategies. With the help CRM in the organizational structure, companies have an integration of databases and the time spent by sales employees on clients is being significantly reduced. Lastly, it was observed that these companies have less miscommunication between front and back office, which is important for any company's successful operation.

4 CRM adoption model

Based on prior research of the importance of CRM, reasons, and common characteristics of the use of CRM in B2B companies, it was essential to have an analogy of the adaptation model to draw the similarities and develop own unique CRM adoption model. Therefore, the basics of 'technology acceptance model' were used as the prototype of the future CRM adoption model. The forementioned model is used 'to measure the adoption of new technology based on customer attitudes' (Allen, 2020). This model also mentions that the success of a new piece of technology could be measured by perceived usefulness and perceived ease of use. The application of this model is necessary when new equipment is being released and the evaluation of its aptness by the company's staff is in order.

In order to compile a model to represent in accordance with the technology adoption model introduced earlier, a dedicated literature revision has been carried out. Despite the area of B2B CRM being scarcely researched, Richard et al. (2007) had formulated CRM system's relational model. Abovementioned authors focused on researching relationship strength after the implementation, in contrast with that of current paper, where the main purpose is understanding the perceptional factors to introduce the CRM into a B2B company.

One of the steppingstones to form a business-to-business CRM model is establishing external variables influencing the enterprise in scope. Throughout the investigation of case studies most of the companies had been motivated to introduce CRM because of increasing competition on the market. Specifically, the market of B2B saw an amplified popularity of substitute of products. This in turn set a higher bar for demands by business customers in various aspects, making it crucial to deliver better service at a greater speed. In order to achieve such results companies simply obligated enterprises to reduce time wasted by employees and stakeholders.

Consequently, these external variables are stimuli for companies analyze the potentially perceived usefulness, as well as the ease of use of the CRM software or system. In the anticipation that CRM is implemented, B2B organization can assume

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that the data will be easier to handle in one singular database and it can then be accessed uniformly from any device or platform. Due to the expectation of using software, companies may deem to think that CRM is useful because of enhanced flow of communication between teams (both customer-facing and internal). Furthermore, it can also be deduced that customers can receive better feedback because of better customer management and generating deeper insights. These, as a whole, can create an affirmative attitude towards the use of CRM, with a disregard to its limitations or drawbacks seen in the case Cisco's CRM implementation.

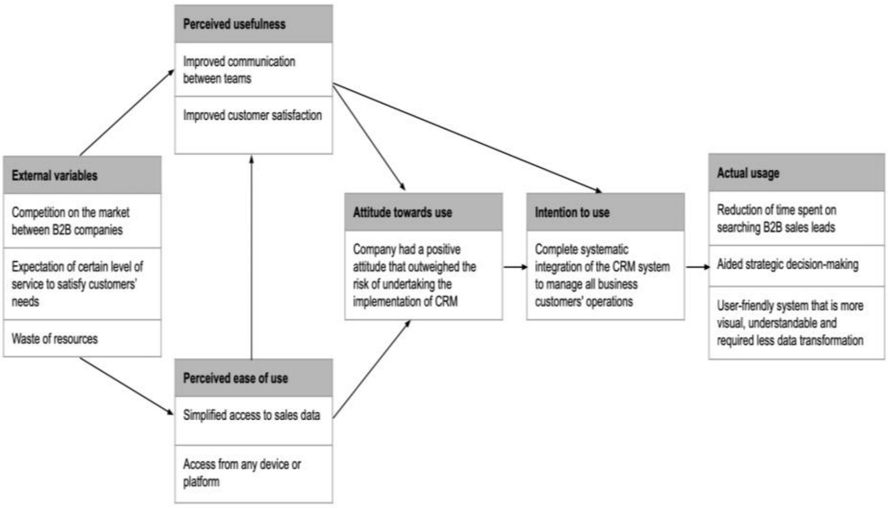

Figure 7.
CRM B2B adoption model formulated by research authors

When considering the implementation of significant changes in an operation of a company, risks are frequently more scrupulously evaluated than benefits. Flowing from the 'perceived usefulness', the attitude towards use is a crucial building block in the CRM B2B adoption model, as it the feedback to the actual result of the positive changes enacted by the implementation of CRM. The attitude towards use can also be interpreted as the level of openness of the company to integrate digitalization in operations. It is usually an analysis that goes beyond the traditional SWOT framework and involves modelling future returns to accurately predict potential risks, shortcomings and thereby identify the disadvantages of new software implementation. This augmented analysis highly depends on variables that concern the usage intention of the CRM software. Whether it is to boost sales, integrate databases, predict customer sentiment, or optimize processes, implementing CRM software usually means completely transforming the company's operations. It is important to clarify the intentions beforehand to accurately choose both the software, the field of use and the expected outcomes and benefits the implementation of the system may bring. Finally, the model considers feedback from actual usage: whether the software has accomplished to aid the employees in reducing time spent on searching B2B leads, whether it is user friendly, whether the data visualization is appropriate and usable.

Conclusion

The B2B model has seen a significant oversight in the customer relationship management research. Hence, this research drew attention to its immense importance by analyzing different reasoning to implement and use CRM as an integral tool for achieving competitive advantage on the market. The CRM enables an advanced customer data management, improves the effectiveness of the sales cycle, provides profound analysis of the work completed and, therefore, resulting in positive bottom line in the companies' books.

The research resulted in the synthesis of the relevant case studies and literature of companies in the varied sectors of economy. This led to the formulation of the basic common characteristics of companies adopting CRM in the B2B organizational model. These characteristics in correlation with the application of basic technology adoption model (TAM) resulted in a development of the custom CRM B2B adoption model. By following the building blocks of the model, the companies could assess the necessity of using CRM. Future research could focus on testing the model on unique business cases to evaluate its applicability.

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The importance of digital and face-to-face human contact networks for knowledge diffusion in technical higher education

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Abstract: The study focuses on the importance of human social networks. We narrowed the focus to technical higher education and compared the effectiveness of social human contact networks based on digital and face-to-face contact. The human social network is illustrated using graph theory to illustrate the concept of "six degrees of separation". We investigate whether the work of university lecturers was made easier or more difficult by the immediate spread of digital education following the outbreak of the coronavirus epidemic. An exploratory inductive method was used for the study, which allowed us to gain a deeper insight into the views of practitioners in technical education and to explore their feelings about the research topic.

Keywords: online education, Covid-19, higher technical education, human contact networks, graph theory, six-step distance, graph theory

1 Introduction

With the onset of the coronavirus epidemic, the widespread uptake of digital education at national level happened virtually overnight. All age groups have been affected by this rapid and important change. Our research has focused primarily on technical higher education, and we will now highlight the specificities of this field. The emergency situation created by the pandemic has posed major challenges for all those involved in education. Educators had to take immediate action. They had to master the use of online platforms for digital education to a level that would enable them to help students when necessary. Most of the trainers already had this knowledge, having used e-learning systems in their teaching activities, but teaching in the online space required a completely different teaching methodology. In the case of classes with a larger number of students, the technical difficulties were cumulative, since in most cases the platforms for online meetings were not prepared for such a heavy workload. At the same time, human contact networks have also changed. Face-to-face meetings have been replaced by online-only contact. Relationships have become more personalised, and more informal conversations have become even less important in digital education. Human interactions have been reduced and minimised. Instructors have uploaded course material into virtual space, so the importance of taking notes during the lesson has also been relegated to the background. Instructors were able to check digital presence after the fact, making the use of the catalogue obsolete. The student could not afterwards claim why he had not signed the catalogue while attending the class. This is both a relief and the elimination of a source of contention. At the same time, the instructor had little control, in the case of a lecture with a large number of students, over whether the student, having joined the class, was actually a participant or whether he or she had just signed in. This problem was better addressed in the smaller practical classes. The central question of the research is whether university lecturers in technical higher education consider digital teaching to be more effective in enriching students' knowledge or whether it is based on face-to-face presence. Another research question is whether it is easier for both students and lecturers to flow relevant information when teaching online.

In summary, the hypotheses of the research according to the opinion of the interviewed subjects are:

H1: Digital education is more effective for students' knowledge acquisition than education based on face-to-face contact only.

H2: When teaching exclusively online, it is easier for both students and teachers to obtain relevant information.

To confirm or refute the research hypotheses, a qualitative methodology was applied using a semi-structured interview design. The main themes of the guide were: experiences, feelings and memories of digital education, advantages and disadvantages of digital education. Exploring experiences, feelings and memories of digital education, advantages and disadvantages of digital education. This gave the interviewees the opportunity to express their experiences freely and to share their opinions and thoughts. Given the qualitative nature of the research, the limitations of the research cannot be extended to any population, but could serve as a basis for future quantitative research. The interviews were conducted with the help of 6 practitioners in higher technical education. The sampling was done in an

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arbitrary way by interviewing familiar lecturers and our results are not representative. The interviewees were very helpful and cooperative. Interviews were conducted online and were recorded with the unanimous consent of the collaborators. A transcript of the interviews was then prepared and the responses were processed using a traditional content analysis method following the guide's guidelines. Due to the exploratory nature of the interviews, they can be used as a basis for further research and statistical analysis. In terms of gender, there were 3 male and 3 female respondents. The research underlying the analysis was self-administered in 2021.

2 Human networks

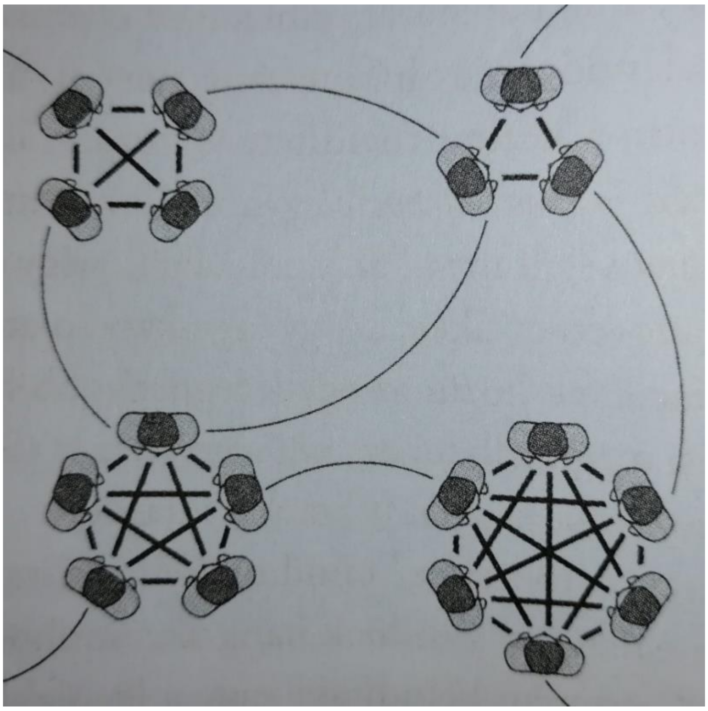
The role of human contact networks is of paramount importance for the flow and sharing of information. Their function is increasingly being taken over by information networks. In addition to being fast and wide-ranging, the dissemination of information in the online space has another advantage: the transmission of undistorted information. (Lövey, Nadkarni 2003). The vast majority of communication in the online space takes place in writing, with the exception of the use of platforms specifically designed for live speech. However, there is also a way to record the conversation on these platforms. In this sense, the undistorted flow of information can be ensured more easily than in face-to-face forms of encounter. As already mentioned in the introduction, attendance at meetings can be tracked at any time without any special setting. Material of any kind (whether images, documents or spreadsheets) shared online can be retrieved and accessed at any time afterwards. These advantages are also useful in many cases in the field of education. Students cannot claim to have attended a class if their name does not appear on the list of course participants. From the instructor's point of view, a student cannot claim that he or she did not receive the materials required for the course, as it is clearly provable whether the data in question was available to the student, and the elearning interface also allows instructors to track which students have even opened the course material they have published. At the same time, in questionable cases, the protection is also available to the students. Instructors cannot claim knowledge for which they have not provided material, nor can they inadvertently ban a student for missing class if they have attended. Online networks make it easy to track the flow of information. Access to relevant information in the online space is usually achieved with less effort than without the use of online interfaces.

Human networks of connections (whether digital or based on personal presence) and knowledge creation are closely linked and their interaction is not accidental. Looking at the role of networks, their interaction with information flows is evidence. According to Fukuyama (2000), networks can be understood as an alternative channel for information flows. Already in the 1900s, Karinthy described a theory in his narrative "The Chain Eyes", according to which all the people on earth are connected through five acquaintances. A similar theory is described by Albert-László Barabási in his book Behálózva (2013). This is the theory of the six steps, which has now become a concept known as "six degrees of separation". "Even gigantic networks of acquaintances shrink into very small worlds, since we all have a lot of acquaintances" (Barabási, 2013. p. 44). In his research, Barabási describes the network of acquaintances between people as a graph. The points of the graphs are the people themselves, and the connections between people and people are the edges of the graphs. This principle, or graph theory, can be used to represent not only a society, but also the internet itself (the World Wide Web) or even a cell (Bíró 2017). According to the graph theory model, one edge per point is needed to unfold an entire society. A single connection between two people results in a dense network within which all points are accessible. The threshold is only one (Ishii&Kawahata, 2020). In general, a single person has many more social connections than just one. In other words, our society far exceeds the single threshold set by graph theory. Sociologists estimate that a person usually has an acquaintance network of between two hundred and five thousand people (Kacziba, 2021). The more edges we add to a graph, the harder it is to find an isolated point in it.

According to the Poisson distribution, there is a prominent vertex value and most of the points have the same number of edges connected to them as the average vertex. Significant deviation from the mean is rare.

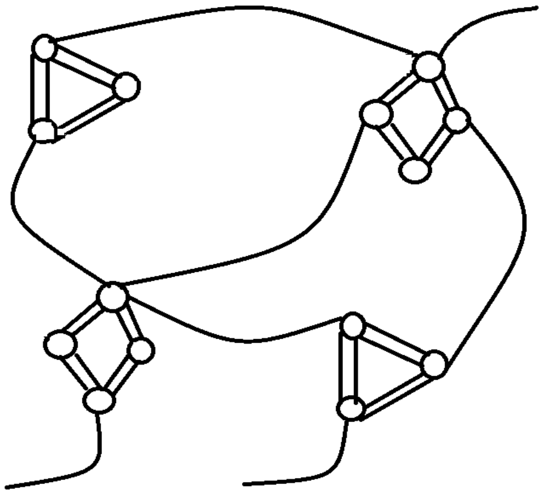
According to the theory of Poisson distribution, social relationships are characterized by a uniformly structured network with the highest number of individuals with average connectedness capital, i.e. all individuals in a human network of relationships have an average number of connectedness elements (edges in terms of graph theory) (Boissevain & Mitchell, 2018). The number of individuals with very different relationship counts (i.e., overly social and completely antisocial) is distinctly rare.

Mark Granovetter's (1973) research "The Power of Weak Relationships" is one of the most influential sociological studies of our time. According to Granovetter's research, all human society can be divided into small groups that are relationship-rich. Members of the narrower groups are bound together by stronger emotional ties. These individuals also tend to have a circle of friends made up of the same people. The closer this relationship between two people, the more common intersections there are in their social network. These social circles with a smaller number of elements, more closely related to each other, are connected by looser ties with "weak ties" to other (more closely related) social circles. That is, more closely connected social circles are connected to other social circles with looser ties (Hossain, 2019).



1. chart:
Source: Barabási (2013. 50.p)

Graphically, points in smaller social circles are connected by two edges. Some members of smaller groups are connected to other circles by a looser link, illustrated by an edge.



2. chart:
Source: Own editing based on Barabási (2013)

According to Granovetter (1973), these weak social ties play a major role in our ability to communicate with the wider external world. He gives a concrete example of this. When a person is looking for a job, his immediate close contacts can be of little help because they move in the same social circles as the job-seeker. However, these weak ties can be the way to the outside world, because they are the ones who go to different socio-social places from the jobseeker and get their information from different places, and thus can be more helpful than people from the immediate circle of friends (Molnár, 2020).

Csermely (2005) has similar findings, reporting in his research that weak links between knowledge creation and networks are the link between knowledge creation and networks.

Cross and Parker (2004) have also investigated the importance of connections and networking in the world of work. In their research they found that it is not enough to have the right knowledge and good skills for a worker to be highly successful. They also place great emphasis on relational capital, on human network connections. The rapid and widespread diffusion of acquired knowledge among members of an organisation is a prerequisite (Szántó-Tóth 1993).

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3 Methodology

To answer the central questions of the research, we conducted an expert interview with renowned academics with many years of experience in technical higher education.

According to the interviewees, the hypotheses of the research are:

H1: Digital education is more effective for students' knowledge acquisition than education based on face-to-face contact only.

H2: When teaching exclusively online, it is easier for both students and teachers to obtain relevant information.

In order to confirm or refute the research hypotheses, a qualitative methodology was used, using a semi-structured interview schedule with both open and closed questions, giving the interviewees the opportunity to freely express their experiences and share their opinions and thoughts. The main themes of the guide were: experiences, feelings, memories, advantages and disadvantages of digital education. Exploring experiences, feelings and memories of digital education, advantages and disadvantages of digital education. Sampling was done arbitrarily by interviewing familiar educators, our results are not representative. Given the qualitative nature of the research, the limitations of the study cannot be extended to any population, but could serve as a basis for a future quantitative study. The interviews were conducted online on Zoom and Teams digital platforms. The interviewees were very helpful and cooperative, and a recording of the interviews was made following unanimous consent of the participants. The transcripts were then prepared based on the recordings, followed by the processing of the responses using a traditional content analysis method. The results are presented according to the themes of the guide. Due to the exploratory nature of the interviews, they can be used as a basis for further research and statistical analysis. In terms of gender, there were 3 male and 3 female respondents. The research underlying the analysis was self-administered in 2021.

4 Results

The analysis of the interviewees' answers led to the following results: Digital education has several advantages over face-to-face education alone.

"I was very happy when we switched to digital education in our country. We already knew from the English news that there was a big problem and that the tightening was not unexpected. It's easy to get sick, so I was worried when we had to teach in person, even if we were wearing masks," said one interviewee.

Among these benefits, interviewees cited greater effectiveness in protecting their health, greater comfort and safety, increased energy efficiency due to the absence of travel and a much more efficient way of managing time.

"I have to travel from the suburbs to the capital and spend several hours a day travelling. It's a great relief to be able to use this time for more useful activities", says another trainer.

In their experience, student information is more accurate and it is easier to monitor student activity thanks to digital platforms. Students cannot escape responsibility afterwards and have to take responsibility if they are withdrawn from a course or cannot complete a course in a given semester.

"During digital education, even the more timid students dare to speak up during group assignments. Once I learned about the Teams feature to create group rooms for students, I divided the participants into smaller groups and they were able to discuss a number of professional issues with each other in class. This is not possible with face-to-face teaching, as the room is more overheard with the conversation between the groups and the more shy ones are not as active as they could be. I think it's a useful thing", according to one interviewee.

Digital tracing eliminates many sources of contention. Students cannot claim that there was no course material or that they did not receive the catalogue. That is why lecturers feel more secure in this respect. The trainers also shared that the transition to digital education initially caused serious difficulties, but that in the course of subsequent use, the platforms used in digital education have been further improved by the developers and are now no longer a problem to use. The ability for educators to take advantage of the benefits of digitalisation has been a significant facilitator in the transfer of knowledge. They were able to use online programmes that made their work much easier, they could use different learning apps to make the lessons more colourful. Thanks to the platforms used for digital learning, teachers were able to set up group rooms where students could work together in small groups. This allowed groups to work separately from each other without interfering with each other's work. This also allowed more shy students to get involved in class work. The group class activities made for very interesting lessons. The consensus of the interviewees was that teaching exclusively online would not be an ideal solution.

"Personally, I missed seeing the students, seeing their faces, their eyes. It's important feedback for the instructor to see if everyone understands the subject. I see them taking notes, if they get stuck while taking notes I repeat it again. That way I can't see who is where they are, what they understand or don't understand, where they are in the note-taking process, whether they need further explanation". Teacher's opinion during the expert interview.

People are social beings and need the perceptions and experiences they get from personal encounters. Education that requires personal presence has many essential elements in building human networks of relationships. Relationships based on personal contact are more trusting and friendships and group cohesion are more easily formed. The digital network is better suited to maintaining and nurturing established relationships than to building social relationships (possibly friendships) that have not yet been formed. However, digital education has a number of advantages, which have already been outlined above. Interviewees agreed that it would be beneficial to develop a teaching method where trainers can combine the benefits of digital and face-to-face teaching. There are several possible ways to achieve this. This would depend largely on the individual preferences of the instructor, the subject taught, the technical constraints and the capabilities of the students.

"Digital education certainly has its advantages. It would be good to keep them, but there is also a need for face-to-face contact. Somehow it would be useful to combine the two forms of education and develop some kind of hybrid teaching method." An expert interview during an instructor's opinion.

Two hypotheses put forward during the research:

H1: Digital education is more effective in terms of students' knowledge acquisition than education based solely on face-to-face contact.

H2: When teaching exclusively online, it is easier for both students and instructors to obtain relevant information.

Analysing the interviewees' responses, both hypotheses of the research are considered to be accepted and supported. Given the qualitative nature of the research, the limitations of the research cannot be extended to any population, but could serve as a basis for future quantitative research.

5 Conclusion

The study focuses on the importance of human social networks. The topic is narrowed down to technical higher education and the effectiveness of social human contact networks based on digital and face-to-face contact is compared, with a focus on technical higher education. Human contact networks permeate all our lives. Whether they are digital or face-to-face. People are fundamentally social beings who need each other's company. It is up to the individual to decide how much of a social network they need. It is natural that we have more social and less social human counterparts. The role of human social networks is of paramount importance in the flow and sharing of information. Their function is increasingly being taken over by information networks. This is also true for human networks of contacts in higher education in engineering.

The hypotheses hypothesised in this research are:

H1: Digital education is more effective for students' knowledge acquisition than education based on face-to-face contact only.

H2: When teaching exclusively online, it is easier for both students and teachers to obtain relevant information.

In order to confirm or refute the research hypotheses, a qualitative methodology was used, using a semi-structured interview schedule with both open and closed questions, giving the interviewees the opportunity to freely express their experiences and share their opinions and thoughts. The main themes of the guide were: experiences, feelings, memories, advantages and disadvantages of digital education. Exploring experiences, feelings and memories of digital education, advantages and disadvantages of digital education. The interviews were conducted with the help of professionals experienced in higher technical education. The interviewees were very helpful and cooperative. The interviews were conducted online using Zoom and Teams digital platforms. Sampling was done in an arbitrary way by interviewing familiar academics and our results are not representative. Due to the exploratory nature of the interviews, they can be used as a basis for further research and statistical analysis. The qualitative nature of the research means that its limitations cannot be extended to any population, but it can serve as a basis for future quantitative research. In terms of gender, there were 3 male and 3 female respondents. The research underlying the analysis was self-administered in 2021. By analysing the interviewees' responses, both hypotheses of the research are considered to be accepted and supported. In the future, we would like to further extend our research with quantitative methodology and explore further findings on this topic.

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In search of the transaction costs in the bioeconomy

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Abstract: The ongoing changes in the natural environment caused by human activity require the societies of the 21st century to focus more on ways of protecting nature, as well as on the efficient use of available natural resources. One of the systemic solutions is the implementation of the bioeconomy concept. In the bioeconomy area, the entrepreneurial perspective plays a key role in ensuring that social and economic expectations are met along with protecting nature. This perspective can be seen in accordance with the New Institutional Economics theory, which stresses out that institutions create the essential framework for the activities in the economic system, especially in terms of costs of the transactions occurring therein. The main objective of this paper is to identify transaction costs in the bioeconomy as well as to describe the tools for their analysing. Based on the literature review focusing on transaction cost theory and empirical studies it was found that there is no one fits all approach. The transaction costs in bioeconomy can be measured directly and indirectly. The lack of a comprehensive approach to transaction costs in bioeconomy translates also into many possible research methods applied to measure them. Thus, the paper identifies the research gap for further elaboration.

Key words: New Institutional Economics; transaction costs; bioeconomy; sustainability

1 Introduction

Societies striving for economic development for many centuries didn't pay attention to the impoverishment of surrounding ecosystems. By using natural resources in many places, it has changed the surrounding landscape irreversibly. In the late 20th century and especially in the 21st century, the perception of the impact of human activities on the surrounding environment has changed. The evolution that has taken place in this area has made the transformation of economies and individual businesses towards the use of renewable resources an extremely important area. Anthropogenic changes in the environment have resulted in the paradigm of sustainable development, which is reflected in European and national legislation. Sustainable development, defined as development that meets the needs of the present without compromising the ability of future generations to meet their own needs (World Commission on Environment and Development, 1987), is consistent with the concept of bioeconomy.

The bioeconomy uses renewable biological resources from land, sea and waste to produce food, materials and energy (European Commission, 2018). The defined scope of the bioeconomy results in a wide range of enterprises within it. They operate in a variety of sectors with industry-specific legal environments. Simultaneously, social and economic expectations of creating value for consumers in the form of new or improved products and services that are also environmentally friendly influence how individual bioeconomy enterprises operate. Taking into account both legal, social and economic aspects, the institutional environment characteristic for the bioeconomy area is clarified.

Every area of the economy is shaped by a certain institutional environment that affects the way businesses operate. In addition to the framework imposed by law, the approach to the conduct of transactions between market participants is influenced by the specifics of the market. Researchers applying New Institutional Economics (NIE) theories use the institutional environment of companies and transaction cost theory to explain the functioning of the economic processes. Diversity within the bioeconomy, both in terms of the exact area of business and the size of the organization affects the nature of the transactions that take place and, consequently, the level of transaction costs. Transaction costs play an important role in the bioeconomy enterprises too.

This paper will conduct a literature review of both transaction cost theory and empirical research on transaction cost measurement dedicated to the broader bioeconomy sector. On this basis, the impact of transaction costs on the functioning of business entities in the bioeconomy sector will be illustrated. Through this, the author will attempt to identify the research gap in transaction costs analysis in the bioeconomy.

2 Methods

The main objective of the article is to present the importance of transaction costs in the context of the bioeconomy area and to indicate possible research methods that could be used. For this purpose, a literature review was applied to both the bioeconomy field and transaction cost theory. Methods for quantifying transaction costs in bioeconomy companies were also identified based on the desk research of empirical studies. The sources of the literature were scientific databases: Web of Knowledge, Scopus and Erih Plus.

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3 Definition of a bioeconomy

More companies are operating in the bioeconomy sector causing an increase in the importance of this area to the economy (Cingiz et al., 2021). As Komor (2020) points out, the bioeconomy is a concept of resource-efficient development based on the management of renewable biological resources, whose challenge according to Adamowicz (2017) is also to integrate with the paradigm of sustainable development. The concept of bioeconomics also provides a framework for the different sectors and activities of the business on which the process of creating added value for the economic system of a country is based. The primary sectors forming the core of the bioeconomy include agriculture, forestry, and fisheries, which are the main sources of biomass, which is used to produce biofuels and bioenergy, as well as feed and bioproducts (Beluhova-Uzunova et al., 2019). Also linked to the industries that form the core of an economic system based on the use of renewable resources are the industrial processing sectors, which are responsible for the production of food, paper and pulp. The partial bioeconomy also includes elements of the chemical, pharmaceutical, and textile industries (Wąs et al., 2019). In the intermediate sphere of the bioeconomy, there are supporting sectors that serve a similar function to other economic sectors. Companies operating in this zone provide the necessary technology, machinery, products and services. Figure 1 shows the spheres of the bioeconomy.

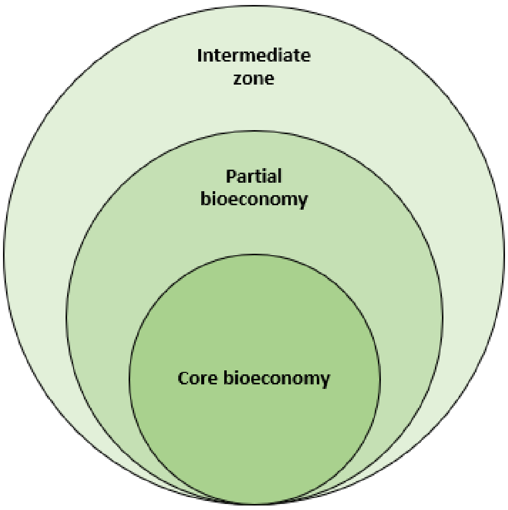

Figure 1 Bioeconomy spheres

Growing public awareness of climate change outlines a long-term view of bioeconomy development. Wesseler (2015) indicates that the development of the bioeconomy will continue due to increasing globalization and ongoing progress in life sciences and information technology, as well as increasing volumes of inter-and

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intra-industry trade. At the same time, Maciejczak (2018) argues that the implementation of the idea of bioeconomy will solve the problems of modern economies such as the need to replace non-renewable resources with renewable ones or to counteract the overexploitation of the environment while ensuring an adequate quality of life for the growing population.

3.1 The importance of the bioeconomy for the European Union

As Pajewski (2014) underlines, the bioeconomy development strategy creates opportunities for global food security and smart product creation. It also supports agriculture, forestry, aquaculture and other ecosystem sectors to adapt to climate change. Czernyszewicz (2016) argues that implementing a bioeconomy strategy increases food chain efficiency. From the perspective of adapting societies and economies of the European Union to the ongoing climate change, the concept of bioeconomy is extremely important. The growth of this area of the economy is also evident in the value added generated, where the bioeconomy sectors generated €614 billion in 2017. Figure 2 shows the allocation by the source of value added from the bioeconomy area.

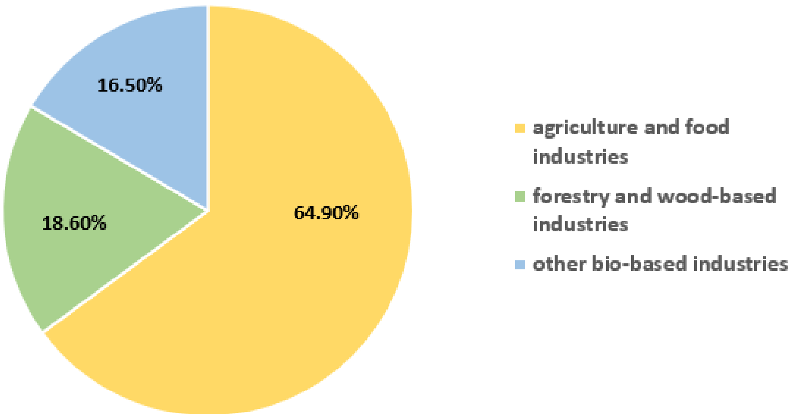

Figure 2 Value-added of the EU Bioeconomy

Source: https://knowledge4policy.ec.europa.eu/bioeconomy/monitoring_en Acces: 20.11.2021

The main source of added value for the European Union economy is the sector related to agriculture and food, which accounts for nearly 65% of the total. The bioeconomy area employed 17.5 million people in 2017. The greatest need for labor capital was in the area of agriculture, which employed nearly 78% of people. Figure 3 illustrates the structure of employment in the bioeconomy by main areas.

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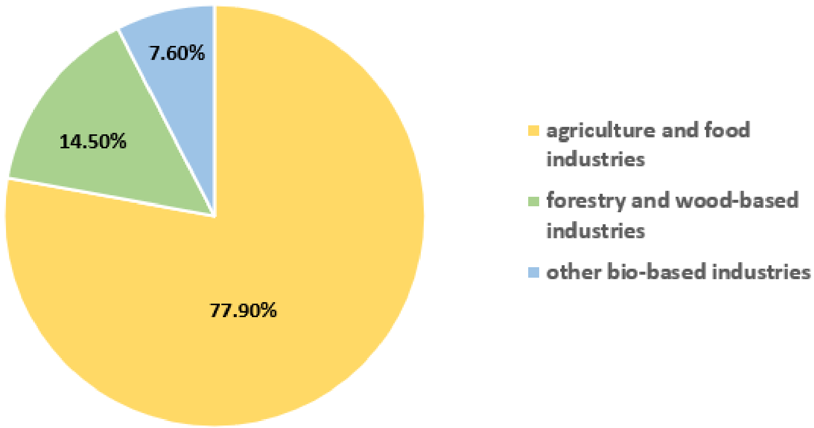

Figure 3 Employment in the EU Bioeconomy
Source: https://knowledge4policy.ec.europa.eu/bioeconomy/monitoring_en Acces: 20.11.2021

The bioeconomy plays an important role in the European Union, enabling economic development based on renewable resources. As Czyzewski and team (2021) point out, an important factor in the development of the bioeconomy is the well-developed qualifications and skills of the workforce. As the authors of the report *Future transitions for the Bioeconomy towards Sustainable Development and a Climate-Neutral Economy (2020)* note, the bioeconomy should be a priority area of the European Union economy. By using a resource-efficient model of economic development, it is possible to achieve sustainable development goals.

4 New Institutional Economics as a research perspective of the bioeconomy

In the bioeconomy area, the entrepreneurial perspective plays a key role in ensuring that social and economic expectations are met along with protecting nature. This perspective can be seen in accordance with the New Institutional Economics theory, which stresses out that institutions create the essential framework for the activities in the economic system, especially in terms of costs of the transactions occurring therein. The institutional environment of the enterprise provides a starting point for research for economists analyzing economic agents from the perspective of the New Institutional Economics (NIE) doctrine. NIE, in explaining economic phenomena, draws on the achievements of other disciplines. In its research method, it uses not only the principles of the traditional economic stream but also draws on the achievements of legal sciences, organizational theory, political science, sociology, psychology and anthropology (Hardt, 2005). NIE in its assumptions is based on the

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foundations of institutional economics created at the beginning of the 20th century by Thorstein Veblen. As Kowalska (2005) points out, the fundamental difference that separates the two approaches is the attitude towards theory: constructive in the case of NIEs, and critical among "old" institutionalists. In contrast to institutional economics, NIE creates its research agenda and actionable research methods.

NIE for learning about and explaining the economic processes taking place uses the concept of institutions, which are specific rules formed by society over centuries (Kuder, 2011). A complementary definition of institutions is that provided by Douglass North, who defined institutions as rules of human conduct that lead to the reduction of uncertainty and improve the degree of coordination of actions taken and economic relations established (Owczaruk, 2013). Within institutions, the subject literature distinguishes formal institutions, which are the rules of the game, top-down imposed by law in the form of constitutions, laws and regulations. In addition, it distinguishes informal institutions that are related to the cultural heritage of a country and developed moral norms, customs, or mores (Aoki, 2001). As Owczaruk (2013) points out, existing institutions must be characterized by completeness, complementarity, and substitutability.

4.1 Definition of transaction costs

Inextricably linked to NIE is the transaction cost theory. The originator of the concept is considered to be 1991 Nobel Prize winner Ronald Harry Coase, who originally defined transaction costs as the costs of using the price mechanism and market costs (Coase, 1937). On the other hand, another prominent economist and the creator of the concept of New Institutional Economics, Oliver Williamson, defined transaction costs as the comparative costs of planning, adapting and supervising the performance of tasks in different governance structures (Williamson, 1998). Although the concept of transaction costs has been well established in economic sciences, in scientific discourse they still do not have one widely accepted definition. Table 1 summarizes different definitions of transaction costs.

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Table 1 Definitions of transaction costs

The scope of the definition	Author	Definition
Market mechanism	Coase (1937)	The costs of using the price mechanism
	Arrow (1969)	The cost of running the economic system
Property rights	Demsetz (1988)	The costs resulting from the transfer of property rights
Property rights	Allen (1991)	The cost appearing when property rights are transferred or they require protection
	Demsetz (1995)	The costs of coordinating resources through market arrangements
Operationalization of the transaction	Barzel (1977)	Involve all the required costs of coordinating and securing a contract
	North & Wallis (1986)	All costs associated with making exchanges, the costs of performing the transaction function
	Wang (2003)	The difference between the prices paid by the buyer and received by the seller

Source: Own construction according to the above cited references

As Gorynia and Mroczek (2013) point out, differences in the definition of transaction costs result from the differences in contracts related to the specifics of the given domestic and foreign sectors, and which entail different costs. Wieliczko (2010) argues that the transaction cost theory is an extremely important element of modern economic theory, playing a significant role in the development of this science. Danilowska (2007) notes that for NIE, transaction costs are the lens through which it explores key economic issues.

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4.2 Factors influencing transaction costs and their role in the enterprise

Transactions are an unavoidable element of the functioning of any enterprise, and their specificity influences the resulting transaction costs. The literature suggests that each transaction can be described in terms of several dimensions or characteristics, including transaction frequency, the uncertainty of the transaction parties, opportunism, and asset specificity (Williamson 1998, Plichta 2009). As highlighted by researchers, the most important factor differentiating transactions is asset specificity (Slyk 2003, Mroczek 2014). Asset specificity is defined as the involvement of funds that are unique to a particular transaction. There are four types of asset specificity: location specificity, physical specificity, human asset specificity, and committed asset specificity (Szwedziak-Bork 2016). Another important dimension through which transactions are considered is opportunism, resulting from the tendency of transaction participants to put their own goals ahead of the goals of the transaction (Walczyk 2012). Each dimension affects the level of transaction costs that arise, as well as the possible methods of quantifying them.

The literature analysis shows that the level of transaction costs depends on three attributes: asset specificity, frequency of transactions and uncertainty of transaction participants (Marcinkowska 2017, Suska 2016, Hardt 2007). The level of transaction costs depends on many factors, including the information available, the complexity of the terms, and the ability to monitor the terms of each contract (Carlton 2020). Kraciuk (2015) points out that the costs incurred by a firm are due to the existing relationships between the firm's employees, as well as the firm's relationships with external stakeholders. Researchers also note that the transaction cost problem is an optimization problem where the level of each cost category is interdependent (Kállay et al. 2020, Puciato 2018), as higher ex-ante transaction costs are very likely to translate into lower ex-post transaction costs. Zygan (2014), in the context of the level of transaction costs in a company, emphasizes the importance of mutual trust both within internal relationships within the organization and relationships with external stakeholders. By increasing mutual trust, uncertainty is reduced, which reduces the level of transaction costs in the enterprise. Table 2 summarizes the factors that affect the level of transaction costs in the business.

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Table 2 Factors affecting the level of transaction costs in an enterprise

Factors		**Level of transaction costs**
Asset specificity	high	higher ↑
	low	lower ↓
Transaction frequency	high	lower ↓
	low	higher ↑
Uncertainty of transaction participants	high	higher ↑
	low	lower ↓
Opportunism of transaction participants	high	higher ↑
	low	lower ↓

Sources:

Williamson, O. (1998): Instytucje ekonomiczne kapitalizmu. Warszawa: Wydawnictwo Naukowe PWN.

Plicha, J. (2019): Pomiar kosztów transakcyjnych – różne podejścia i perspektywa badawcza. Ekonomista, 3.

Walczyk A. (2012): Redukcja kosztów transakcyjnych przedsiębiorstw jako jedna z korzyści funkcjonowania w klastrach, Ekonomiczne Problemy Usług, 94, pp. 327-342.

Marcinkowska, E. (2017): Wpływ teorii kosztów transakcyjnych i teorii zasobowej na proces decyzyjny outsourcingu. Zeszyty Naukowe Uniwersytetu Ekonomicznego w Katowicach, 341.

Whereas Staniek (2010) expands the range of factors affecting the level of transaction costs. Indicates such determinants as the number of participants in a given transaction, the structure and nature of a given market, the type of contract, and the type and form of business ownership. The level of transaction costs in an enterprise affects the nature of decisions made by the organization, as well as the profitability of the business entity. Nikolaeva and Pletnev (2016) argue that firms that are unable to reduce their transaction costs risk becoming unprofitable. McCann et al (2005) indicate that transaction cost theory provides a way to understand the decisions that are made by economic actors in the bioeconomy. Milczarek-Andrzejewska (2012) distinguished the size of transaction costs of an enterprise as one of the most significant elements affecting the bargaining power of entities in the food chain, which is an element of the agricultural sector.

Monitoring the scale of a company's costs is critical to organizational effectiveness. Businesses operating in the bioeconomy incur certain transaction costs, and as Daniłowska (2007) points out, the desire to save transaction costs is the primary reason for the diversity of existing structures for managing broadly defined transactions. Walczyk (2012) notes that transaction costs are an important component of the overall cost of operating businesses in the market. From the perspective of company managers, knowledge of where certain costs arise is of fundamental importance. It allows not only the elimination or reorganization of cost-intensive processes but also translates into more efficient use of available resources. At the same time, as emphasized by Gorynia and Mroczek (2013), the ideas contained in the transaction cost theory have a key application in decisions related to the development of the company.

4.3 Typology of transaction costs

To accurately examine transaction costs, it is required to address the unique characteristics of the transaction and to categorize them on a per variables basis. The literature distinguishes several possibilities for the breakdown of transaction costs. Roszkowska (2019) points to such criteria for classifying transaction costs as the ability to quantify costs, the rationality of incurring costs, the phases of the transaction in which costs arise, and where costs arise. The first possible criterion for classifying transaction costs is that they can be quantified. Kowalska (2005) distinguishes measurable costs connected with accounting documentation concerning e.g. legal expertise for a given contract and non-measurable transaction costs connected with the time spent by employees on searching for contractors. When considering transaction costs from the perspective of the rationality of incurring them, it is pointed out that there are necessary transaction costs, which are necessary to carry out the transaction, and undesirable costs, which occur when the organization's resources are wasted (Roszkowska 2019). One of the most commonly used criteria in transaction cost analysis is that of the stage of the contracting process. This approach includes costs arising before the conclusion of the contract, i.e. ex ante transaction costs, as well as ex post costs related to the performance of the contract (Gruszecki 2002). The literature also indicates that transaction costs can be divided by the place of their origin, where public transaction costs, market transaction costs and managerial transaction costs are distinguished (Kyzenko O., Kyzenko D. 2016, Chotkowski 2010, Poniatowicz 2017). Considering transaction costs by their place of origin is also linked to the classical division of costs into fixed and variable costs (Wander 2014). On the other hand, Lazareva (2018) proposed a different approach to classifying transaction costs, among which she distinguished: transaction costs of entering the system, transaction costs of leaving the system, and transaction costs of hierarchy. Synthesizing the above approaches, it should be noted that they are complementary. Table 3 illustrates selected classifications of transaction costs.

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Table 3 Selected classifications of transaction costs

Classification criteria	Types of transaction costs
Quantification capability	measurable
	unmeasurable
Rationality of incurring costs	essential
	undesirable
Contracting phase	ex ante
	ex post
Place where costs arise	market
	managerial
	public

Sources:
Roszkowska M. (2019): Modele koordynacji lokalnych usług publicznych w kontekście ekonomii kosztów transakcyjnych. Studia i Prace, 1(37), pp. 43-76.
Kowalska, K. (2005): Kontraktowanie i koszty transakcyjne w nowej ekonomii instytucjonalnej. Gospodarka Narodowa, 7–8(167–168), pp. 56–57.
Chotkowski J. (2010): Instytucje rynkowe i koszty transakcyjne – kluczowe pojęcia Nowej Ekonomii Instytucjonalnej, Roczniki Nauk Rolniczych, 97(2).
Gruszecki T. (2002): Współczesne teorie przedsiębiorstwa. Warszawa: Wydawnictwo Naukowe PWN.

4.4 Methods of measuring transaction costs

One of the main problems faced by transaction cost theory is its direct application in empirical research. As Collins and Fabozzi (1991) point out, researchers who want to measure the level of transaction costs in a company will have to deal with three distinct problems related to the specificity of a company's assets, defining a benchmark for measuring venture and opportunity costs, and isolating the factors that affect the level of transaction costs. Regarding the problems that scholars face when it comes to measuring transaction costs, Serigati and de Azevedo (2016) note aspects such as the lack of adequate data, the inability to observe many of the relevant characteristics of the transactions that take place, and the lack of a uniform definition of transaction costs.

Economists, despite the difficulty of empirically applying transaction cost theory, have attempted to estimate transaction costs in both macroeconomic terms of the level of transaction costs in the economy and microeconomic terms. In the context of measuring transaction costs in an enterprise, the two most commonly used approaches to measuring transaction costs are indicated (Chlebicka, Strzębicki 2009, Plicha 2019). In a direct approach, the measurement of transaction costs is based on the traditional analysis of a firm's costs, which are incurred in the various stages of a transaction. In contrast, the second approach - indirect - looks for relationships between transaction costs and the factors that influence their formation and amount. In such a view, the analysis should primarily focus on factors related to the characteristics of the transactions themselves. The lack of uniform treatment in the literature of the issue of measuring transaction costs translates into many possible research methods. Lu et al (2012) identified four possible methods for measuring transaction costs from the perspective of a business entity, among which they distinguished: the margin method, the typical reference quantity method, the investigation method, and the data statistics method. Table 4 shows the advantages and disadvantages of the indicated methods for measuring transaction costs.

Table 4 Advantages and disadvantages of transaction cost measurement methods

Method	Used in the research	Advantages	Disadvantages
margin method	Stavins (1995)	To assist the company in selecting the operating pattern that generates the most profit.	Doesn't include all transaction costs.
typical reference quantity method	Dyer & Chu (2003)	Useful for conducting comparative transaction research.	It is too difficult to analyze the total transaction costs.
investigation method	Bakare & Gold (2011)	A practical method to illustrate the effect of factors on transaction costs.	It is possible to exclude significant factors affecting cost levels.
data statistics method	Falconer & Saunders (2002)	A method that takes many factors into account.	Considerable labor and time resources are required to conduct the research.

Source: Own construction according to the above cited references

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4.5 Transaction costs in the bioeconomy – the review of empirical research

A review of the literature found that past research by economists has not addressed the issue of measuring transaction costs in bioeconomy companies. A study by Wen and Chatalova (2021) showed the impact of transaction costs and economies of scale on the area of agricultural biomass production in Germany by creating an econometric model. In the study cited above, the authors didn't consider all possible variables, such as biomass and land prices, environmental variability, and the aspect of competition within the sector, which could also have a significant impact on the results obtained. Results from Wen and Chatalova (2021) showed that a higher degree of asset specificity increases transaction costs while reducing the rate of farm downsizing. Altman and team's (2007) research work examined the relationship between transaction costs and economies of scale and the impact of these factors on bioenergy production in the United States. The study used survey data from 53 companies creating bioenergy. The authors of the publication point to the connection between the aspect of transaction costs incurred by business entities and the obtained economies of scale of production. Altman and team (2007) indicate that these aspects are key compromises in organizational decision making. Economists have also conducted research focusing on measuring transaction costs in the agricultural sector (Deng, Zhang 2020, Traversac et al. 2011, Drygas 2011, Wander et al. 2003, Key et al. 2000), as well as the impact of agrarian (Rørstad et al., 2007) and environmental policies (Pannell et al. 2013, Mettepenningen et al. 2009, Huusom, Strange 2008, Falconer, Saunders 2002) on the level of transaction costs of enterprises. Deng and Zhang (2020) used a diagnostic survey of employees and business owners to show the impact of transparency of the transaction process on the level of transaction costs. The lack of openness and honesty between counterparties has been proven to foster high transaction costs. Whereas Drygas (2011) in his study focused on the aspect of public transaction costs. Using data from publicly available reports on the activities of the Agency for Restructuring and Modernization of Agriculture (ARiMR), the author of the study estimated the size of the public transaction costs incurred. Drygas (2011) also pointed out the factors affecting the level of transaction costs, among which he distinguished, in particular, the complexity and vastness of the institutional system, as well as the excessive bureaucratization of procedures. Difficulties in communication between transaction participants also significantly affect the level of public transaction costs. At the core of the bioeconomy, in addition to the agriculture sector, there is also, the forestry and fisheries sector. Within these two sectors and related fields, there has also been research work focusing on the measurement of transaction costs and their impact on business performance (Womble, Hanemann 2020, Nantongo, Vatn 2019, Niquidet, O'Kelly 2010). Womble and Hanemann's (2020) study focused on determining the impact of regulatory changes in Colorado (USA) water market on transaction costs. Using a survey questionnaire, the researchers determined which of the possible

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modifications of the law have the most beneficial effect on lowering transaction costs. The cited studies were characterized by an indirect approach that specifically examined the impact of individual factors on transaction costs. The transaction cost analysis primarily used an investigative method based on the creation of an econometric model. Transaction cost measurement results obtained by the researchers in bioeconomy sectors are summarized in Appendix 1. As Man et al. (2017) point out, transaction costs, despite their difficulty in measurement, should be estimated and evaluated because they are important elements in the decision-making process. the authors of the cited publications indicate the need for deeper research in the field of transaction costs.

5 Conclusion

The reorientation of the current perception of the impact of human activity on the environment and the focus on the use of renewable resources creates strategic growth opportunities for companies, not only in the bioeconomy sector. Within the bioeconomy, the right rules of the market game are important, creating an important institutional background. In bioeconomy businesses, transaction costs affect not only their profitability and decision-making but also their competitiveness. The conducted literature review showed that there are many opportunities to study the level of transaction costs in bioeconomy enterprises. It should also be emphasized that in the case of research aimed at determining the level of transaction costs, special attention needs to be paid both to specific institutional conditions and the dimensions and attributes of individual transactions.

It is argued that to examine the level of transaction costs in bioeconomy companies, the following criteria should be used as a starting point: specification of the assets involved in the transactions, determination of the frequency of transactions, determination of the level of uncertainty in the company, determination of the significance of the opportunism factor in the participants of the transactions. Based on the underlying assumptions, attempt to develop a typology of transaction costs in the bioeconomy. Based on the presented methods of measuring transaction costs, as well as empirical studies conducted so far, the author suggests that an indirect approach focusing on the analysis of factors shaping the level of transaction costs should be used. Using the investigative method, the need for an econometric model is indicated to determine the impact of variables on a company's transaction costs. The amount of transaction costs determine the decisions made in the organization and translates into the way bioeconomy enterprises function. Knowing the factors and how they affect the different agents will enable the optimization of transaction processes and consequently reduce the level of transaction costs in bioeconomy enterprises.

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Appendix 1. Results of measuring transaction costs in bioeconomy sectors

Area	Author(s)	Methods	What aspect was studied	Results
Biomass production	Wen & Chatalova (2021)	Based on data from 2005 to 2016 from the European Statistical Office (Eurostat), the Federal Ministry of Food and Agriculture, and the German Land Market Report, the base parameters of the model were determined. Data environment analysis (DEA) was used.	Based on the example of Germany, the influence of economies of scale and transaction costs on the area of agricultural biomass production in Germany was investigated.	A higher degree of asset specificity is shown to increase transaction costs while reducing the rate of farm downsizing.
Bioenergy production	Altman & team (2007)	The study used survey data from 53 bioenergy creation companies.	The relationship between transaction costs and economies of scale was verified and their impact on bioenergy production in the United States.	It was pointed out that there is a link between transaction costs and the economies of scale of production obtained.

Area	Author(s)	Methods	What aspect was studied	Results
Rural cooperative land market	Deng & Zhang (2020)	A diagnostic survey was conducted where 350 responses were obtained from employees and managers. The Tobit model was used.	The effect of transparency of the transaction process on the level of transaction costs was studied.	The lack of openness and honesty between counterparties has been shown to foster high transaction costs.
Wine producers	Traversac & team (2011)	The study sample was a collection of Farm Census wine producers. A logistic regression model was used.	The link between wine producer size and direct wine sales was verified using transaction cost economics.	Transaction cost savings were found for large wine farms.
EU support for rural areas	Drygas (2011)	The data from the reports on the activities of the Agency for Restructuring and Modernisation of Agriculture (ARiMR) were used.	The amount of public transaction costs incurred by the Agency for the Restructuring and Modernization of Agriculture was quantified.	The level of public transaction costs incurred by the Agency for Restructuring and Modernisation of Agriculture was estimated. The factors affecting the level of public transaction costs were identified.

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Area	Author(s)	Methods	What aspect was studied	Results
Agrarian policy	Rørstad & team (2007)	Interviews were conducted with agricultural market participants for each agrarian policy measure.	The effect of agrarian policy in Norway in particular areas on the level of transaction costs was studied.	It has been shown that differences in transaction costs incurred by farmers are mainly due to differences in asset specificity and the nature of the agrarian policy measure in question.
Water market	Womble & Hanemann (2020)	A diagnostic survey was conducted among 100 legal and hydrological experts. A logistic regression model was used.	The impact of introduced legal changes in the water market in the state of Colorado (USA) on the amount of transaction costs was verified.	It was determined which of the possible modifications to the law is most beneficial in reducing transaction costs.
Forestry	Niquidet & O'Kelly (2010)	The study used survey data from 136 companies - sawmills located in Sweden and New Zealand. A fractional logit model (FLOGIT) was used.	The study examined whether transaction costs affect the decision of forestry firms in terms of contractor selection and contract length.	Firm constraints such as capital were found to negatively affect transaction costs. It was concluded that the choice of contractor and the length of the contract

Area	Author(s)	Methods	What aspect was studied	Results
				depends largely on the characteristics of the supplies, which vary by region as well as by type of processing plant.

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Singapore Unlimited: A Global Benchmark for Strategic Innovation, Resilience, and Overall Sustainability

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Abstract: Both current and future global challenges, such as growing economic instability, widening social inequality, access to food and potable water, proper education and healthcare, are provoked by climate change, environmental degradation, overpopulation, as well as irresponsible private greed and public impotence. This paper aims to display how the combination of a clear strategic vision, diplomatic excellence, environmental awareness, and resilience allows a small city-state, scarce in land and natural resources, to continue its sustainable success story, serving as not only a regional but also a global benchmark. The intentional and systematic building of a welfare state in the midst of a region characterized by historic conflicts and colonial exploitation is based on the unique synthesis model of Singapore, allowing long-lasting stability and prosperity. Strategic government planning, cooperation in various areas (digitalization, education, environmental protection, FinTech, research and development, smart cities) in the form of highly goal-oriented public-private partnerships or mission-based ecosystems serve as an ideal breeding ground for creating shared value, including sustainable economic development, social responsibility, and overall security. The applied innovation-driven approach renders possible the continuity of Singapore's exceptional advantage as a regional hub and benchmark.

Keywords: effective diplomacy; global benchmark; holistic education; overall sustainability; resilience; Singapore; strategic innovation

1 Introduction

A global state of emergency, defined by the lack of value-based leadership, the mainly profit-oriented corporate shortsightedness, the growing distrust in public and civic institutions, as well as the seemingly unbridgeable cultural gaps and civilizational differences, exacerbates the problem of acute tensions building (cycle of violence) and morbid discrepancies (extreme inequality, living conditions, social instability and insecurity, both explicit and implicit modern slavery, etc.). Hence, the ever-growing number of chinks in the shield amplifies the signs of the overall dysfunctionality of the current global order. The imminent threats posed by climate change, the inevitably required structural changes, the fragility of global value chains as experienced as a result of the coronavirus pandemic, the interdependence of each link, as well as the resulting volatility of economies deeply entangled in international trade and service providing undeniably call for the application of multidimensional and multitask management strategies.

Just like at the moment of its newly gained independence back in 1965, once again and out of pure necessity, Singapore is facing another major hurdle. Due to the high-end digital infrastructure, as well as the exceptionally open and business-friendly environment, registering a company (e.g. a limited liability company) in Singapore only takes a few hours. Opportunities in the Southeast Asian city-state are nearly limitless, activities giving added value are more than welcome and appreciated. Nevertheless, a cacophonic symphony of challenges puts the resilience of the hard-fought welfare state to the test. In order to successfully perform the necessary transition to a truly sustainable economy and society, a comprehensive effort in form of an overall national movement, including a wide range of measures and projects, creativity-boosting education for intellectual capital building and cutting-edge innovation, is needed for Singapore to maintain its exemplary position.

An overview of the elements of the regional commercial and financial hub's unique success story allows us to understand the dynamics behind the creation of a benchmark state of excellence from a very disadvantaged starting position. Also, the examination of its valuable set of assets clearly shows that it is in possession of the prerequisites to become sustainable. Furthermore, this research highlights both the steps already taken and the strategic plans laid out to repeat the 'Singapore miracle' on a more elevated level of development.

2 Methodology

This paper is part of an ongoing research project, started in 2019, that aims to determine the unprecedented and unmatched path of sovereign Singapore in the context of sustainable development. It synthesizes sector-specific facts in order to highlight interactions and prospects in the light of an ever-changing local and global environment.

With regard to the complexity of the topic and due to the fact that Singapore's strategy consists of mostly interdependent elements, this research was conducted with the integration of the holistic approach and deductive method. Hereby, both economic, environmental, infrastructural, historical, political, social, and technological aspects were taken into account. Because of the limited availability of scientific literature for this niche, the proven transparency of local authorities and relevant government agencies enabled the use of official publications (assessment reports, media releases, project presentations, speeches, surveys) and statistics as reliable sources. Evaluation of retrieved datasets showed consistency with indexes elaborated by various trusted intergovernmental international organizations and independent research institutes. Furthermore, the thematic analysis used quantitative data and qualitative findings, published in articles and expert opinions of recognized media outlets.

3 Results

3.1 Driving Factors of Sustainability

3.1.1 Foundation

Per definition and in economic terms, the concept of sustainability is about producing goods and providing services without exploiting, let alone depleting, irreplaceable natural, “financial, social resources”, as well as irreparably damaging the environment in order to maintain and improve a highly developed level, or “to achieve successful catching-up and social welfare” (MNB, 2021: 7) in the case of emerging countries. Irrefutable evidence and data confirm the impact of human activity as a catalyst for climate change (IPCC, 2021: 12). Therefore, Resolution 48/13, adopted by the United Nation’s Human Rights Council in October 2021, recognizing ”the right to a clean, healthy and sustainable environment as a human right that is important for the enjoyment of human rights” (UNHRC, 2021), is a crucial milestone. It underlines the urgency of any human activity to be in compliance with the altogether 17 Sustainable Development Goals, outlined in the 2030 Agenda (UN, 2015), adopted by the United Nations in 2015.

The interconnected combination of the following platforms serves as a foundation for global sustainability efforts to be even possible to succeed. The Sendai Framework for Disaster Risk Reduction (2015) highlighted climate change as a factor that exacerbates the “increasing frequency and intensity” of natural disasters (UNDRR, 2015: 10). The Paris Agreement (2016) set out to limit the global average temperature increase by a maximum of 2, but preferably 1.5°C above pre-industrial levels and to significantly reduce greenhouse gas emissions. The Glasgow Climate Pact (2021) reaffirms the previous limitation commitment, urges to speed up the carbon neutrality process, technology transfer, and climate/green financing, as well as accentuates the necessity to put an end to deforestation (UNFCCC, 2021).

Using Galileo Galilei’s analogy that ”mathematics is the alphabet with which God has written the universe,” it can be concluded that statistical data and projections on population growth and aging, human fertility and mortality, as well as net international migration are key elements in determining the trend of or, in other words, the present and ”future challenges to sustainable development” (UN DESA, 2019: 3). The constant growth of the total global population (an estimated 8.5 billion people in 2030 and 9.7 billion in 2050) (UN DESA, 2019: 5) is aggravating the global challenge.

A sustainable economy provides the resources to ensure sustainable living conditions for the population and the conditions for building a knowledge-based, resilient society. Also, international cooperation is essential to address global challenges effectively (Hean, 2017).

3.1.2 Modeling Sustainability

Amidst the global challenges of overpopulation, urbanization, climate change, resource scarcity, social inequality, business ethics, stakeholder responsibility, as well as transparency, sustainability models display corresponding objectives, priorities, and values. Those models revolve around four areas based on economic (corporate), environmental (ecological), social, and governance impacts, also taking into account diverse driving and influencing factors (finance, legislation, technology, etc.) to illustrate this densely woven web as precisely as possible.

A great initiative dates back to 2007, when an ecologically responsible Taiwanese textile producer implemented its very own Everest SustainAbility Model (ESM), ”based on the 7R Discipline (rethink, redesign, reduce, reuse, repair, recycle, recover),” that ”emphasizes balanced development among economy, society, and environment” (Everest Textile, 2021) and reflects everything that urgently needs to be done on a global level. The Doughnut Model of Sustainability, created by Kate Raworth in 2017, represents another interesting and useful tool. This complex, multilayer analysis not only takes economic, ecological, political, as well as social factors and their level of interaction into consideration but also allows to determine their respective shortages or excesses relative to the “safe and just space” (Raworth, 2017: 49) of optimal functioning in terms of sustainability. The ever-evolving environment and the complexity of this specific model justify a detailed analysis of Singapore that shall be presented in a separate paper.

Though the current research does not aim to analyze the (local) ramifications of the coronavirus pandemic, they are undoubtedly omnipresent. As a consequence, the global healthcare, as well as the resulting economic, psychological, social, and moral crisis are obvious obstacles in the advancement of sustainability efforts, mostly in terms of available funds for necessary financing. On the other hand, the multifaceted challenge posed by climate change, the demographic explosion, recurring pandemic waves, and urbanization, requiring rapid responses and instant solutions, inevitably provokes an acceleration in the digitalization process, cross-border and cross-sector collaboration, all accelerating the transition towards

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comprehensive and truly sustainable development. However, despite all the scientifically proven data, numerous professional suggestions, and expert warnings, the required global joint effort to tackle this very complex set of challenges is deeply undermined by unilateralist leanings or already implemented fragmented national responses, as well as the ongoing trade war between the world's two largest economies, the People's Republic of China and the United States of America. On top of that, there is an acceleration in the tendency of sharply "rising public and corporate debt" (IMF, 2018: xi) levels, predating the pandemic, that aggravates the unwillingness to both tangible and effective international cooperation and solidarity.

3.2 Correlation Between Innovation and Sustainability

The ancient Greek philosopher Plato described necessity as the "real creator" of invention or, to use a more contemporary term, innovation. Since the deeply interconnected biosphere is gradually deteriorating, the complex sustainability challenge mankind faces undeniably exhibits the urgency for joint action. ”We need a level of ambition similar to that of the Marshall plan—which created the OECD—and a vision akin to that of the New Deal, but now at the global level." (OECD, 2020: 3), according to OECD Secretary-General Angel Gurría.

There is nothing new about the fact that one's main rival is always within, both on an individual and a community level. Overcoming the physical, mental, and psychological obstacles takes bold visions, steadfast determination, endurance, and self-criticism to be able to perform optimal adjustment whenever necessary. Also, numerous examples show how to implement a strategic plan. Consequently, empirical observation clearly points at the prerequisites of a successful shift to a sustainable future. A change in the mindset of public officials, investors, and the general population mainly depends on fine-tuning regulatory instruments, as well as raising the level of awareness, responsibility, education, and proper incentives. In addition to that, building a comprehensive infrastructure with intelligent financing, featuring both hard and soft elements, enables "open and collaborative innovation" operating within a multi-stakeholder, cross-border framework (UNCTAD, 2017: 21–29).

Innovation-driven structures are largely defined by the number of intellectual property (IP) filings. East and Southeast Asia (especially the People's Republic of China, the Republic of Korea, and Singapore) are rapidly overtaking classic North American and European IP leaders both in numbers and in per capita proportion (WIPO IP Statistics Data Center, 2021). Furthermore, inclusive innovation generates inclusive development, which implies that adopting an integrated approach shall increase the effectiveness (UNCTAD, 2017: 8–9) and accelerate the transition to sustainability.

A new paradigm for cooperation on global challenges seems promising. The idea of the mission-based ecosystem (Figure 1), introduced at the World Economic Forum in 2021, is that successful solutions to the current complex challenges depend on a strong and shared mission that mobilizes the intellectual potential of participants and stimulates focusing, as well as on the promotion of self-sustaining, complementary operations (Romeo et al., 2021).

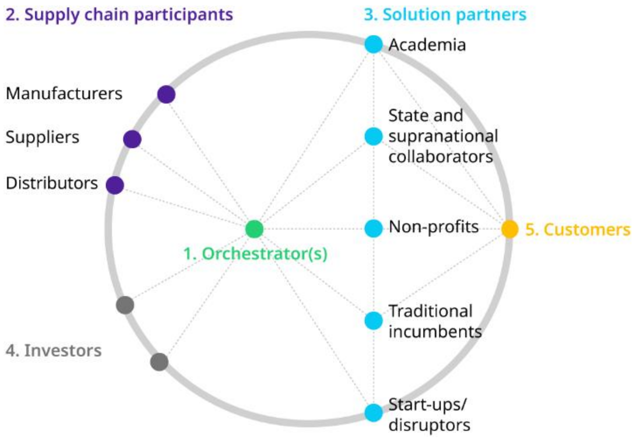

Figure 1
Illustrative Model of an Effective Mission-based Ecosystem
Source: Oliver Wyman Analysis Available: https://www.oliverwyman.com/our-expertise/insights/2021/feb/a-new-paradigm-for-collaboration-mission-based-ecosystems.html

The imperative hereby is to put such innovative methods to the test in order to gather valuable data in a relatively short period of time as pressure is intensifying by the hour. Since starting its journey as a sovereign state, Singapore has been being a living laboratory. It is the experience of working against all odds that allows an in-depth analysis of its ever-evolving and ambitious vision, by reason of this current research, primarily in terms of sustainability.

However, empirical scientific results reveal that innovation willingness (desirability) and capabilities (feasibility) are less of the barriers to innovation and sustainability—in particular in the bioeconomy—than the innovation opportunities (unsuitable institutional framework and policies) (Wilde – Hermans, 2021) that require urgent and customized adjustments. In addition, “eliminating the provision of finance for fossil fuel developments internationally goes hand-in-hand with increasing climate finance, and stopping fossil fuel subsidies” (Stockwell et al., 2021: 7), which is desperately needed for successful mitigation, disaster prevention, and catching-up of primarily low-income countries in the most affected regions.

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4 Discussion: Past, Present, and Future

4.1 Singapore's Strategic Vision and Endurance

4.1.1 From Poverty to Wealth: A Unique Success Story

The story of independent Singapore is—apart from the periodically appearing economic or healthcare crises sweeping over the region or most of the planet—one of constant development, filled with outstanding achievements. It often takes a charismatic leader with a clear vision to steer a country to a wealthier state, like in the case of Lee Kuan Yew (1923–2015) and Singapore's outstanding metamorphosis. This stands in harsh contrast with the German post-WWII approach that distances itself from visionaries, based on some deterring historical examples, as the famous quote by former German chancellor Helmut Schmidt, according to which ”Anyone who has visions should go to the doctor,” (Palmer, 2015) shows. Evidently, the newborn city-state did not have to tackle a shameful past. Following centuries of European colonization, at the time of the proclamation of its independence in 1965, Singapore found itself in dire straits.

Naturally, the city-state's unique geolocation at the crossing point of major maritime trade routes has been being its greatest asset, but wouldn't have been enough by far to rise to the elite club of industrialized welfare states. It took the right combination of a strategic vision, unclinching determination, bold policies, tough measures, and a joint effort. "Targeted crime reduction policies, effective policing and the combating of corruption (…) are the key elements of the Singaporean model of governance that helped bring down levels of violence and crime" (UNODC, 2019: 27), laying the foundation for the comprehensive social contract established that, to this day, is built upon the trusted partnership, the meritocratic system, and the rule of law. Defense capabilities had to be created in order to compensate for vulnerabilities and by mastering the art of balancing diplomacy, practiced ever since, with the goal of "winning the influence game" (Watkins et al., 2001).

Lee Kuan Yew's legendary and exemplary strategic vision, conceptualized based on extensive research, is a highly interconnected conglomerate of concepts. Creating an open economy with a business-friendly, transparent (i.e. practically corruption-free) environment, a strong state marked by good governance, as well as both effective and efficient bureaucracy attracted foreign investments to this culturally and ethnically diverse melting pot. Soon, ”TNCs and their global/regional networks entangled" (Magasházi, 2021: 220) Singapore, making it a regional commercial, distribution, and financial hub, having the busiest transshipment container and the world's second largest port. For a country that lacks farmland and natural resources, investment in human capital, as the most valuable natural resource, proved to be vital. Therefore, special emphasis has been being put on building a highly competitive education system and a most extensive social safety net. Singapore's first major transition from a mere manufacturing location to a dominantly value-added service-providing economy, devoted to research & development, ultimately led to the development of a thriving high-tech sector.

Even without calling it by its name, Lee Kuan Yew understood the concepts of sustainability and sustainable development long before becoming global trends and requirements. For his vision to become a reality, the leadership "set out to transform Singapore into a tropical garden city" (Lee, K.Y, 2014: 189), the then Prime Minister leading by example with planting trees on numerous occasions. Hereby, the utmost importance of an effectively and successfully implemented strategic vision is reflected in the anonymous Greek proverb saying that "a society grows great when old men plant trees whose shade they know they shall never sit in." More than five decades later, this tradition still lives on; a symbolic gesture sending out a clear message of commitment and continuity as far as striving for sustainable development and becoming a benchmark of excellence, in the long run, is concerned.

4.1.2 A Global Benchmark of Excellence

A number of ambitious and inspired leaders around the world have questioned whether Singapore's remarkable journey could be replicated or, at least, parts of it adapted to other cultures or countries. Taking education, as one of the main elements contributing to the city-state's development to this date, as an example, it is fair to say that despite the possibility "for smaller higher education systems such as in Singapore or Hong Kong to import the whole systems by attracting talented academics from abroad", it rather seems "impossible for the midsize higher education systems" (Lim – Shin, 2018: 184), which renders it much harder to copy a success story. However, the adaptation of some core features and the implementation of best practices can largely contribute to improving the overall quality and effectiveness even under different circumstances.

While only accounting for 0.073% (5.7 million people) of the total world population, Singapore's gross domestic product (GDP) based on purchasing-power-parity (PPP) (560 billion USD) represented a 0.424% share of the world total in 2020 (IMF, 2021). Despite its small size (726 km^2), this particular welfare state has been leading international rankings in a wide array of fields (Chart 1) for years. This reflects not only the resilient nature of the meticulously woven fabric that many regard as the main driving force behind the 'Singapore miracle' but holds real potential for further growth with regard to sustainability.

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Table 1. Singapore's Merit/Medal Table (Compiled by the authors)

Category	Year	Rank
Asian Digital Transformation Index	2016–	1.
Global Competitiveness Index 4.0	2019	1.
Public Safety	2019	1.
End of Childhood Index	2018–	1.
International Student Assessment (Reading, Mathematics, Science)	2015–	1.
Index of Economic Freedom	2021	1.
Ease of Doing Business	2020	2.
Top Container Ports	2018–	2.
Network Readiness Index	2020–	3.
Global Financial Centres Index	2021	4.
QS World University Ranking (National University of Singapore / Nanyang Technological University)	2019	11. / 12.

Compiled by the authors according to the sources above

A cooperative ecosystem requires a healthy and functioning public-private partnership environment, where sharing know-how and best practices is essential. Also, there is an urgent need for cross-border collaboration in order to speed up the catching-up process of less developed economies and, thus, avoid future conflicts. It is at that point where Singapore leads the way in ”promoting innovation, skill and productivity enhancements, and transformation of key industries” (Parks et al., 2018: 63) in the Southeast Asia region. “The Singapore Cooperation Program (SCP), established in 1992, has focused largely on capacity building and technical,” instead of financial “assistance” (Parks et al., 2018: 24). Singapore's approach has been shared “with more than 132,000 government officials from over 180 countries, territories, and intergovernmental organisations in areas such as the green economy, sustainable development, urban planning, flood and water management, and disaster risk reduction,” (Fu, 2021) thus, contributed to accelerating the catch-up process of less developed regional and global partners. Within the framework of a joint regional initiative of ASEAN+3 and The World Bank, the Southeast Asia Disaster Risk Insurance Facility operates from Singapore as “a platform for financial preparedness to disasters” (SADRIF, 2021) by improving resilience.

4.1.3 Challenges

An inevitable shift from an investment- and, consequently, consumption-driven to an innovation-driven economic structure is needed in order to enable sustainable development. Therefore, intensive research and development activities, as well as sustainability-enhancing innovations are substantial. Countries that have already gained experience in serving as an ideal breeding ground for startups, future-oriented laboratories, and innovation centers or clusters are in an advantageous position. However, finding adequate responses to and executing strategic planning for the sustainability challenge requires a preliminary in-depth analysis of both the current state and the prospects of any given organization or political entity.

The classic, competition-based SWOT analysis (Chart 2) displays the present situation of the interaction of various factors. It allows identifying the assets available to stakeholders and the elements, trends mostly beyond direct influence or imminent adaptability.

Table 2. SWOT Analysis of Singapore

Strenghts	**Weaknesses**
(Political and social) stability Transparency – Diplomacy Open economy (free trade, hub) Education – Digitalization Sound financial assets – Resilience	Land scarcity Lack of natural resources Dependence on fossil fuels
Opportunities	**Threats**
Cooperative ecosystems (PPPs) Innovation (IPs) Structural change (smart, intelligent) FinTech – Green finances – Web 3.0	Climate change Population ageing and decline Labor shortages Volatility of economy China–U.S. trade war

Compiled by the authors according to the sources above

Due to the scarcity of natural resources and land, Singapore faces multiple challenges with regard to its fuel mix and the transition of its electricity infrastructure (Figure 2). Since the deployment of renewable resources, for geological reasons (calm seas, narrow tidal range, lack of rivers and geothermal energy sources, low wind speed) (NCCS, 2021b), is virtually limited to solar PV systems and waste-to-energy plants (APERC, 2021: 182), accounting only for a marginal portion of the energy supply, the city-state is dependent on fossil fuel imports. Although piped and liquefied natural gas—the cleanest burning fossil fuel—accounts for about 95% of the city-state's power generation (SES, 2021), it still undermines carbon neutrality goals.

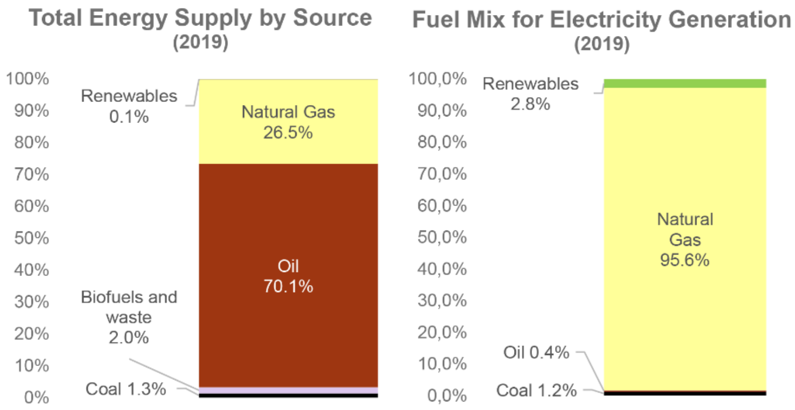

Figure 2

Singapore's Total Energy Supply by Source (2019) and Fuel Mix for Electricity Generation (2019)

Sources: IEA World Energy Balances / Singapore Energy Statistics; Compiled by the authors

The city-state's vulnerability to the various threats (mostly flooding because of rising sea levels and heavy rainfall) posed by climate change is immense. Despite the fact that Singapore's carbon intensity (i.e. carbon dioxide emissions per dollar of economic output) is relatively low, ranking 126th out of 142 countries examined, per capita emissions are high (27th) (NCCS, 2018). In contrast to the pledges made by most developed countries, Singapore has determined to reach its net-zero target by only 2060. Also, while "moving from an emissions intensity target to an absolute cap on emissions and adopting the latest IPCC[1] reporting guidelines, as well as gas coverage, the level at which Singapore will limit emissions remains unchanged," (Stockwell et al., 2021: 15), which marks Singapore's overall climate targets as being "critically insufficient" (Figure 3) by the Climate Action Tracker research consortium.

Since creativity drives innovation that is indispensable for sustainability, the Teach Less, Learn More initiative, launched in 2005, aims to develop children's creativity and prepare them for life (Loo, 2018). In addition, Singapore has been at the forefront of adjusting its education system in compliance with the requirements of future-oriented sectors and professions, based on continuous consultations between the government, educational institutions, and corporations active in the city-state. These companies are not simply partners but regarded and treated as allies (Magasházi, 2020).

[1] Intergovernmental Panel on Climate Change

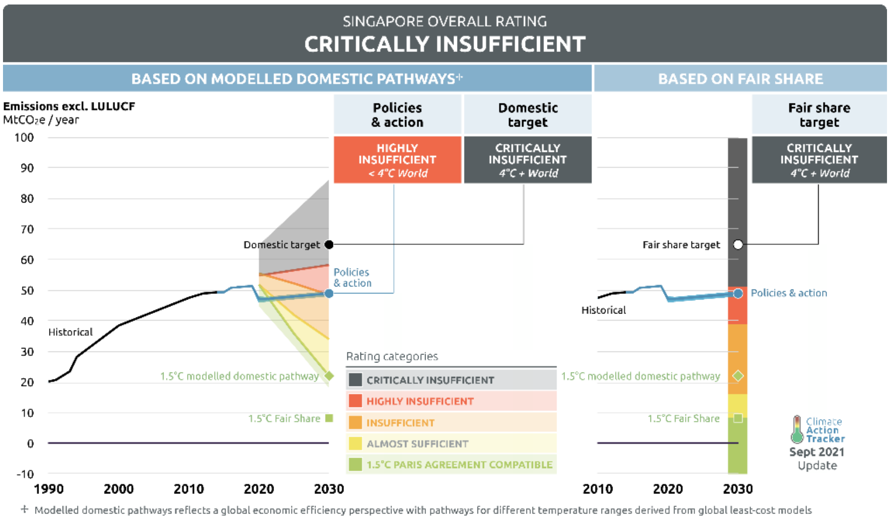

Figure 3
Assessment of Singapore's Climate Policies (Summary, 15.09.2021)
(Source: ClimateActionTracker.org)

As a developed, industrialized, and wealthy country, Singapore faces the problems of population aging and decline, resulting in labor shortages that require the revision of the very strict and highly controlled migration policy. However, using the tried and tested method, talent and activities generating high added value are offered attractive opportunities. The job-creating impact of the transformation process towards sustainability defines priority skills in the key areas of the digital (both tech-heavy and tech-lite competencies), green (construction, finance, manufacturing, trade), and care (education, health) economies (SSG, 2021: 6).

Being at the heart of global value chains, global production, and innovation networks (Magasházi, 2021: 56–59) has both benefits and risks. The uncertainty surrounding the coronavirus pandemic, for example, forced a shutdown of vital industries such as tourism and MICE (meetings, incentives, conferences, and exhibitions) events, the implementation of a protective isolation policy in order to minimize the risk for citizens, all multiplying the economy's volatility factor. However, with Singapore adapting to the new normal, it has been speeding up the transition process in becoming a high-tech, FinTech, and innovation center in the age of Web 3.0. Therefore, the longevity of its strategic position seems to be reinforced.

Singapore's high ranking in a number of sustainability-related indexes (Chart 3), elaborated and published by various international or multilateral (non-) governmental organizations, independent analytical, educational, and research institutions, is a reflection of the overall positive trend.

Table 3. Singapore's Rank in Sustainability-related Indexes

Category	Year	Rank
Smart City Index (Structure + Technology)	2021	1.
Newsweek Future of Travel Awards (International Airline / International Airport)	2021	1. / 1.
Asian Green City Index	2011	1.
Corruption Perceptions Index	2020	3.
Global Innovation Index	2020	8.
Human Development Index	2020	11.
FM Global Resilience Index	2021	12.
Environmental Performance Index	2020	39.

Source: Compiled by the authors

Singapore ranks 11th out of 189 countries in the Human Development Index[2] 2020 (UNDP, 2020: 343) but falls back 92 positions when adjusted with planetary pressures (UNDP, 2020: 241), reflecting its structural dependence on fossil fuels for energy production and its elevated level of greenhouse gas emissions per capita. "No country has ever managed to reach a high level of human development with low resource use", meaning that the "Singapore-style development is not sustainable" (Wignaraja, 2021), according to the UN Assistant Secretary-General and UNDP Regional Director for Asia and the Pacific.

Singapore's outlook for becoming a regional and global benchmark in its own right was very dim at the moment of its birth as a sovereign state. Though many query the Lion City's successful transition to a sustainable economy, based on the lineup of historic facts, unequivocal data, and empirical observations, one should refrain from ruling out that Singapore, against all odds, has the potential to prove its doubters wrong again by becoming, this time, a torchbearer of sustainability in Southeast Asia and on a global scale.

Rising tensions, notably, the hostile competition in form of the China–U.S. trade war, mostly fueled by the quest for economic supremacy and military dominance in

[2] The Human Development Index (HDI) displays the level of wellbeing in the examined countries in a more complex way than GDP. It is determined based on the average of three sub-indicators: Life expectancy at birth, education, and gross national income (GNI) per capita at purchasing power parity (PPP).

the Asia-Pacific region, with a hint of ideological differences. The difficult solution-finding process faces the seemingly irresolvable two-way problem that the West is reluctant to accept that its—so far unquestioned—supremacy has come to an end while, on the other hand, "China does not understand the world" (Karpov, 2021) it is about to become to dominate. There is a difference in approach, too. While industrialized Western countries follow the concept of geopolitics, Asian-style enforcement of interests is exerted along with geoeconomic priorities. A comparison (Chart 4) highlights the harsh contrast.

Table 4. Geopolitics vs. Geoeconomics (Compiled by the authors)

	Geopolitics	**Geoeconomics**
Geography	Political (expansion)	Economic (connection)
Influence/Power	Military	Economic
Strategy	Intervention	Domestic development
Approach	Dominance-based (dependence)	Opportunity-based
Domestic Affairs	Interference (control)	Non-interference

Source: Compiled by the authors

Furthermore, China's growing influence is accelerated by "Western hubris" (Mahbubani, 2018: 29), the gradual decline of values and poor leadership, as well as the failure to deliver tangible results because of a hypocritically outlined PR strategy, based on empty promises and pledges (e.g. environmental goals, financing, sharing COVID-19 vaccines). On top of that, the lack of vision and mutually beneficial cooperation (still being in the bubble of a post-colonialist attitude; missing to share know-how and best practices even with allies) but also fragmented national responses (growing unilateralist leanings) strongly undermine advocacy for establishing democratic systems in the rest of the world, including countries that feel and practically have been exploited and left behind.

Evidently, this ongoing conflict on the global stage poses a major security challenge for Southeast Asian nations, trapped between two superpowers. Luckily, the greatest achievement of the cooperation within the ASEAN (Association of Southeast Asian Nations) framework is avoidance of conflict between member states. Though back in 1965, Singapore's fears of external aggression seemed realistic, a military conflict with any of its direct neighbors, Indonesia or Malaysia, is "virtually zero today" (Mahbubani, 2018: 50). However, regional actors sooner or later will be forced to make a choice. Again, ”the big strategic game in Asia isn't military but economic" and its future ”will be written in four letters, RCEP,"

© Aigner, I.; Garai-Fodor, M.; Szemere, T. P. (2021): Singapore Unlimited: A Global Benchmark for Strategic Innovation, Resilience, and Overall Sustainability. In Kelemen-Erdos, A., Feher-Polgar, P., & Popovics A. (eds.): FIKUSZ 2021 Proceedings (pdf) ISBN 978-963-449-274-0, Obuda University, Keleti Károly Faculty of Business and Management, 252 p pp 157-183., 27 p. http://kgk.uni-obuda.hu/fikusz

standing for a ”massive economic ecosystem” (Mahbubani, 2021), the Regional Comprehensive Economic Partnership.

Despite the outlined limiting factors and all things considered, the sustainability challenge is more about setting a course based on aspirations, as well as envisioning tangible results and putting in place mechanisms that render their successful implementation possible. In this regard, it is useful to perform a more comprehensive and possibility-driven approach, a SOAR analysis (Chart 5), that incorporates all levels of any given organization or entity. In the case of Singapore, this future-oriented examination serves the purpose of confirming the necessity for thinking in terms of a comprehensive national movement so that the results shall be accessible for the entire community.

Table 6. SOAR Analysis of Singapore’s Sustainability Efforts (Compiled by the authors)

Strenghts	**Aspirations**
Multiculturalism – Stability – Resilience – Partnerships – Open economy – Transparency – Education – Digitalization – Strong financial foundation	Structural change Green economy Food self-sufficiency Sustainability
Opportunities	**Results**
Diplomacy (balancing, ASEAN) Innovation (IPs) FinTech – Green finances – Web 3.0	Cooperative ecosystem Eco-friendly energy shift Wealth and Health Regional stability

Source: Compiled by the authors

After having taken stock of the challenges, our focus shifts to the concrete steps, solutions, and projects that are in sync with Singapore’s historically bold strategic vision and enable to successfully transform the above aspirations into reality.

4.1.4 Digitalized, Green, and Smart Future

Cooperation in various areas (digitalization, education, environmental protection, FinTech, research & development) in the form of highly goal-oriented public-private partnerships or on the foundation of mission-based ecosystems is essential in the ongoing transformation process. High-skilled labor is another crucial factor and, luckily, ”Singapore has one of the highest proportions of foreign workers in the world—rising from 3 percent of the population in 1970 to 35 percent in 2010” (Parks et al., 2018: 50). With its sovereign wealth funds (GIC, Temasek) holding a wide variety of valuable assets, the city-state offers a range of migration incentives

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and, most likely, encourages more intentional international relocation (Srinivasan, 2021). Also, strategic government planning and leading by example are key in promoting sustainability, the core elements hereby being adaptive legislation, as well as intelligent investment in innovative technologies and solutions, the impacts of which, ultimately, create value downstream and secure corporate profitability at the same time.

Comprehensive sustainability, however, can only be achieved through collaboration on a regional and global scale. Issue-focused management across multi-stakeholder networks has proven to be an effective problem-solving method as it encourages open dialogue for trust-building along with value-based shared interests (Roloff, 2008). The 33rd ASEAN Summit (2018), held in Singapore, put the issues of resilience and innovation on top of its agenda, featuring e-commerce, green jobs, the creation of smart cities, and regional connectivity (ASEAN, 2018). Singapore launched its Smart Nation initiative, promoting and adopting cutting-edge technology on both an economic (growth-boosting ecosystem and infrastructure), governmental (inclusive, personalized policies and services), and societal (accessibility, digital literacy) level, in 2014. Its aim is to improve the quality of life, build more effective communities, and create business opportunities (Government of Singapore, 2020b). In this regard, Singapore can be seen as a living laboratory for developing and testing digital solutions for a sustainable urban environment.

The 'Smart City in a Box' concept (Figure 4), elaborated by the Singapore-based consultancy firm Surbana Jurong, envisions an integrated interface of interconnected applications related to the four dimensions of the smart city (sustainability, efficiency, people, and security), displayed on a single miniature device (e.g. a mobile phone). This solution shall benefit the authorities not only in terms of planning but also in terms of uninterrupted monitoring and maintenance.

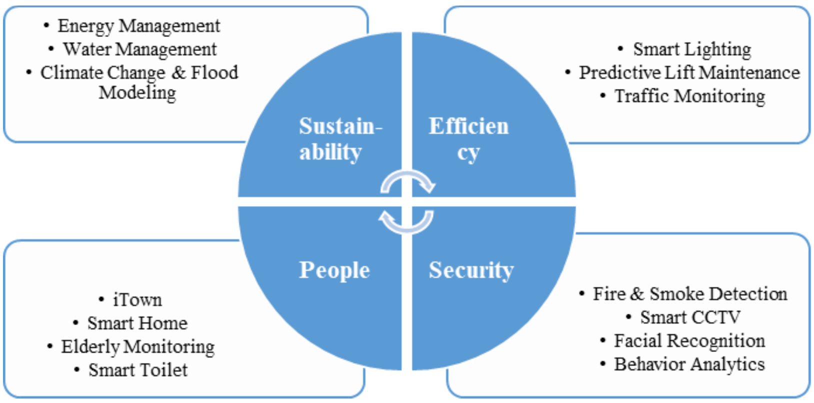

Figure 4
Model of the 'Smart City in a Box' Concept (Source: Surbana Jurong; Compiled by the authors)

© Aigner, I.; Garai-Fodor, M.; Szemere, T. P. (2021): Singapore Unlimited: A Global Benchmark for Strategic Innovation, Resilience, and Overall Sustainability. In Kelemen-Erdos, A., Feher-Polgar, P., & Popovics A. (eds.): FIKUSZ 2021 Proceedings (pdf) ISBN 978-963-449-274-0, Obuda University, Keleti Károly Faculty of Business and Management, 252 p pp 157-183., 27 p. http://kgk.uni-obuda.hu/fikusz

The Singapore Green Plan 2030, as a national movement involving all stakeholders to maximize the outcome by applying a cross-sector cooperation approach, is a milestone in the city-state's sustainability efforts. Announced in February 2021, it has five key pillars: City in nature, sustainable living, energy reset, green economy, and resilient future. Solutions include the reduction of consumption and waste by both households and the industry, promoting the use of green or more carbon-friendly infrastructure (cycling paths, public transportation), the extension of natural spaces (tree planting, building parks). With smart water technologies (seawater desalination, industrial and wastewater reclamation), the island, which has been heavily relying on freshwater imports, has embarked on a path "towards water sustainability" (PUB, 2016: 09). Helping local small- and medium-sized enterprises (SMEs), which account for nearly half of Singapore's GDP and employ three-quarters of the workforce (Government of Singapore, 2020a), in the adoption of sustainability practices, as well as investments increasing efficiencies, such as economic restructuring and job creation, are also important elements. Other steps feature limiting the number of registered vehicles in circulation, using eco-friendly cars, discouraging driving (ERP system), and assisting the construction industry in becoming green. It is crucial to implement innovative engineering and technological methods to raise the adaptability and resilience against the adverse impacts of climate change (sea-level rise, flooding), as well as to enhance vertical farming in order to increase food security (SG Press Center, 2021).

Singapore's proximity to the Equator means that it enjoys sunshine almost throughout the year. Hence, solar panels are increasingly integrated into the urban environment (NCCS, 2021b), placed e.g. on buildings and public transportation vehicles. The most prestigious investments in renewables are the floating solar farms, among the largest worldwide, that allow reducing carbon emissions by several thousand tonnes (Chong, 2021). Nevertheless, the constraint of deployment of renewables requires other sources for Singapore to tackle its greatest sustainability challenge: The current dependence on fossil fuels. Access to low-carbon energy through regional power grids not only enables the country's transition but also enhances regional cooperation and decarbonization efforts. In addition, low-carbon alternatives (hydrogen, carbon capture) are also taken into consideration (EMA, 2021).

A solution to the problem of regulating temperature is presented with the use of vertical greening facades that effectively act "as a passive approach towards sustainable building design in the urban area of tropical climate countries" (Othman – Sahidin, 2016: 50), concluded a study from 2016. In this context, the Tree House, which set a new record as the largest vertical garden in the world at the time of its handover in 2013, is another milestone example of biophilic connectivity. A number of innovative and sustainability-friendly technologies, such as natural insulation (e.g. bio-shading green walls, heat-reducing windows), carbon dioxide filtering, intelligent lighting, sloped design for improved rainwater harvesting, were used to improve its energy and water efficiency while lowering its carbon footprint (City Developments Limited, 2014).

Singapore, strategically welcoming digital technology professionals and fostering talent, also leading "in experimentation in artificial intelligence (AI) across multiple industries," (Parks et a., 2018: 50) is the most advanced and committed country in the Southeast Asian region with regard to building Industry 4.0 (digital transformation) and Web 3.0 (decentralized platforms) capabilities. Singapore's national AI strategy is promoting the creation of a sustainable ecosystem. Hereby, triple helix partnerships (researchers, corporate sector, government) allow fast deployment of innovative solutions, preferably developed by local professionals (goal-specific education), while the quick and secure accessibility of high-quality datasets, embedded in a trusted environment, offer ample opportunities for international cooperation (SNS, 2019: 6). Covering all walks of life, the strategy comprises border security, education, finance, government and municipal services, healthcare, and logistics (SNS, 2021). One model project serves as a comprehensive example.

The technologically sophisticated country's unique geographic location predetermines its ongoing status as a major transshipment container port. The success of the overall sustainable development efforts depends heavily on the port's expanding capacity, digitalization, environmental-friendly processes as its operation generates approximately 7% of the city-state's GDP. The world's second-largest port of call is gearing up by almost doubling its handling capacity of 37.2 million TEUs (twenty-foot equivalent unit) in 2020 by 2040 and preparing for the future with the application of technologically advanced, innovative, and sustainable solutions. Besides ecosystem creation and regeneration (coral relocation, use of prolific construction materials), the Tuas Port Project also features autonomous operations (eg. fully electric, automated guided vehicles and cranes), efficiency-enhancing, intelligent, transparent, and integrated (control and management) systems, as well as smart drones (MPA, 2021). This intelligent port has sustainability written all over it.

Conclusion

Singapore's excellent geographic location, as well as its inimitable path towards building a wealthy and healthy economy along with a clear strategic vision and planning, fueled by unwavering determination, enabled with the clever selection of the right toolset at the right time, provide the necessary prerequisites for stepping on a higher level (of sustainability). With an abundance of valuable and indispensable assets (open, business-friendly, fully digitalized, stable, trusted, and transparent environment; efficient and intelligent global container transshipment hub; high-quality infrastructure and education; multi-stakeholder, cross-sector partnerships; a vibrant breeding ground for creativity, R&D, and innovation) at its disposal, the Southeast Asian city-state has been developing and implementing an array of actions and projects, already bearing tangible results. In addition to regional peace and stability, becoming a global benchmark for sustainable development requires Singapore to strengthen its resilience to economic volatility, to ramp up its defense and mitigate against the disruptive impacts of climate change, to accelerate the shift to carbon neutrality and energy efficiency, while remaining devoted to lifelong learning, global entanglement, and cooperation. A country with a high level of human development and low resource use seems to be possible, after all. With a strong portfolio dedicated to and marked by sustainability, Singapore has the potential to successfully transition from a regional commercial and finance to a resilient innovation, startup, FinTech, and green financing hub.

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Identifying the critical control points in beer production

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Abstract: The aim of the research is to reveal the critical points from the point of view of food safety during the classical brewing technology process. In order to explore these critical points, it is important to know what technological steps we are going through in the brewing process. By examining each technological step, the points of infection can be explored, which I make suggestions for prevention. Even before starting the brewing technology process, the suitability of the ingredients should be checked and it is worth paying attention to the source of supply. Replacing the now obsolete technological solutions used in each technology step can greatly increase the level of food safety, ie reduce or even eliminate the possibility of infection. From a food safety point of view, packaging is also a critical point after the product has been made, which carries a high risk. Environmental and sustainability considerations must not be overlooked when choosing packaging. If we pay close attention to the small details, we can be sure that our brewed beer will be impeccable from a food safety point of view, and we can enjoy the liquid gold under the foam without danger.

keywords: beer, technology, brewing, food safety

1 Introduction

In order to explore the critical points, it is important to know what technological steps we are going through in the brewing process. These processes must take place at a specific temperature and within a specific time frame. The following picture contains the time and temperature steps, what are needed through the process of the brewing:

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Process	Action	Objectives	Time	Temperature (°C)
Malting				
Steeping	Moistening and aeration of barley	Preparation for the germination process	48 h	12–22
Germination	Barley germination	Enzyme production, chemical structure modification	3–5 days	22
Kilning	Kilning of the green malt	Ending of germination and modification, production of flavoring and coloring substances	24–48 h	22–110
Milling	Grain crushing without disintegrating the husks	Enzyme release and increase of surface area	1–2 h	22
Mashing + wort separation	Addition of warm/hot water	Stimulation of enzyme action, extraction and dissolution of compounds, wort filtration, to obtain the desired fermentable extract as quickly as possible	1–2 h	30–72
Wort boiling	Boiling of wort and hops	Extraction and isomerization of hop components, hot break formation, wort sterilization, enzyme inactivation, formation of reducing, aromatic and coloring compounds, removal of undesired volatile aroma compounds, wort acidification, evaporation of water	0.5–1.5 h	>98
Wort clarification	Sedimentation or centrifugation	Removal of spent hops, clarification (whirlpool, centrifuge, settling tank)	<1 h	100–80
Wort cooling and aeration	Use of heat exchanger, injection of air bubbles	Preparing the wort for yeast growth	<1 h	12–18
Fermentation	Adding yeast, controlling the specific gravity, removal of yeast	Production of green beer, to obtain yeast for subsequent fermentations, carbon dioxide recovery	2–7 days	12–22 (ale) 4–15 (lager)
Maturation and conditioning	Beer storage in oxygen-free tank, beer cooling, adding processing aids	Beer maturation, adjustment of the taste, adjustment of CO_2 content, sedimentation of yeast and cold trub, beer stabilization	7–21 h	−1–0
Beer clarification	Centrifugation, filtration	Removal of yeast and cold trub	1–2 h	−1–0
Biological stabilization	Pasteurization of sterile filtration	Killing or removing of microorganisms	1–2 h	62–72 (past.) −1–0 (filtr.)
Packaging	Filling of bottles, cans, casks, and kegs; pasteurization of small volumes in packings	Production of packaged beer according to specifications	0.5–1.5 h	−1 to room temperature

Figure 1
The Beer Brewing Process: Wort Production and Beer Fermentation
Source: Willaert, 2007

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The aim of this research is to explore critical points for food safety in the classical brewing technology process. Once these points of infection have been identified, a solution must be found for prevention and new methods must be used to find alternatives. The use of the right technology, impeccable hygiene and careful attention not only minimizes the risk from the point of view of food safety, but also increases the enjoyment value of the finished product. Large food companies operate under strict rules. In the case of small-scale breweries, although they produce small quantities, they must also apply certain standards and rules in order to produce products of the right quality.

2 Content Analysis - Exploring critical points in technology processes

The main component of this Beer is water. In most cases, this is added to the ground malt by treating it with the right ingredients, thus ensuring consistent quality. In contrast, malt can pose many dangers. A common raw material defect is high mycotoxin content, such as fusarium fungi (Tadei et al., 2020). High concentrations of these mycotoxins pose a serious health risk (Antonissen et al., 2014). Fortunately, European Union legislation sets maximum levels for these toxins in food (portal.nebih.gov.hu, 2020). In most cases, malt enters breweries when it is ready. If it has not been possible to prevent the appearance of the fungus during production, a critical point is to control the quality of the raw material entering the factory (Mastanjevic et al., 2018).

The destruction of unwanted microorganisms is an important task during brewing. This is why the observance of technological temperatures during cooking, but especially during hop cooking, must be constantly monitored (Vaughan et al., 2005).

Nowadays, the use of closed fermentation tanks during main fermentation is also becoming more common, but open fermentation vats are still in use. In addition to being much more difficult to control temperature and pressure, the risk of infection is much higher. Microorganisms in the air can easily enter the uncovered liquid, thus not only changing the microbiological composition of beer, but also posing a major hazard to the entry of hazardous substances into fermenting beer (Kunze, 2014). Today, it is almost unthinkable to hear stories from the beer-drinking layer of the 80s in which a mouse was found in a beer bottle in Kőbánya, even though a separate person was employed in the factory, to keep unwanted rodents away from open fermentation vats. remove specimens that are already intoxicated.

At this stage of production, beer encounters a lot of new surfaces compared to the past, which increases the risk of infection (Bokulich & Bamforth, 2013). Whatever unit of use the finished beer is in, it is very important to follow the rules of hygiene.

In the case of recycled packaging units (returnable glass, KEG barrels), even more attention must be paid to cleanliness. Infected beer not only loses its enjoyment value (when exposed to light and oxygen), but also carries serious food safety hazards. It is no coincidence that most large-scale beers are pasteurized before delivery. This creates microbiological stability, destroys potential pathogens, and in turn, beer loses its enjoyment value (Hoff et al., 2013). With this aspect in mind, unpasteurized tank circuits with short maturities but higher enjoyment values were created. In addition, attempts have been made to sterilize beer with microwaves, which has also proven to be reliable and even has benefits (Shi et al., 2012).

Based on this, we can conclude that it is important to select and use the right raw materials, to store, handle and use the purchased raw materials properly, to use the right technology and to use the right tools. Closed fermentation tanks should be preferred and proper hygiene should be observed during fermentation and packaging.

3 Results - Prevention options and solutions

There are breweries where a complete analytical and microbiological laboratory is available for the continuous control and monitoring of the characteristics and properties of the raw materials and the finished products. However, these opportunities are not available everywhere. In this case, it is advisable to send the incoming malt for a laboratory test in order to exclude the possibility of contamination of the grain. If an infected raw material gets into the beer without control, it can no longer be removed from it. It is much more expensive to destroy the entire finished product afterwards than to inspect it beforehand. EU limits must not be exceeded in the presence of toxic substances, and if this is the case, it is forbidden to dilute the finished product with a suitable quality. Thus, it is strongly recommended to test the raw materials before any process of brewing begins. The amount of fusarium in the grain can be detected easily and quickly with HPLC devices (Piacentini et al., 2017).

It is also worth paying attention to the sources of raw materials. If we can, we always choose our homeland. The cheaper raw material may end up being more expensive if it turns out to be infected. Always choose good quality ingredients that we would consume with a good heart.

Another way to eliminate the risk of infection in grain is to use a substitute product as a raw material. Nowadays, gluten-free beer has become very fashionable, here too a grain substitute product is used in some cases (Hager et al., 2014). It is popular to use wheat, corn, rice instead of barley malt.

It is essential to maintain the correct technological temperatures during brewing. It is an economically determining factor, as cooling and heating is a very energy-intensive process. Improper temperatures produce the wrong end product, but more importantly, boiling hops is a critical point for food safety, as raising the temperature to the wrong height will not only result in poorer hop yields, but will also kill the microorganisms left in the wort, which they can be dangerous to the human body. Not only the temperature, but also the exact observance of the technological times must be observed, because if the heat treatment does not last for the right time, we make the same mistake as with the wrong temperature. Today, the technology is so advanced that the temperature of the raw material can be controlled and standardized throughout the production process. Mechanization can eliminate this source of danger.

Although beer made in open fermentation tanks has a special taste that is impossible to achieve indoors under pressure, it unfortunately carries many dangers. No matter how carefully and prudently we try to ferment beer in open fermentation vats with maximum adherence to hygiene rules, unfortunately the risk to food safety increases. Therefore, it is advisable to use closed fermentation tanks with a modern, cylindrical design during the entire fermentation process of the beer, in which both temperature and pressure can be controlled and the entry of foreign substances into the beer can be avoided.

The fermentation of beer takes a long time, it can take up to several months. Meanwhile, microorganisms have countless opportunities to attack beer, and at the end of fermentation, beer travels a long way from tanks to packaging, where countless hazards lurk around it. The process of pasteurization, which covers heat treatment, serves to eliminate these hazards. It can be used in several ways, with instant pasteurization or tunnel pasteurization, each with its own advantages and disadvantages. It should be noted that in the tunnel paste process, the beer is already in the bottle when it enters, and due to the sudden change in temperature, the glass can easily break and shards of glass can get into the beers. If this technology is applied to the packaging line, it is advisable to set up a solid state detector after the tunnel paste, which filters out such cases.

It is important that the storage device into which the beer enters and travels to the consumer is always clean. This is especially important for recycled devices such as recyclable glass or KEG barrels. If not properly washed and cleaned, there is a risk of infection. Today, the consumption of tank beers is becoming more widespread, which means that beer is taken directly from the factory to the pubs in huge tanks, unpasteurized. Its shelf life is thus greatly reduced, but its enjoyment value is greatly increased due to the omission of heat treatment. To prevent the storage tanks from becoming dirty and having to be disinfected weekly, the factories line the inside of the tanks with a sterile bag and fill the beer directly into these bags, thus avoiding contact with metal surfaces. It can be disposed of after the bag has been emptied, which is reassuring from a food safety point of view, but a concern from an environmental and sustainability point of view.

4 Conclusion

An adequate level of food safety is essential during brewing. With proper attention and care, most hazards can be eliminated and prevented. It is important to pay attention to the right raw material and check the conformity of the components before starting the processes. If we can control the temperatures, our decoction can also be made safer. Abandoning outdated technological solutions greatly increases the level of food safety, so it is advisable to work with the most modern technologies and in no case provide the possibility of infection with an outdated technological solution. Once our product is ready, there is a high risk in the packaging phase, so it is worth handling potential hazards with even greater care. If we pay close attention to the small details, we can be sure that our brewed beer will be impeccable from a food safety point of view, and we can enjoy the liquid gold under the foam without danger.

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Methodological analysis of the relationship between key corporate financial indicators and stock returns

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Abstract: The developed capital market is of particular importance in market economies. The efficient functioning of a stock exchange is a prerequisite for a well-functioning economy, as it provides a trading venue for transactions between market participants and thereby realises a large volume of safe capital flows between economic agents. As a secondary market, the stock exchange is an excellent venue for ensuring the liquidity of securities. There are a number of analytical methods available, whether fundamental or technical, to forecast the future changes in returns. In the current research, we use statistical methods to investigate the relationship between the financial performance of firms in the S&P 500 Index and stock returns. The objective of our study is to identify corporate financial indicators that may have a statistically significant impact on the average corporate stock returns achieved. The central database of the study is the 505-component dataset of the S&P 500 Index, from which we aim to identify homogeneous groups whose financial performance can be related to stock performance through cluster analysis. The relationships between financial ratios and stock returns were examined using bivariate and multivariate statistical methods on the basis of 28 financial ratios of the 505 firms included in the analysis. The period evaluated in the analysis covers the period between 2015 and 2019. Factor analysis was used as a basis for cluster analysis to aggregate financial indicators that are more highly correlated. It was hypothesized that stocks of firms with strong return on equity and EPS growth rate would generate above average returns, and stocks of firms with stronger operating and free cash flow would generate above average returns.

Keywords: analysis, EPS, capital, liquidity

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1 Introduction

There are several definitions for the stock exchange in the literature. All of them try to convey the most important features of the functioning of the capital market. The Exchange is ‘a basic institution of trade, a specially organised form of open market, operating under strict rules, which concentrates the supply and demand for the items listed and traded on the exchange.’ (BAKONYI et al. 2004. p. 42)

The definition expresses that a stock exchange is a publicly operating market regulated by external laws and internal regulations, thus providing a trading venue for specified persons to trade instruments listed on the exchange at specified times. The main functions of stock exchanges are to provide all market participants with public, transparent information and make the efficient operation of the technical infrastructure possible. The exchange trading venue ensures the free flow of capital between market participants and the execution of trading processes. An important role of the Exchange is to ensure that listed shares are traded on the secondary market. Due to this, changes in ownership can be easily traced down by selling or buying shares; in other respects, the stock exchange allows corporate profits to be distributed among shareholders according to the extent of their ownership share (CORPORATEFINANCEINSTITUTE.COM 2021).

The stock exchange provides the opportunity to trade shares, bonds and other financial instruments. A share is an ownership security that represents an interest in a company. A share confers property and membership rights, under which shareholders are entitled to dividends on company profits and a liquidation dividend. The liability of shareholders is limited, as the worst that can happen in the event of a company's liquidation is that they lose the capital they have invested, but they are not liable for the company with their own assets. It is important to note that not all shares carry voting rights, but all shares issued carry property rights. In addition to shares, bonds also play a prominent role in the markets. Bonds are debt securities that can be issued by governments and corporations, but the use of debt is generally used for different purposes in the activities of governments and corporations. (BAKONYI et al. 2004)

The price of the bonds is expressed as a percentage of their nominal value, and a rational investment decision can be made on the basis of a proper valuation of the bonds, based on a comparison of the theoretical and market price. The theoretical rate can be defined as the present value of the future cash flows expected from the bond, while the market rate represents the price as a function of supply and demand. (VINCZE 2013)

In recent years, exchange-traded index funds have become increasingly popular as a way to track the performance of different stock market indices, markets and industries. ETFs are passively managed investment funds whose portfolios are weighted in such a proportion that the portfolio can adequately represent the movements of the market index being tracked. The function of equity indices is to provide a transparent picture of the performance of the equity market, and they are therefore also used as benchmarks, for example by mutual fund managers to determine their own performance. The S&P 500 Index is the main indicator of the performance of the US stock market and its performance has, in our view, an impact on stock market sentiment around the world. The index comprises the stocks of the 505 largest capitalisation companies in the US, with the weighting of each component depending on the market value of the stock and is therefore called a market value weighted index. (ZVI BODIE et al. 2005, GABE 2021)

For long-term fundamental-based investment decisions, investors can choose from a variety of stock valuation models. The purpose of the investment determines which model is appropriate to use to estimate the value of a stock. (DAMODARAN, 2006) highlights three main valuation approaches in the field of valuation, discounted cash flow based, asset based and relative valuation models. The fundamental value of a stock can be estimated using cash flow based and relative valuation, but the effectiveness of the chosen method depends on the investor's preference. Value-based investors expect their returns to come primarily from dividends from the stock, while growth-oriented investors buy growth stocks in the hope of higher price returns. (BREALEY - MYERS, 2005) The DCF-based models often used in practice are an appropriate way for both dividend-oriented and growth-oriented investors to determine the value of shares. The value of shares in companies with a stable growth rate and dividend payments should be determined using Gordon's dividend discount model. The Gordon growth model can be applied effectively to mature companies with stable growth rates and predictable dividend policies. For growth stage companies and companies in cyclical industries, where expected dividends are difficult to predict, it is advisable to use a two-stage or three-stage dividend discount model, whereby the analyst distinguishes between a period of faster growth and a subsequent transitional and stable growth period and determines the value of the shares by adding the present values of the estimated cash flows in the three different stages (DAMODARAN 2006).

A dividend valuation model can be considered rational if it is consistent with the growth characteristics of the company under consideration, which is most determined by the stage of development of the company.

2 Material and method

The analysis required financial data for the S&P 500 Index components for the period 2015 - 2019 and stock price data for the period 2016 - 2020, which were collected from publicly available data sources. Financial and stock price data for the components of the S&P 500 Index were compiled from data published on the most popular stock market websites. The list of components of the S&P 500 Index was compiled from the suredividend.com website based on data available as of 11 July 2020, which included the names and ticker codes of all 505 components. Based on this data, for each company, we downloaded financial data for the period 2015 - 2019 from the morningstar.com website, which included key financial indicators. This data included financial data from the balance sheet, income statement and cash flow statement published in the annual financial reports of the companies, which are displayed on the Morningstar website. The database included 2483 items per column and 28 financial indicators. The detailed listing of the 28 selected indicators is beyond the scope of this paper due to the constraints of length- They involve the assessment of the wealth, financial situation and profitability of the enterprises under review, providing a basis for testing our hypotheses. After collecting and sorting the data, data cleaning was performed to exclude outliers from the analysis in order to filter out distorting effects. After proper data preparation, the database created in Excel was imported into the SPSS statistical program. The relationships between the financial performance and stock returns of the components of the S&P 500 Index were investigated, typically using bivariate and multivariate statistical procedures. Before performing the multivariate analyses, we examined the descriptive statistics for each variable to gain insight into the typical properties of the data structure under study. (SAJTOS AND MITEV 2007) In the multivariate analyses, factor and cluster analyses were performed, while in the bivariate analyses, the relationship between financial indicators and stock returns was examined using Pearson's correlation matrix, one- and multi-step analysis of variance. (CSISZÁRIK et al. 2021)

3 Results

Figure 1 shows the average and quartile values of stock returns based on the cleaned database. By defining the quartiles, the values in the sample can be divided into four phases in ascending order, giving an overall picture of the sample distribution of the indicators under review.

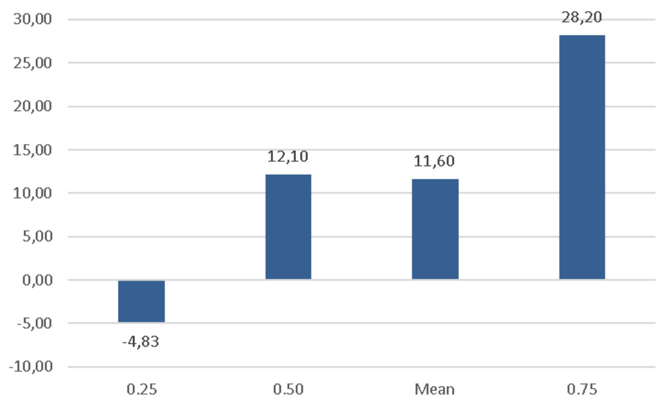

Figure 1 Average and quartile stock returns (%)
Source: authors' own editing based on database data

Figure 2 shows that the median revenue of the companies surveyed was approximately $7.5 billion over the period, with the highest revenue firms having revenues above $13.87 billion, as shown by the 0.75th percentile.

The EBIT figures show the operating profit, and the median (0.5 percentile) shows that half of the companies in the figure had an EBIT below USD 1.08 billion, while the other half had an EBIT above USD 1.08 billion. Firms with the highest results typically generated an operating profit above USD 1.99 billion.

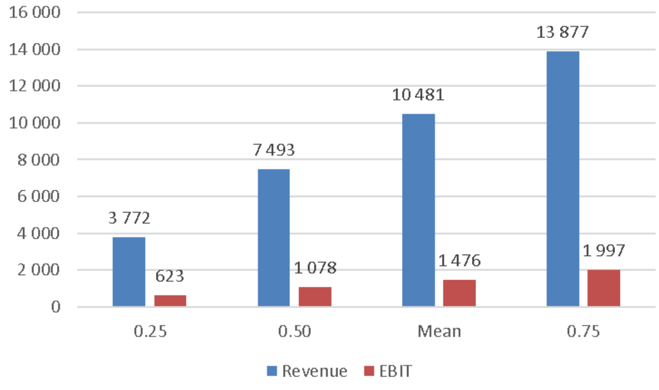

Figure 2 Average and quartile values of revenues and EBIT for S&P 500 Index companies (millions of dollars)
Source: authors' own editing based on database data

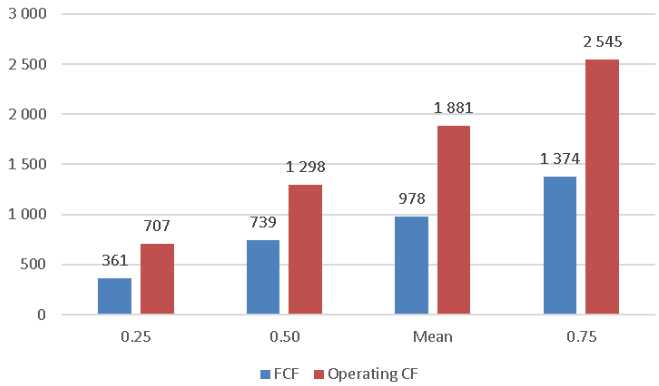

Figure 3 Average and quartile free cash flow and operating cash flow (million USD)
Source: authors' own editing based on database data

The value of shares is mostly determined by the cash flow that companies can generate for shareholders. Operating cash flow is the balance of cash receipts and cash payments actually made in the business. Free cash flow (FCF) expresses the excess cash flow available to creditors and investors, i.e., the part of cash flow that remains after investment and development expenditure from the operating cash flow generated.

Figure 4 shows that 50% of the companies generated more than $1.3 billion in operating cash flow and more than $739 million in free cash flow during the period under review. Based on the 0.75th percentile, we can see that 1/4 of the firms surveyed had operating cash flows over $2.5 billion and free cash flows over $1.3 billion.

Return ratios measure the returns that firms are able to achieve on the assets they use in their operations and the capital they invest. The average and quartile values of return ratios are shown in Figure 4. Half of the firms surveyed achieved a return on equity of over 15% and a return on equity of over 10% over the time horizon examined. For 1/4 of the indicators, ROE above 24% and ROIC above 15.8% can be identified based on the 0.75th percentile.

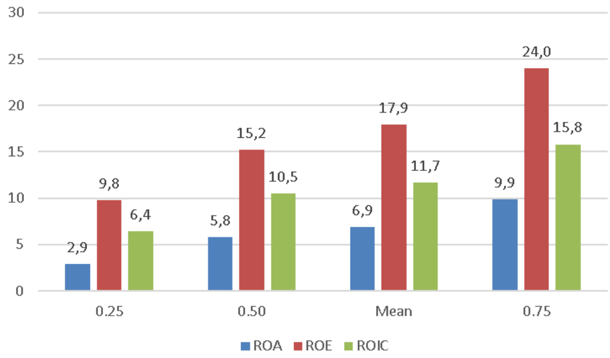

Figure 4 Average and quartile return on assets and return on equity for S&P 500 companies (%)
Source: authors' own editing based on database data

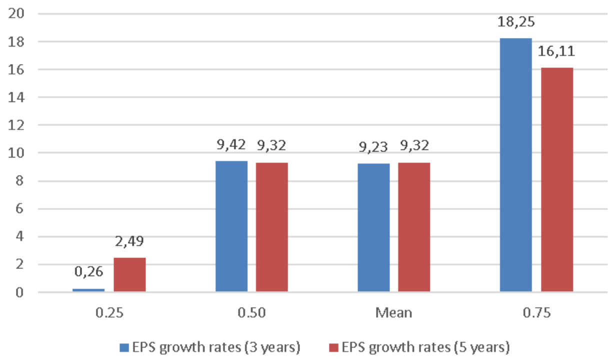

Figure 5 Average and quartile EPS growth rates of S&P 500 companies over 3 and 5 years (%)
Source: authors' own editing based on database data

In Figure 5 the blue column shows the quartile and average EPS growth rates over the 3-year time horizon, while the green column shows the quartile and average EPS growth rates over the 5-year time horizon. There is a large variation in EPS growth rates across the sample firms, which is obviously due to activity, size, firm and sector specific characteristics. The figure shows that a subset of the sampled firms (1/4) had particularly strong average growth rates, for example, the segment with strong growth had an average growth rate of more than 16.11% over the five-year period. Firms in the weakest growth segment had an average growth rate of less than 2.49% over a 5-year period. The median and average growth rates for the components of the S&P 500 Index were around 9.4% and 9.3% for the 3 and 5-year timeframe data, respectively. These data indicate that S&P 500 companies typically showed strong profit growth over the period under review. The objective of factor analysis was to summarise the information content of the correlated financial indicators into a single variable in order to facilitate the interpretation of background information and explore the interrelationships between financial indicators. The correlation between the variables under review is a prerequisite for factor analysis, and the fulfilment of these conditions was tested by examining the correlation matrix and the results of the KMO and Bartlett's test.

Table 1 Assessment of the suitability of factor analysis based on KMO and Bartlett's test

KMO and Bartlett's Test		
Kaiser-Meyer-Olkin Measure of Sampling Adequacy.		0,637
Bartlett's Test of Sphericity	Approx. Chi-Square	10008,805
	df	378
	Sig.	0,000

Source: authors' own editing based on database data

The table above shows the results of the KMO and Bartlett's test, which confirmed that the variables included in the analysis are suitable for factor analysis as the variables are well correlated. The significance level in the bottom row of the table shows that the calculated correlation coefficients are within the 5% significance level, as this value is well below 1%, which indicates that there is an acceptable level of correlation between the variables at 95% and 99% probability level, respectively. Factor analysis was performed on 28 selected corporate financial indicators. Relatively high communality scores were obtained for the financial indicators analysed, confirming that the factors will adequately represent the variance squared of the original variables. (SZÉKELYI AND BARNA 2002) According to the model under consideration, the factors would have a meaningful explanatory power for a maximum of 9 factors, since for a factor number above this, the eigenvalue would already fall below the value of 1, which would result in a significant reduction of the information content of the original variables in the factor solution.

Table 2 Pearson correlation coefficients between factors and stock returns

Factor	Correlation between factor and yield	Significance level
return on equity	-0.057	0.268
cash flow	0.041	0.433
liquidity	0.112	0.031
profit margin	0.085	0.099
growth rate	0.060	0.245
leverage	-0.063	0.221
market interest	-0.015	0.766
dividend payment	-0.079	0.129

Source: authors' calculations in SPSS based on database data

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The Pearson correlation coefficient values between the factors shown in the table and the average stock return, as well as the corresponding significance levels, are displayed. Based on the correlation calculation, only the Liquidity ratio was found to have a significant effect on stock returns, as the relationship between the two indicators is within the 5% significance level. Thus, the liquidity position of firms plays an important role in investors' decisions. It can be seen that the cash flow, profit margin and growth rate factors also have a positive effect, but no statistically significant relationship can be found between these factors and stock returns. Table 3 shows that, within these factors, the financial indicators with the highest weighting can be identified as having a significant impact on the performance of the US equity market during the period under review.

Table 3 Pearson correlation coefficients between the largest factor-weighted financial indicators and stock returns

Financial indicator	Correlation between financial indicator and stock returns	Level of significance
ROIC	0.094	0.000
ROE	0.055	0.016
Liquidity ratio	0.021	0.365
Liquidity quick ratio	0.051	0.026
Net profit margin	0.045	0.038
EBIT	-0.039	0.098
EBIT growth rate (5 years)	0.104	0.000
Forward P / E	0.023	0.299
EV / EBITDA	0.054	0.019

Source: authors calculations in SPSS based on database data

The table above shows that for companies, return on invested capital, net profit margin, liquidity quick ratio, EBIT growth rate and EV/EBITDA ratio had the largest impact on equity returns. Of these indicators, the impact of ROIC and EPS growth rate was the most significant, as it can be seen that the correlation coefficients associated with these indicators are within the 1% significance level.

It is important to note, however, that the correlation relationships are weak, i.e., in addition to these financial indicators, a number of other factors have also played a role in the evolution of stock prices, which is a natural feature of stock market behaviour. However, if we approach the question of how the financial performance of companies influences investment decisions from a fundamental point of view, the correlation relationships show that the return on capital employed, liquidity, growth rate and the value of the company relative to operating cash flow were the most valued by investors over the period under review. Among the components of the S&P 500 Index, stocks in Clusters 1 to 3 generated the highest returns over the period 2016- 2020. The average returns of stocks in each cluster are shown in Figure 6.

Figure 6 Average annual return per cluster (%)

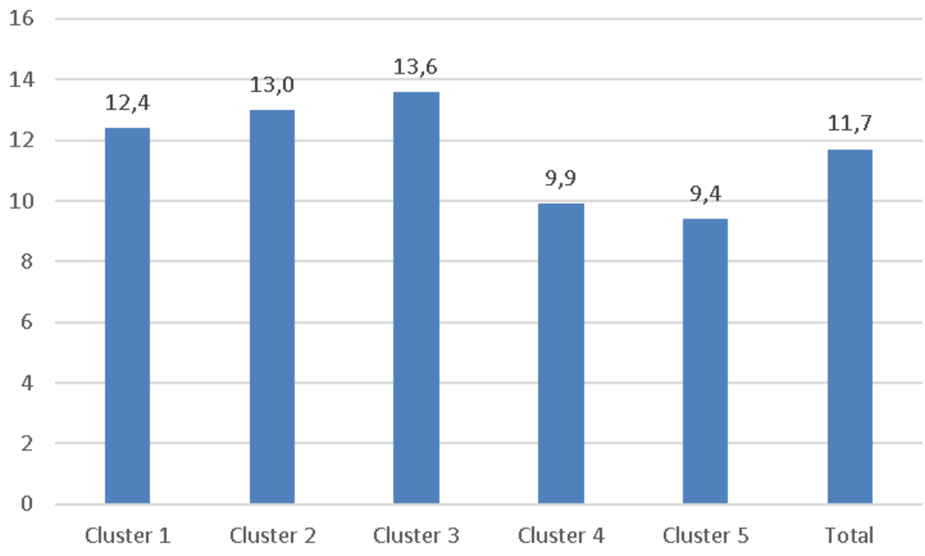

Figure 6 Average annual return per cluster (%)
Source: authors' calculation in SPSS based on database data

The figure shows that the US equity market has delivered average annual returns of 11.7% over the period, as shown in the last column. It can be seen that above average returns were achieved with stocks in Cluster 1 to 3, with Cluster 2 and 3 performing the best. Although the segments in Cluster 4 and 5 performed below average, these stocks also generated average returns of close to 10% per annum. As shown in Figure 7, Cluster 2 and 3 were also the best performers in terms of return on assets and return on equity, but Cluster 5 also had above average ROA and ROIC ratios and average ROE returns.

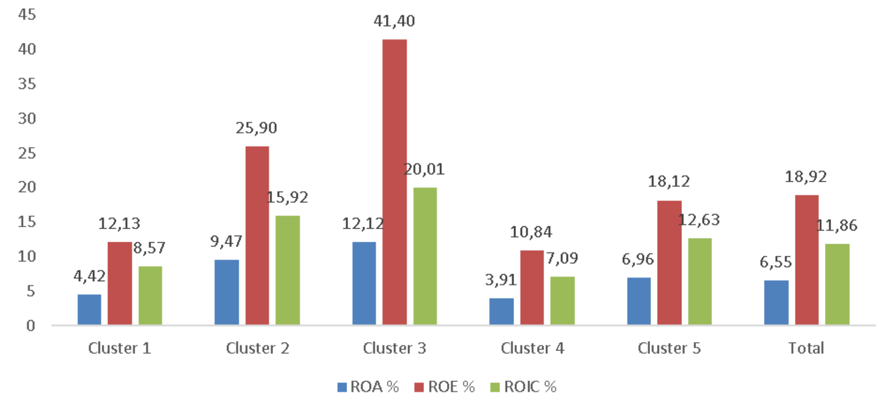

Figure 7 Average return on assets and return on equity per cluster (%)
Source: authors' calculation in SPSS based on database data

Conclusions

The analysis examined the relationship between the financial indicators of S&P 500 companies for the period 2015-2019 and stock returns for the period 2016-2020 so that the impact of the year following the financial reports on the results can be reflected. Among the financial indicators with the highest factor weighting identified in the factor analysis, we found a significant relationship between ROIC, ROE, quick ratio of liquidity, net profit margin, EBIT growth rate, and EV/EBITDA indicators and stock returns based on the values of Pearson correlation coefficients. Based on the correlation tests, we found a weak positive correlation between the listed financial indicators and stock returns. Cluster analysis identified two clusters whose strong financial performance was associated with higher stock returns. Members of Cluster 2 and 3 have above average scores on all key financial indicators, as these two groups have the strongest free cash flow and return on assets, equity and return on equity ratios, and also appear to be attractive segments in terms of EPS growth rates.

In the case of Cluster 2 and 3, it can be seen that investors valued strong financial performance in these segments, with the shares of these groups achieving an average annual return of 13% and 13.6%, respectively, while the combined average return of the shares of all clusters was 11.7%.

Cluster 5 has been identified as having an EPS growth rate of 24.42% over a five-year time horizon and is also a strong performer in terms of return on equity and profit margins but has shown below average results in terms of operating and free cash flow generation. The stocks in Cluster 5 showed an average annual return of 9.4%, which corresponds to below average performance. The extra high EPS growth rate and strong return on equity for this cluster did not translate into above average returns, which from a financial perspective can be explained by weaker cash flow generation and uncertainties around the future growth outlook, which is sector and industry specific. Clusters 2 and 3 stood out from the other clusters in terms of all key financial indicators, as reflected in their equity performance, as these two clusters showed above average returns. At the individual stock level, among the members of Cluster 2, Target stock was the standout performer, with its share price rising 93% in 2019, while Raytheon and Honeywell's 14.7% and 13.5% share price appreciation in 2016, respectively, was much more modest compared to Target stock, but these stocks also achieved above-average share price appreciation. Cluster 3 has the strongest financial performance of all key financial indicators. In this segment, Apple shares have shown the most outstanding performance, with a share price increase of 10% in 2016 and 46% in 2017, followed by a correction of -8% in 2018 and an 86% share price increase in 2019. Apple's outstanding performance was observed in several financial years during the period under review. Among the strongest Top 6 financial performers in Cluster 3, Texas Instrument shares returned 42% in 2017, while Caterpillar shares returned 21% in 2020. Based on the results of the sector analysis, it can be seen that the financial performance of companies was evaluated differently by investors across sectors, with some sectors showing stronger share price appreciation relative to the average return of all sectors. The largest impact of corporate free cash flow and return on assets and return on equity was observed in the technology, industrials, healthcare, financials, communications and materials sectors, as stocks in these sectors showed the highest returns. Forward P/E also shows that investors set different prices within the sectors. On the basis of forward P/E, real estate stocks were overvalued relative to the average stock valuation, which is probably the reason why stocks in this sector did not generate a significant increase in returns. The main limitation of this research is that we can only continue the analysis with the use of the constantly updated database. Furthermore, it is also challenging to collect the necessary data from multiple databases for a comprehensive analysis. The future aim of the research is to create a continuously updated database that will allow further analyses to be carried out.

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Pro bono activity in higher education with a project-oriented approach

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Abstract: Volunteering and mutual assistance are becoming increasingly important in today's fast-changing world. The growing social, income and knowledge gaps between different social classes are creating huge gaps. This is true at the social level, but also at the organisational level. Recognising problems and wanting to help are powerful values and skills that need to be recognised. In this paper we would like to present the main steps and stages of a pilot programme implemented at the Keleti Károly Faculty of Business and Management of Óbuda University, with a project-oriented approach, pointing out the constraints and the potential opportunities of the programme. This paper presents the partial results of a six-country (Spain, Portugal, Bulgaria, France, Hungary) Erasmus+ project named "Boosting Employability and Empowering Social Engagement in High Education through Pro Bono". Building on the experience of the programme, we would also like to present the future of the programme as a subject in higher education curricula. In this paper, we will present the results of the three pilot projects carried out over three years, along the lines described above, and highlight the importance of volunteering.

Keywords: volunteering, pro bono, CSR, project approach

1 Introduction

Volunteering and its importance is one of the most important core values of our time. Seeing problems, helping people in today's fast-paced world is very important. Different generations have different approaches to volunteering. According to the basic concept of generational marketing, each generation can be differentiated according to the common values that are specific to it. (Törőcsik, 2003). In this paper, we present the results of an international Erasmus+ project, "Boosting Employability and Empowering Social Engagement in High Education through Pro

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Bono", which was carried out in six countries (Spain, Portugal, Bulgaria, France, Hungary), along the project approach. The project involved young Generation Z students. Generation Z is also known as the "new-conservatives", the "Facebook generation", the digital natives, the "instant online" generation, the net generation, the iGeneration. Because of the former, they are often referred to as Generation C, named after the English word connection, or D, which refers to the word digital, but also R, which comes from the English word responsibiliy (Tari, 2010). They are the world's first global generation, growing up in the same culture, sharing the same food, fashion and places. Globalism is also part of their linguistic toolbox: modern technologies, IT and the online world have come of age with them and become part of their identity (Törőcsik, 2017). This also has an impact on their communication: they are at home in the online world, but face-to-face contact and social communication often confuses them (Tari, 2011). Another important characteristic of this generation is the search for experiences, which permeates their everyday life, determining their choice of sports and leisure activities, their cultural and consumption habits, and not least their learning and choice of jobs (Csehné 2017; Pink, 2010).

Another dimension of the research, beyond generational specificities, is pro bono, a specific volunteering activity based on professional knowledge transfer. It consists of young university students supporting non-profit organisations in the form of voluntary work on specific professional issues and projects under the guidance of company professionals. This has a number of benefits for both the universities and the companies that employ them, in addition to the non-profit organisations that receive support. It is beneficial for the employer because pro bono can fit well into the employer branding strategy: it gives employees the opportunity to work with other organisations, expanding and updating their knowledge and practical skills, while creating social value. This can take employees out of their daily routine and give them a sense of achievement in a noble cause that fits in with the corporate culture. This increases employee satisfaction, loyalty and motivation. As the programme is based on teamwork, it is also an excellent tool to develop teamwork and project spirit.

And for corporate HR, Pro Bono is also an excellent way to recruit and find prospective employees and talents: they can assess the professional competences and social skills of participating student volunteers in a live project. Such a process of recruitment has a much smaller margin for error than traditional methods (tests, interviews). In the current workforce context, characterised by an increasing demand for labour across Europe, HR needs all the tools it can get to help find and retain the right people (Kópházi, 2007; Lazányi 2014).

ProBono also brings adequate benefits for university actors. Universities can use the programme to strengthen the practical orientation of their training, expand their contacts with companies and use such events to sensitise teaching staff towards volunteering.

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During our programme, young students visited NGOs and transferred their economic knowledge to people who did not have the necessary skills to run their organisations and who did not have the money to improve their knowledge. The students mentored multinational companies and helped deserving NGOs, while ensuring the right professionalism. In this paper, we will share the characteristics and experiences of the three pilog projects implemented during the programme.

2 Pilot programmes implemented under the project

2.1 Characteristics of the first, long-term pilot programme

The first pilot programme under the programme was implemented in Hungary by the University of Óbuda in cooperation with the Volunteer Centre Foundation. During the preparation of the programme, the main concern was to ensure that the work could be fully integrated into the semester timetable of the students. In this pilot programme, a short description of the areas of knowledge to be transferred by the students was prepared. It was also here that the NGOs and the mentors and business experts were selected. An important aspect of the programme was to increase the social awareness and motivation of the students, so they had to have a clear vision of the framework of the programme. In addition to the university, the foundation involved in the programme has many years of experience and a wide network of contacts, which was a great advantage in this pilot programme. The NGOs selected for the programme were those that were looking for and in need of the knowledge that our students could offer them. It could be seen that the NGOs were mostly looking for the information needed to prepare and implement their strategic ideas and were also open to the information needed to select the right target markets.

2.2 Characteristics of the second, short-term programme

The second pilot programme was a short-term project. The conclusions of the first pilot programme were taken into account. We made the preparation process shorter and much more structured, and we were much stricter about deadlines. We have tried to incorporate all lessons learned into the subsequent programmes. During the preparation process, the main aim was to continue to fit the pilot programme into the semester timetable of the students and to adapt the programme to the subjects the students were studying. We then prepared a brief description of the knowledge we could offer to the NGOs. It was also at this stage that the mentors were selected and the students were introduced to the main steps of the Pro Bono programme. A high percentage of NGOs were looking for marketing communication solutions and asked for help in developing their online platforms.

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2.3 Characteristics of the third, medium-term programme

The third pilot programme was medium-term. It took into account the experience of the first and second pilot programmes. We made the preparation process shorter and much more structured and we were even stricter about deadlines. Unfortunately, this phase of the programme was interrupted by the pandemic. All work had to be transferred to online platforms, using online communication tools. This is where the first meetings with NGOs took place. The main aim of the first meetings was to gather the necessary information and to start developing solutions to their problems. The first meeting was followed by a series of online meetings to discuss issues related to the key problems faced by NGOs. The problems of the CSOs involved were very complex and multifaceted. The issues ranged from communication to day-to-day economic issues. In many cases, lack of funds was the main problem, so the students also developed fundraising campaign plans to increase their resources.

2.4 The tasks and tasks of the pilot programmes

The main tasks of the University in the three project phases can be summarised along the following lines:

- recruiting motivated students,
- finding targeted volunteering activities (skills) for the selected NGOs that we can help,
- support the coordination of the whole project from the university side,
- offering appropriate infrastructure facilities
- supporting students throughout the project (providing them with information, knowledge),
- an active partnership between the company, the NGO, the egetem and the ÖKA.

The diagnosis based on the pilot programme was very important for the study part in several respects:

- understanding the main characteristics of the pro bono programme: objectives, tasks, framework,
- the realisation that young people are open to doing something for society and that a well-targeted communication and programme can increase their social awareness,
- we could recognise that there are many NGOs in Hungary who are looking for the knowledge and professional support that we can offer them,
- the diagnoses provided a great opportunity to get to know better the partners of the pro bono programme.
- to increase the analytical skills of the students,
- to broaden our corporate contacts and our practice-oriented educational activities.

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The lessons learned from the pilot programme are summarised below:

- recruitment of students and NGOs should start a little earlier,
- ask for more written feedback from students from the very first step,
- the time frame and the
- time limits should be much stricter.

3 SUMMARY

The activity carried out under the programme can clearly be described as unique and innovative, with the challenges and new situations that it entails. The programme has brought many lessons for all parties. It was particularly interesting to see the differences between the national sections of these activities, the process of implementation and the difficulties encountered. These jointly implemented programmes, but run in different contexts, have provided a number of lessons on which to build an even stronger and more effective guidance campaign in the future. A particular benefit of the programme was that the students remained motivated throughout. They gained skills that cannot be taught in the classroom. Increasing our social awareness and the desire to help are human values in today's fast-paced world that should be emphasised and retained. In view of the positive impressions of the programme, we would certainly like to continue it in the future, launching separate courses to promote voluntary work, for which there is an increasing demand today, not only from NGOs but also from society as a whole.

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Agility in the online space - agile project management and the home office

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Abstract: In the last almost two years, our lives have changed significantly as a result of the pandemic of the coronavirus and the efforts to reduce the spread of the pandemic. We shop online more, we have learned about the pros and cons of digital education, and where it was possible and provided or could be provided, some or all of the workplaces and jobs have introduced, enabled or extended the possibility of teleworking. Our study set out to examine the impact of home office or hybrid working, which has proliferated in the last two years as a result of the coronavirus pandemic, on the increasingly widespread use of agile project management, including continuous contact and face-to-face communication, which has emerged from the world of software development and promises flexibility, responsiveness and effective change management. In order to understand the relationship and the impact of agile and the home office on each other, we conducted primary research through in-depth interviews with managers and experts involved in the field, to learn about their experiences, opinions and insights. In addition to presenting the principles and values of the agile approach and summarising its essence, we would like to present the results of this research.

Keywords: agility, project management, online space, home office

1 Introduction

The last two years have brought significant changes to our lives: the pandemic of the coronavirus and the measures and regulations it has brought in have had a profound impact on our daily lives. Measures taken to slow the spread of the epidemic, such as curfews, opening hours in restaurants and suggestions for fewer face-to-face meetings, have reduced the time we spend in the community, and the regulations on shops have changed the way many people shop. However, a new era has also begun for work, as the reduction in face-to-face meetings in the workplace has also brought about changes. Where it was possible, and where it was provided

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or could be provided, teleworking was introduced, enabled or extended. As a result, the number of workers who continued to work from home, in the home office, increased dramatically in just a few weeks. Some workplaces have switched to this form of working (almost) entirely, but perhaps even more so is the so-called hybrid solution: some workers work at their workplace, others work in parallel from home, and may take turns at certain intervals. This solution can reduce the number of face-to-face contacts while maintaining a lower level of attendance.

Of course, the use and feasibility of home office or hybrid working depends to a large extent on the activity carried out and the availability and feasibility of the technical conditions. There are some jobs and occupations (e.g. drivers, postmen) which, by their very nature, do not allow teleworking. But what about those organisations and projects where the agile approach and its methods, based on continuous, face-to-face communication, have become more widespread in recent years? How compatible is this with home office working? To what extent can agile methodologies be applied in such circumstances, when the possibilities for face-to-face collaboration are limited?

Our study aims to investigate the co-operability of agile project management and home office or hybrid working. To understand this, we conduct primary research and explore this through in-depth interviews. Before presenting the main results of this, we will use relevant literature to illustrate the principles and essence of the agile approach.

2 Agile project management

The true birth of the Agile approach to project management is often associated with the February 2001 Agile Manifesto, in which leading software development professionals summarised the four core values of the Agile approach. These are that personal communication between individuals is more important than the methods and tools used; working software is more important than detailed documentation; working with the customer is more important than contract negotiation; and effective change management is more important than full adherence to plans (Beck et al. 2001). However, as Špundak (2014) points out, the emphasis on the more important elements, the core values, does not mean that those that are opposed to them are entirely dispensable or unnecessary, but that they are de-emphasised.

The four core values are detailed in the Agile Manifesto in twelve principles: they are: delivering valuable software, change management, frequent delivery, continuous communication, motivated team members and trust between them, personal communication, progress, sustainable improvement, technical excellence, simplicity, self-organising team and frequent fine-tuning (Beck et al. 2001).

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These four values and twelve principles summarise the essence of agility. These characteristics help to identify what can be considered agile, and from these can be derived the various agile approaches, techniques and methods used. In the twenty years since the Manifesto was first drafted, a number of books have been published on these (Chin, 2004; Wysocki, 2007; Cohen, 2010; Cobb, 2011).

But what are the advantages and strengths of adopting an agile approach? According to DeCarlo (2004), the most important characteristic is adaptability, which is much more important than the predictability that is part of the traditional approach. As Špundak (2014) puts it, agility is actually the ability to balance flexibility and stability.

The major differences between the traditional (waterfall) and the agile approach are summarised in Table 1 below, based on some aspects.

Table 1: Key differences between traditional (waterfall) and agile approaches

Aspect, characteristic	Waterfall	Agile
Requirements	are clear from the start	changing during the process
Customer involvement	Not involved in development	Close and frequent collaboration
Documentation	detailed requirements	technical knowledge is much more important
Project size	larger	smaller
Team members	not focused, fluctuate	smaller, assembled teams
System failure	means serious consequences	less critical, manageable
Project plan	linear	complex
Key strengths	predictability	adaptability

Source: DeCarlo, 2004 and Špundak, 2014 based on own editing

3 Agile project management and the home office

3.1 The meaning of agility

In order to gain an in-depth understanding of the experiences and opinions on the impact of home office and hybrid working systems on the use of agile methodologies, which have been widely adopted as a result of the pandemic, primary research was conducted through in-depth interviews. In total, eleven managers with significant experience in project management and experts in the field were interviewed in spring 2021.

We chose qualitative research and in-depth interviews as the research method because we felt it was important to be able to ask the selected individuals questions personally, and to map their feelings and attitudes by seeing their reactions. In addition, the advantage of the in-depth interview is that it allows the subjects to answer the questions in their own words, to express their thoughts, to explain in detail their views on the topic, and thus to get a more accurate picture of their opinions and to know them better. In addition, the discussion may also bring to the fore other perspectives not previously expressed. In doing so, we followed the example of Suomalainen (2015), Srivastava and Jain (2017) and Kamei et al. (2017), who also used in-depth interviews to explore the agile approach and its application.

The topic, background and purpose of the in-depth interview were communicated to the participants during the first approach. A semi-structured interview outline provided the framework and the main direction of the interviews. The responses received were assessed using a traditional content analysis method.

The subjects of the in-depth interviews were agreed to be completely anonymous, so in order to respect this, they are referred to without their names when referring to their responses, and are mentioned or distinguished by their job or role where appropriate. Of the eleven professionals surveyed, nine work in the electricity, gas, steam and air conditioning, finance, insurance and information and communication sectors, and two did not wish to be named. Six of the interviewees are managers of some kind (technical, IT, project or general manager), two are agile coaches and one person works as a project manager, consultant or enterprise architect.

3.2 Perception of agility

The first thing we wanted to find out about agility was the general opinion of the interviewees, how they view it and what their perception of it is. In order to find out, we first asked the interviewees to briefly describe in a few words what agility means to them. The most frequently mentioned terms in the responses (mentioned by almost all interviewees) were clearly, and not surprisingly, flexibility and agility. Other terms mentioned are summarised in Figure 1 below.

Figure 1: Terms first mentioned in relation to agility
(source: own editing)

One of the agile coaches elaborated on this point: "agility is first of all a mindset, and only then a tool or framework. It is about delivering the best solutions, both at the operational level (things related to actual delivery) and at the meta level (building and optimising collaboration and performance)". According to another agile coach in the research, "agile is a set of meaningful processes built around goals and values".

In our opinion, the responses received can be divided into three main groups:

- terms and attributes considered as prerequisites for agile functioning (e.g. teamwork, decentralisation, allocation of responsibility);
- the consequences of agility (e.g. flexibility, speed, efficiency);
- terms referring to a complex approach and way of thinking (e.g. mindset, set of rational processes).

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3.3 Agile methodology in home office - just a constraint or does it really work?

In the next part of the interviews, we turned to the main question of our research: we wanted to know whether the interviewees think that the agile approach works in the home office system, whether they have experienced that agile methodologies can be applied in such circumstances, when the possibilities for personal collaboration are limited?

To investigate this, we first asked whether, in the interviewees' experience, the introduction of teleworking (in whole or in part) had necessitated changes in the application of agile methodologies. The responses reflected the fact that there was no particular need for direct or imposed changes among the interviewees in this respect. According to one agile coach, no changes had been made in the methodologies, but changes in the tools - adapted to the online space - had been made. It was added that there were cases where the new system had evolved naturally as a result of changed circumstances. The other agile coach underlined that in his opinion and experience, the importance of the coach's competences was particularly heightened during this period and in these circumstances.

We were also curious to know what the interviewees considered to be the most difficult aspects of the transition to the home office system. Some mentioned the transition to fully online communication: in their experience, many found it difficult to get used to this way of communicating and needed more time to get it running smoothly. This was particularly true for those who were completely new to this way of conducting meetings and discussions. The IT manager's view is that where agile is well organised, there is no problem in switching to teleworking. In addition to this, there were those who stressed that even if home office and agile project management could work together, this situation could make many people aware of the human aspect of the importance of personal relationships.

When working in a home office system, there are some digital tools that are essential for working: a laptop or tablet, or software and interfaces for online communication. We asked what tools and methods, in addition to these, support agile working in a home office. The IT manager pointed out that in such circumstances, it is even more important to have a continuous and accurate tracking of tasks, which requires a proper tracking and accounting system, as it is more difficult to monitor whether the employee is working as expected and actively. In addition, specifically related to the use of agile methodologies, the importance of trained agile coaches to help teams find their best solutions, whatever the circumstances, was also mentioned here.

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As shown in Figure 2, respondents highlighted flexibility, openness, punctuality, trust, responsibility, focus, activity and proactivity as key factors for a successful transition to home office working and for working effectively in such circumstances, as well as the ability to work independently and the importance of teamwork.

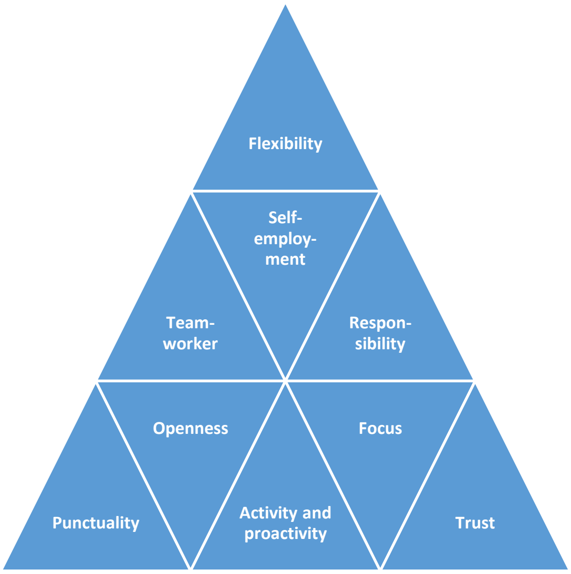

Figure 2: Competences required to run a home office according to agile methodologies according to interviewees
(source: own editing)

4 Summary

Based on the interviewees' responses to the interviews, we conclude that the key values and pillars of agility, personal communication and continuous contact through digital solutions, are not compromised when colleagues work in a remote home office environment. Nevertheless, according to the opinions and experiences of the interviewees, although there were some initial difficulties, in the long run, working under the agile methodology was not negatively affected by the home office or hybrid working system. Thus, overall, the managers and experts interviewed during the in-depth interviews unanimously attested that agility and agile project management works in the online space.

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Project finance panorama all over the world and in Europe during the pandemic

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Abstract: Project finance as a special structured finance product is a product of modern banking finance. Covering a great area since the 2000s, it is a risky but high-yielding form of credit, and a key instrument for financing large projects. In recent decades, this form of financing, which was brought to life by the abundance of liquidity before the 2008 crisis, has given rise to a number of projects of major importance worldwide, not only in economic fields but also in social fields as well. It is a popular form of financing for energy projects, telecommunications, transport infrastructure and even social facilities. However, its high risk and high amounts make it very sensitive to any economic changes. If we look at the crisis of 2008 and the periods that followed, this kind of sensitivity is very evident when we look at the data. With the secondary research presented in our paper, we want to investigate to what extent the crown crisis, which escalated in 2020, affected this type of banking products, what changes the crisis caused in project finance, inferring the extent and impact of the crown crisis.

Keywords: structured finance, project finance, pandemic, global trends

1 Introduction

The 21st century has significantly enhanced the value of management techniques that increasingly help operators to deal with complexity, difficult tasks and new challenges in a rapidly changing business environment. A few centuries ago, it was this need that gave birth to the roots of project management and project finance, which have now grown into a very serious management field, even a science. After the Second World War, but especially after the 1980s, interest in both areas increased considerably. Both have developed in parallel and very rapidly, as project management and project financing are inseparable processes. Given that projects

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also have budgets, the financial aspects cannot be ignored. However, the success of a project depends to a large extent on the type and risk of resources available for its implementation. Project finance is about more than just associating financial resources to projects. It is a much more complex category, involving financial planning, estimating and monitoring cash flows, analysing risks and the ethical and moral responsibility of economic operators. It is not only the project itself that is complex, but also the specific financing technique that seeks to provide an appropriate financial solution to achieve project success. The importance of the subject, not only today but also for the future, makes it extremely important to study and understand it.

2 Project finance as a source of funding for projects

Project finance is a financial activity closely linked to project management. Given that it costs money to implement a project (given that it has a budget), we cannot ignore the question of what resources are available to ensure its implementation. As with project management, the origins of project finance go back a long way. First observed in mining activities in the 13th century, this specifically structured form of financing was really appreciated after the Second World War, similar to the rise of project management (Finnery, 2007; Szalay, 2011). While in project management the project itself is the object of study (Verzuh, 2006), in project finance it is the cash flows from the project that really make the analysis important. Also, projects became really important for organisations after the 1970s, when the economic complexity of both the global economy and organisational markets slowly reached untraceable proportions (Verzuh, 2006; Gareis, 2007). Project management can be seen as the management of complex and novel tasks that could no longer be satisfactorily solved by traditional processes.

The project itself is specific in that it is a unique task with a precise objective and expected outcome, a budget, a deadline and a defined resource requirement (Görög, 2001). Not only the uniqueness of the project, but also, over time, its financing started to show very specific characteristics. The form of financing associated with projects itself has evolved until it is now a specialised area of project financing. The role of project finance became increasingly important after the 1980s (Brealey et al, 1996). In the 1990s, project finance was mainly used for large-scale investment projects, such as offshore oil field development or remote mining operations (Gatti, 2013). Today, it is also increasingly found in medium-sized projects. At its core, it consists of financing a specific economic entity created by sponsors and in which the lenders share the risks. And the financial resources are provided exclusively to the project (Pinto, 2017). Lenders are paid almost entirely or exclusively from the cash flows generated by the new project. The borrowers create an SPE, or Special Purpose Entity, which has no other function than to develop, own and operate the

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project object. Elsewhere, the same is referred to as SPVs, or Special Purpose Vehicles. The repayment of the funds raised to finance the project is secured by the cash flow of the project and the assets of the project (Basel Committee on Banking Supervision, 2004). The same idea is shared by Finnerty (2007), who argues that the cash flows from the project are considered as the source of their services (Wibowo - Kochendörfer, 2015) and that this also provides the return and the return on investment (Finnerty, 2007). The specificity of project finance can be seen through the creation of SPVs. This implies the creation of special project vehicles (SPVs), which are legally independent. Investments in these SPVs are finite and last for a limited period of time (Walter, 2017).

Similar ideas are expressed by Young (2015), who argues that project finance is an alternative financing mechanism for structural development and that project financing depends on the project itself, rather than on sponsors and lenders. He also mentions that these financing techniques involve significantly more risk than traditional lending (Young, 2015). Project finance is an extremely risky activity (Yescombe, 2002) and even riskier in developing countries (Young, 2015), so the risk analysis and financial planning behind it is not entirely straightforward. Project finance can thus be considered essentially as asset finance, with the repayment resources being generated by the project (Kónya, 2009). Project finance has found applications in an increasing number of sectors of the economy. It has become popular for investments in the energy sector, transport, infrastructure development, telecommunications or real estate development (Madácsi, 2013). Similar findings were made by Szalay (2011), who argues that project finance can also be found in tourism, public services, health and, last but not least, agriculture.

Project finance can be considered as a form of credit and is a fairly new area among the types of lending (Csiszárik-Kocsir, 2016). In this paper, we also see references to authors such as Newitt and Fabozzi (1997) and Yescombe (2008), who have provided very well-known definitions of project finance. Newitt and Fabozzi's definition is very similar to the one defined by the Basel Committee on Banking Supervision, while Yescombe (2008) also highlights the need for financial planning behind project finance, and he also mentions the importance of project cash flows. The above-mentioned 2016 article also sets out the target areas for project finance, which include, in addition to those mentioned above, the construction of motorways, paper production, the chemical industry and airports. It is clear from these examples that project finance is covering an increasing range of investments in the economy and is indeed becoming a popular financing technique. Yescombe (2008), in his book Fundamentals of Project Finance, reiterates the importance of financial planning and the planning of cash flows from projects. In his view, the greater the risk to which future cash flows from a project are exposed and the more uncertain they are perceived to be, the greater the investor's fears about the certainty of return. The author sees project finance as a financial planning tool to support the longer-term financing of projects (Yescombe, 2008). The importance of financial planning, indicators and equity is also highlighted by Kónya (2009). He also mentions that the financial part of project financing is not the only part of the process that is planned and organised, but that the whole project financing process itself requires a defined sequence of steps. In his view, five distinct steps should be mentioned when describing the project finance process. A review of the literature confirms the notion that this is indeed a well structured and planned process. The techniques of structured finance that have been constantly being developed over the last decades are clearly visible. It can be seen as a financing solution that focuses on well-defined, long-term objectives while creating the partners needed to achieve success and a framework that makes it possible to manage and share the risks inherent in the project (Nádasdy et al, 2011). In addition to the financial aspect of project finance, other risk factors need to be carefully considered. Berlinger et al (2015) raise a very interesting aspect in their paper. In the authors' view, it is not enough to conduct a purely financial analysis to assess project risks, given that financial indicators cannot be sensitive enough to factors such as actor behaviour, morality or ethics.

There are basically two ways in which economic operators can behave and this can have a major impact on the success of the project and therefore on the effectiveness of the project financing itself, or the return on investment of the project. The actors involved in a project will either do their utmost to ensure the success of the project or they will prioritise the maximisation of their own benefits. The maximisation of private benefit is contrary to the interests of the financier, not to mention the fact that improving the quality of the project is not the first priority during implementation. In addition, successful projects and the efficiency of project financing itself strongly require the right project manager (Greek, 2013; Verzuh, 2006; Gareis, 2007). The quality of project management is essential in this process, but is not the subject of this study. Whatever the project management, the risks that arise during the project need to be constantly monitored. Investment risk, operational risk and revenue risk should be carefully assessed before financing a project. These risks should be shared between the project sponsors, the lenders and the other project participants, otherwise there is a risk of failure and loss (Jenei, 2017). In this way, project success can indeed be in everyone's interest, as there are profit strings attached. If well designed and structured, project finance can be a useful tool to help raise finance, make the project a success and achieve its objectives, as well as to help investors achieve their interests and objectives.

3 Material and method

Refinitiv's report for 2019 and 2020 was used for the study. From this report, we worked with the data that is aggregated from the project financing stock data for 2018, 2019 and 2020. We were interested in the extent to which the pandemic crisis

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is affecting the project finance situation. What were the areas that were given higher priority in terms of amounts financed and number of projects financed as a result of the pandemic. The European situation is specifically addressed in the study, looking at the situation in the main target countries in both Western and Eastern Europe, with a particular focus on Hungary and its neighbouring countries. The paper presents the data in a descriptive manner, which is interpreted in a comparative way in the results section.

4 Results

Project finance, like all other forms of debt finance, is very sensitive to changes in the global market. Project finance reacts immediately to global market movements because of the large amounts and long maturities involved. In the event of a crisis, the amounts and number of deals are immediately reduced, thus holding back the development of large projects. Looking globally at the evolution of the amounts financed for projects, it can be seen that in 2019 there was a significant increase compared to 2018, as a 7.9% increase. In 2020, the amount financed compared to the previous year was only 89.5%, which is below the 2018 level. In the case of the Americas, a steady decline is visible, but in contrast, emerging countries, including Africa and Europe, have been able to grow significantly both compared to the previous year and compared to 2018. Asia and the Pacific jumped in 2019 but saw a huge drop in 2020 (70.5%), representing only 81.2% of the 2018 value. These figures show that investors see Europe and Africa as new potential destinations, while Asia is perceived as a risky place to invest. The decline in the US is visible because in previous years the US has highly outperformed other continents in terms of project finance and investors' risk assessment is also driving down the amounts invested there.

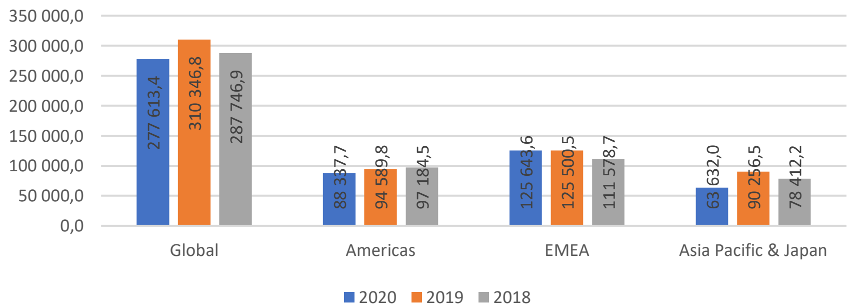

Figure 1: Value of project finance in each region of the world between 2018 and 2020 (USD million)
Source: own editing, based on Refinitiv 2019, 2020

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It is also worth taking a look at the distribution of project funding between industries. In terms of amounts, it can be seen that the energy industry has slightly decreased by 2020, so that it is hovering around the 2018 value. It can also be seen that oil and gas investments have increased for all the years considered compared to 2018. Telecom project finance amounts have also increased in 2020, and industrial outsourcing has also changed significantly. In terms of telecom outsourcing, it can be seen that in 2020 the amount outsourced was double the amount in the previous year, which also represents a 60% increase compared to 2018. Industrial investments in 2020 were also double the amount of the previous year, which also shows an increase of 36% compared to 2018. In contrast, mining is steadily losing value, and the chemical industry is also showing a very hectic trend. There has also been a very marked increase in the amount of project funding for waste treatment and recycling. While 2019 saw a terrible drop, the amount for 2020 has already increased sevenfold. Similarly, the amount of project funding for water and sanitation shows a huge jump within a year. All this suggests that investors are increasingly supporting the financing of projects related to basic utilities, but the 2020 data clearly shows the advance of the oil and gas and telecoms sectors. This not only shows the impact of the pandemic, but also highlights the energy crisis that could escalate in 2021.

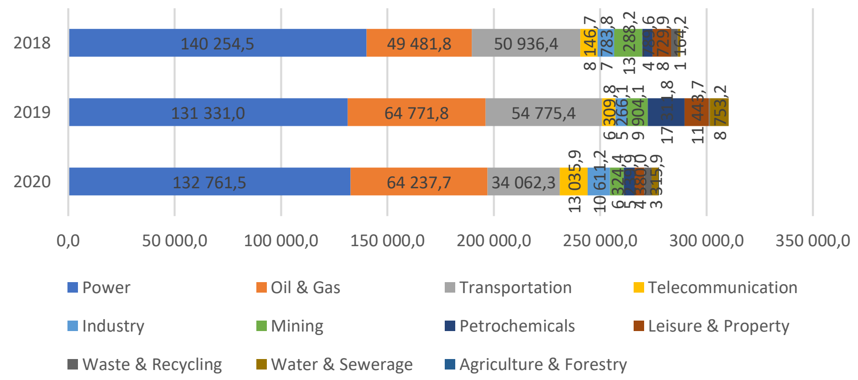

Figure 2: Value of project finance by industry between 2018 and 2020 (USD million)

Source: own editing, based on Refinitiv 2019, 2020

The value of the amounts financed per transaction is also very telling. It is clear to see what could be concluded from the amounts. America has the lowest value per transaction, which is also below the global value per transaction. Europe and Africa show a steady increase in values. Asia shows the most hectic jumps. While it had the highest value in 2019, by 2020 it had fallen back, falling behind Europe. The data clearly demonstrate the trend just described. The investment destinations that currently dominate the project finance market are clearly visible.

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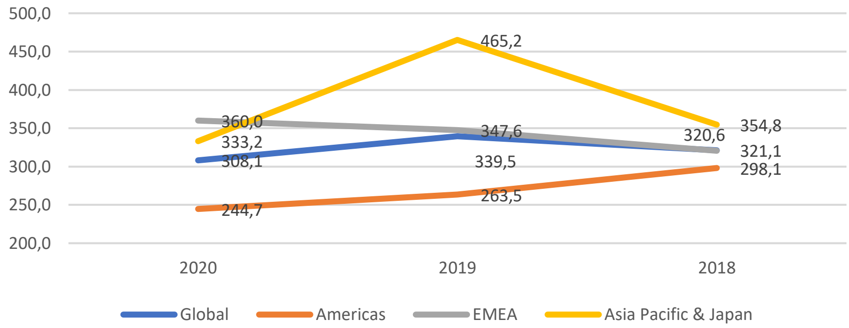

Figure 3: Average transaction value of project finance in each region between 2018 and 2020 (USD million)

Source: own editing, based on Refinitiv 2019, 2020

It is also worth looking at industry values in terms of values per transaction. It can be seen that there is a huge variation between sectors. The largest values per transaction are in the oil and gas, telecommunications and chemicals sectors. In addition, waste management and recycling have high values. In 2020, the oil and gas industry has the highest value per transaction,

In 2019, the chemical sector was clearly the highest. It is interesting to note that telecoms only had the highest value per transaction in 2018, due to the high cost of investment.

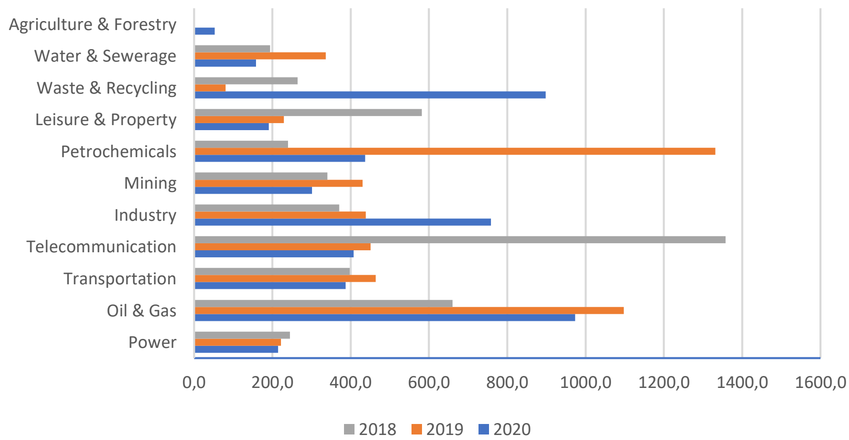

Figure 4: Average transaction value of project finance by industry between 2018 and 2020 (USD million)

Source: own editing, based on Refinitiv 2019, 2020

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We now turn to the European picture. It is clear that Western Europe continues to be a prime target for project finance compared to Eastern Europe. The top two countries were clearly the best performers in 2019 and 2020, but Spain came third in terms of the amount of project funding.

In these countries, energy investments were the main beneficiaries of project finance. The largest investments were in renewable energy, with a high proportion of wind farms financed from this source of finance. In France, another telecoms investment stands out in 2020, with a high value in terms of project financed amounts. In Eastern Europe, Turkey, Russia and Serbia topped the ranking in 2018. In 2019, Russia and Turkey continue to lead, but interestingly, Hungary has also been ranked in the top spot. In 2020, Russia was followed by Poland and Croatia with a mixed bag of energy investments.

Table 1: Project funding values for European countries between 2018 and 2020 (USD million)

	2018	2019	2020		2018	2019	2020
Western-Europe	79 824,2	75 959,6	75 359,4	Eastern-Europe	12 411,6	24 471,2	6 865,4
United Kingdom	22 843,1	26 249,8	21 672,7	Russia	1 927,2	16 789,8	2 023,3
France	8 454,7	11 910,5	15 591,8	Turkey	8 001,1	4 918,3	1 027,1
Spain	4 973,5	11 727,1	15 555,2	Hungary	246,3	989,9	230,4
Italy	16 598,4	5 636,9	2 232,6	Ukraine	98,9	0,0	0,0
Netherlands	7 358,5	5 136,2	2 782,1	Poland	658,4	385,2	1 856,6
Germany	6 763,2	3 426,8	7 584,0	Serbia	750,9	317,0	126,6
Norway	1 074,4	2 672,0	1 078,6	Croatia	282,0	222,6	1 095,8
Belgium	3 173,4	2 639,1	1 907,6	Bulgaria	0,0	175,0	150,0
Sweden	1 982,0	1 702,3	3 253,9	Slovak Republic	26,4	0,0	0,0
Portugal	3 514,2	1 642,6	1 994,6	Romania	0,0	0,0	216,6
Ireland	597,0	1 236,9	495,6	Lithuania	0,0	0,0	76,9
Finland	661,7	649,8	909,3	Czech Republic	0,0	0,0	62,2
Switzerland	96,5	0,0	0,0				
Greece	728,9	129,6	126,0				
Austria	0,0	0,0	163,8				

Source: own editing, based on Refinitiv 2019, 2020

5 Summary

As described above, project finance remains a significant source of financing worldwide. However, investors' assessment of risk is highly variable. They prefer regions where they can safely rotate funds invested for the long term. We certainly benefit from the fact that Europe ranks high in terms of funding sources, both in terms of the amount financed and the value per transaction. However, it is also important to see that there is huge competition between continents. The projects that receive this form of funding for our major projects are those that can offer the right advantages and guarantees to their investors. For our country, it is good news that we are in a leading position in the Eastern European field. Although we do not have huge oil and gas resources, we are a popular destination, which means that we have been able to raise funds every year. From renewable energy sources to leisure infrastructure, Hungary is also keen to finance leisure activities. In terms of project finance, our risk rating is good, so if the global economy does not show any further signs of the coronavirus epidemic, Hungary can expect to continue to receive adequate and sufficient resources in the future.

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Consumers' Purchasing Decisions as a Resultant of the Perception of Selected Elements of the Packaging's Visual Layer

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Abstract: This article focuses on the marketing function of packaging which plays an important role in packaging science. The visual layer of the packaging, including all information placed on it, determines the choice of a specific product by the consumer. Due to the growing number of products, and thus - packaging, the marketing function of packaging is gradually changing. Nowadays, the basic features of the packaging, such as shape, form, colors or graphic design, cannot be enough to gain a competitive advantage. The packaging of the product enables to create a unique brand image in the eyes of consumers and to present the features and values with which a given brand wants to be identified. It is an increasingly common practice to try to evoke a feeling of individuality in the customer, which is achieved by personalizing the packaging. Among the huge number of products, consumers' purchasing decisions are therefore largely dependent on the visual layer of the packaging, which is the main means of communication between the producer and the consumer. The aim of the article is to emphasize the importance of the marketing function of the packaging in terms of its impact on consumers' purchasing decisions. The presented considerations can be a source of information for both producers and consumers.

Keywords: packaging; marketing; consumers' purchasing decisions; visual layer of packaging; functions of packaging

1 Introduction

Nowadays, the choice of the appropriate product by the consumer can be a challenge. Producers offer a number of products of a given type, and the consumer, having a very wide choice, is not able to thoroughly analyze each of them. Consumers, seeing a large amount of products, of various types, in various packaging, face the problem of choosing the product that is most suitable for them. The fast pace of life of people in the 21st century, combined with the multitude of

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the product offer, means that consumers often make purchases rapidly and without much thought. One of the elements influencing the choice of the final product by consumers is the packaging and its visual layer. The often commonly used saying: "people buy and consume with their eyes" seems to be confirmed. Packaging is one of the most important elements that distinguish the product from others offered by other manufacturers and is able to influence the consumer's purchasing decision. The intention is to influence the psyche of the consumer in such a way that he consciously or subconsciously chooses a given product, and the packaging is to prove the attractiveness and high quality of the product. Packaging and its visual layer are playing an increasingly important role due to the intensive competition in the market.

2 Functions of packaging with reference to marketing function and its impact on the perception of packaging by consumers

According to the definition, packaging is a product with a specific structure, that should protect both the product inside the packaging against damage and the user of the product. According to one of the divisions, the packaging has basic functions such as: protection, informative function, ecological function, economic function, and marketing function (Tomiczek 2021).

One of the primary and obvious objectives of the package is to protect the product. This is the most important function among the functions of packaging. The package protects the product from the harmful elements of the environment and simultaneously, protects the environment from the product.

Another function of packaging is informative function that allows to identify and distinguish products. The packaging should contain information about the product, its composition, purpose and price. It is assumed that the appropriate selection of information included on the packaging should understandably inform the consumer about the packed product. Obligatory information that includes the details of the goods are specified in the Regulation of the European Parliament and the Council of the European Union No. 1169/2011.

The ecological function of packaging has been gaining importance for decades. Nowadays, the packaging that is currently placed on the market must meet certain standards that define the type of material used. It must be more friendly to the environment and should be biodegradable (Ahani et al. 2014).

Another function is economic that includes the relation of manufacturing costs to distribution costs. The goal is to minimize packaging costs while maintaining quality.

The last from the basic functions of packaging concern about marketing affairs. The marketing function plays a special role in packaging. When choosing a product, consumers primarily pay attention to the packaging. Packaging is designed to evoke the willingness to buy. Currently, enterprises use similar research methods, as a result of which competition between them is inevitable. Therefore, it is important to be aware that the packaging, which is similar to the competitive one, will not gain a unique position on the market. The manufacturer has just a few seconds to interest the consumer with his product and attract attention, and the tool used to achieve this goal is packaging. The visual layer of the packaging is of particular importance, as its individual elements determine the choice of the product. The purpose of the combination of the elements of the visual layer of the product is to create a positive impression in the minds of consumers about the product and reach for its purchase. Carefully designed packaging evokes positive associations and reaches the consumer's subconscious, creating a bond with him. Organizations analyze consumers behavior to launch to the market appropriate products. Combination of consumer's thoughts, emotions, the behavior of the consumer individually, the target groups of consumers and the society is changing constantly. The dynamic nature of the consumer behavior makes the development of marketing strategies also regarding packaging (Hawkins et al. 2010).

3 Marketing in packaging – classical elements

The packaging is a multifunctional product, and its visual layer is the image material of the product. The task of the visual layer of the packaging is to draw the consumer's attention through an appropriate combination of shape, form, color and graphics (Ankiel-Homa 2007).

Shape of packaging is important because the packaging should be handy and comfortable in use. Moreover, the packaging with an innovative shape can also be a decoration. Nevertheless, when designing the shape of the packaging, attention should be paid to the need to limit natural losses.

Figure 1 Evolution of shape of the Coca-Cola bottle

source: https://forsal.pl/galeria/615239,coca-cola-konczy-126-lat-zobacz-jak-zmieniala-sie-legendarna-marka.html (access: 9.12.2021)

The size and form of the packaging are further elements characterizing the packaging and influencing the choice of a given product. There are products available on the market in bottles, jars, boxes, etc., and the manufacturer is able to distinguish a given product if he uses non-standard dimensions and forms according to current trends.

Furthermore, consumers' choices are subconsciously influenced by the colors of the packaging. Color is an integral part of packaging design and contributes to its efficiency by attracting attention and facilitating identification. Colors are responsible for emotions and impressions, and manufacturers, thanks to the use of appropriate colors, are able to encourage the consumer to buy the product they offer. The consumers perceive the product with all his senses. Due to the function it should perform, the packaging must be graphically interesting. The color must be adapted to both the product itself and the group of customers whom it is intended. It should be remembered that each color symbolizes emotions and evokes specific associations (Simmonds, Woods, Spence 2015).

Another basic element of visual layer of packaging is the graphics that should be understood as a set of specific signs that allow to distinguish and identify products thanks to an appropriate system of signs. The graphic of the visual layer of the packaging has two basic functions. Firstly, graphics are a carrier of information about the product, so its task is to draw the consumer's attention and distinguish the product, and the second function is to influence the consumer's emotions. Graphics should emphasize the most important features of the product (Szymczak, Ankiel-Homa 2007).

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4 Marketing in packaging – important elements at present

Nowadays, the classical elements of marketing in packaging are not enough. The packaging has lost the ability to distinguish itself with the appropriate shape, dimensions, form and color. Today, the most important elements influencing consumer purchasing decisions include brand, personalization, being environmentally friendly and design.

The packaging is used to emphasize the brand image, the character of the product, and to increase the producer's recognition. Thanks to this, the packaging becomes a carrier of information not only about the product itself, but also about the brand and its values. The brand can be identified by the consumer, and building positive associations with the brand contributes to increasing the competitive advantage only thanks to the brand. Scientific studies show that consumers demonstrate brand identity by the packaging of the product they offer. Therefore, the manufacturer has all the tools to influence the opinion of unaware consumers[3].

The other aspect is personalization that is defined as a process of creating a shopping experience that aims to reach a single customer and give them a sense of uniqueness. To achieve this, it is necessary to develop a strategy that will not be based only on a universal, homogeneous approach to the group of consumers'. For example, the Coca-Cola company added value to its products by the possibility of creating a label with any name or phrase while on the website of the Oreo brand, there was a possibility to freely color the design of the packaging of cookies.

Figure 2 An example of personalized packaging of Oreo cookies
source: https://unilogo-drukarnia.pl/wlasne-opakowanie-oreo (access: 9.12.2021)

Nowadays, there is a necessity to produce ecological packaging that aims implement ecological packaging solutions. The main goals are to reduce the impact

[3] According to: https://munjodesign.pl/opakowanie-produktu-a-wizerunek-marki/, access: 9.12.2021

of companies on the ecosystem and to promote more responsible consumption by users of goods. In fact, for packaging to be considered "green packaging" there must be fulfilled requirements[4]. For example, the packaging must be reusable for the other purposes or be recycled to create new materials. The activity supporting environmental issues in the context of packaging is the idea of a circular economy. According to the European Strategy for Plastics in a Circular Economy, the amount of plastics recycled should be constantly increased. There is also a need to limit the production of plastic packaging, which is replaced by paper (Tomaszek 2019).

In modern packaging a significant element is design. Packaging design is a combination of colors, forms, structures, materials, images, typography, and the information combined, which together with additional elements create a packaging. The design of the packaging consists of many factors, all of which must form a coherent and consistent whole. It is important to design the packaging in such a way that the consumer's attention is attracted. The key is to follow the current trends in packaging design. At present, the pattern is particularly important, as it is an effective element of the packaging design. Patterns work well both in the case of rich designs and minimalist packaging such as "less is more" (Hanssen 2010).

5 Packaging of visual layer of beer – own research

5.1 Research subject and methodology

The research was conducted at the turn of 2020 and 2021. The research group consisted of consumers over 18 years of age who purchase beer with different frequency. The beer packaging in the form of a glass bottle is by far the most common. The classic bottle has a capacity of 500 ml, however bottles with a capacity of 330 ml are becoming more and more common. Nevertheless, the largest number of bottles in the store is 500 ml.

Interviewees responded relatively willingly, even though due to the COVID-19 pandemic, access to respondents was difficult. The study was conducted "live"; respondents had the opportunity to directly evaluate the beer packaging, which determined the high reliability of the study. However, due to the pandemic situation, a research group was unrepresentative: in the study participated 28 men and 22 women. The most numerous respondents were young people - aged 18-25, who represented 50% of all respondents. A product evaluation form was used to conduct

[4] According to: https://www.spg-pack.com/blog/pl/opakowania-ekologiczne/, access: 9.12.2021

the research. It applied the form of individual interviews with filling the product evaluation form.

The subject of the research were beer bottles with a capacity of 500 ml with the content inside (4 bottles of "Ipa" beers and 4 bottles of non-alcoholic beers).

Figure 3 Research subject – 4 bottles of “Ipa” beers
source: author’s photos

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The respondents were generally divided into working people (23 respondents) and pupils/students (20 respondents). The rest were unemployed or retired people.

The study was conducted using the product evaluation form. The respondents answered 3 questionnaire questions and 7 questions related to the research question. The respondents had 8 different bottles of beer produced by different producers at their disposal. They were asked for:

- evaluating beer bottles in terms of selected features,

- choosing which beers they would like more,

- choosing the most important factors that guide buying beer.

The research results made possible to identify the consumers' behavior purchasing beer.

5.2 Results

The respondents were first asked to evaluate selected product features on a five-point scale (5 - meant the highest score, and 1 - the lowest). The average scores for the examined features are presented in the tables.

Table 1 Average ratings of the packagings of "Ipa" beers in terms of selected features

Trade name	Visibility of the manufacturer on the label	Visibility of the variety/type of beer (e.g. Ipa)	Visibility of the alcohol volume	The colors of the label
„Ból zęba" („Toothache")	3,58	3,56	4,30	3,82
„Święty spokój" („Peace of mind")	4,18	3,16	3,36	3,46
„Jungle Ipa"	3,68	4,38	3,06	3,90
„Ipa"	3,12	4,94	2,42	2,98
Trade name	Label elements coherence	Graphics	Ergonomics	Overall evaluation of the packaging
„Ból zęba" („Toothache")	4,08	3,78	4,56	3,84
„Święty spokój" („Peace of mind")	4,18	4,20	3,96	3,86
„Jungle Ipa"	4,00	3,92	3,98	3,78
„Ipa"	3,74	3,20	3,88	3,34

source: own elaboration

Due to the general attractiveness of the packaging, the beer with the trade name "Święty spokój" ("Peace of mind") was rated the highest. The respondents in this package will also give the most points for features such as: graphics, label elements coherence and the visibility of the manufacturer on the label. A beer with the trade name "Ból zęba" ("Toothache") also received a high score in the feature "overall evaluation of the packaging". Moreover, in "Ból zęba" ("Toothache") the visibility of the alcohol volume in the product and the ergonomics of the bottle were rated the highest.

The beer with the trade name "Ipa" received the lowest marks, with as many as 7 out of 8 characteristics rated the lowest; including the overall attractiveness of the packaging. Only the visibility of the variety/type of beer (e.g. Ipa) was rated higher in this beer than the others.

The assessment of the overall attractiveness of the packaging is not directly correlated with the assessments of other features, however, this assessment may result from them. Taking this feature into account, the Ipa beers were rated in the following order (according to trade names):

1. Święty spokój (Peace of mind),

2. Ból zęba (Toothache),

3. Jungle Ipa,

4. Ipa.

Another way to evaluate is to treat all features as being of equal importance. The point averages of the eight features were summed up and the ranking is as follows:

1. Ból zęba (Toothache) - 31.52 points,

2. Jungle Ipa - 30.7 points,

3. Święty spokój (Peace of mind) - 30.36 points,

4. Ipa - 27.62 points.

According to the adopted evaluation criterion, the beer with the trade name "Ból zęba" ("Toothache") was rated the highest.

Table 2 Average ratings of the packagings of non-alcoholic beers in terms of selected features

Trade name	Visibility of the manufacturer on the label	Visibility of the variety/type of beer (e.g. Ipa)	Visibility of the alcohol volume	The colors of the label
„Kormoran" („Shag")	4,30	4,42	3,20	3,62
„Ole"	2,90	3,44	3,94	3,50
„Zaraz wracam" („I'll be right back")	2,88	3,16	2,70	3,24
„Spryciara" („A smart cookie")	2,12	2,52	2,70	3,24
Trade name	Label elements coherence	Graphics	Ergonomics	Overall evaluation of the packaging
„Kormoran" („Shag")	4,40	3,60	4,16	3,92
„Ole"	3,28	3,32	3,60	3,46
„Zaraz wracam" („I'll be right back")	3,42	3,36	4,22	3,22
„Spryciara" („A smart cookie")	3,42	3,44	3,66	3,32

source: own elaboration

Among the non-alcoholic beers, "Kormoran" ("Shag") was rated the highest in terms of the overall attractiveness of the packaging. Beer with this trade name was also ranked the highest in terms of visibility of the producer's name on the label, visibility of the beer variety/type (e.g. alcohol-free), color of the label, label elements coherence and graphics.

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Taking into account the "overall evaluation of the packaging" feature, the order of non-alcoholic beers is as follows:

1. Kormoran („Shag”),
2. Ole,
3. Spryciara („A smart cookie”),
4. Zaraz wracam („I'll be right back”).

By combining the average ratings of all eight characteristics, the ranking of beers is presented in the following order:

1. Kormoran („Shag”) - 31.62 points,
2. Ole - 27.44 points,
3. Zaraz wracam („I'll be right back”) - 26.2 points,
4. Spryciara („A smart cookie”) - 24.42 points.

The respondents were also asked to rank beers of a given variety/type, first according to labels (starting with the one they like the most), and then according to which they would like to buy the most. The questions were somewhat biased but forced the respondents to think; the same rankings gave a signal that the respondent selects a beer based on whether he or she likes a given label.

Among the rankings of "Ipa" beers, as many as 24 out of 50 respondents made the same first and second rankings. Among the rankings of non-alcoholic beers, 21 out of 50 respondents made the same first and second rankings. In the remaining responses, the rankings generally differ only slightly from each other.

Among the "Ipa" beers, Jungle Ipa (15 indications) turned out to be the most popular beer. The respondents were least willing to reach for beer with the trade name "Ipa" (17 responses).

The most favorable balance is shown by the beer "Święty spokój" (“Peace of mind”): 12 people would like it most willingly, and only 4 - the least willing. The least favorable balance is shown by the beer "Ból zęba" (“Toothache”): 10 people would use it most willingly, but as many as 15 - the least willing.

Among the non-alcoholic beers, the beer that respondents would choose most often turned out to be "Kormoran" (“Shag” - 24 indications). The respondents were least willing to reach for beer with the trade name "Spryciara" (“A smart cookie” - 15 responses).

“Kormoran” (“Shag”) beer shows the most favorable balance: 24 people would like it most willingly, and the least willing - 12 people. The least favorable balance is shown by the beer "Zaraz wracam" ("I'll be right back"): only 5 people would choose it most willingly, and 14 - the least willing.

The respondents were asked to indicate the three most important criteria that they take into account when buying beer of a given type. The most important criterion - 14 people indicated the manufacturer/brand, 11 people chose the extract content and the level of bitterness in the product, and 10 people indicated the alcohol content in the product.

Indications were taken as point values; 3 points were awarded to the most important criterion chosen by the respondent, 2 points - the second most important criterion, 1 point - the third most important criterion. On this basis, the ranking of the most important criteria is as follows:

1. Producer/brand and alcohol content in the product - 62 points each,
2. Price - 60 points,
3. The content of the extract and the level of bitterness in the product - 49 points,
4. Label attractiveness - 38 points,
5. Product description on the label - 24 points,
6. The shape of the bottle - 5 points.

The results of the product evaluation form provided a lot of information.

Firstly, among the beers of the "Ipa" variety, the sum of the assessed characteristics was comparable in the case of three beers: "Ból zęba" ("Toothache"), "Jungle Ipa" and "Święty spokój" ("Peace of mind"). Beer with the trade name "Ipa" was rated significantly lower. This assessment is confirmed in what follows, where as many as 17 people would be least likely to buy this beer. The packaging features with the highest scores for this beer are visibility of the variety/type of beer (e.g. Ipa), bottle ergonomics and label elements coherence. Therefore, it can be concluded that these features are of little importance when purchasing beer by consumers. The low importance of the ergonomics of the bottle is also confirmed. Consumers indicated the shape of the bottle as the least important factor when buying beer.

Among non-alcoholic beers, the beer under the trade name "Kormoran" ("Shag") obtained a significantly higher number of points in the first level of research compared to the other three beers, which is confirmed in the second level of research. As many as 24 people would prefer the "Kormoran" ("Shag") beer. In the "Kormoran" ("Shag") beer, the visibility of the alcohol volume in the product was rated the lowest. However, a low assessment of some of the features from the first level, e.g. the visibility of individual elements, does not have to result in a lack of willingness to reach for a given bottle of beer.

The most interesting answers concern about the most important factors selected by the respondents. They indicated the manufacturer/brand and the alcohol content of the product. The attractiveness of the label was placed only on the 5th place out of 7 features. Nevertheless, in rankings from the second level research, as many as 45 out of 100 rankings had the same order both in the selection of beers in terms of label and the willingness to reach for the presented beers. This result may suggest that consumers are not aware that the label plays a significant role when purchasing beer. Respondents may follow it even though they think they do not or should not do it.

The test results provide a lot of information about the analyzed beer packaging and their visual layers, however, the suggested recommendation is to perform an in-depth study for various product groups and taking into account a representative group.

6 Conclusions

Nowadays, the visual layer of the packaging plays a significant role in attracting consumers' attention. Packaging design is becoming increasingly important. Basic packaging elements such as shape, dimensions, color and graphics are currently insufficient to make consumers want the product. Today, the particular importance is played by the brand and its perception by consumers, packaging personalization, designing with the care of the natural environment, and reducing waste consumption in mind, as well as a unique packaging design considering the current trends.

The conducted own research has shown that the visual layer of the packaging is an important factor determining consumers' purchasing decisions. Moreover, consumers are not necessarily aware that they are making their purchase based on a subjective assessment of the visual layer of the packaging. As a result, manufacturers are faced with the possibility of a real influence on consumer choice.

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Cybersecurity issues in power systems

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Abstract: As a result of technological advances, humanity has become increasingly vulnerable to the operation of information systems. We have built ourselves an infrastructure system that supports our daily lives and makes them more comfortable, but these systems rely almost entirely on IT systems. However, with the development of information technology in the early 2000s, the level and number of remote management and convenience services provided by infocommunications has risen to such a level that there is almost no organization or company operating a critical infrastructure that is not connected to the World Wide Web. However, everything requires electricity. The electricity system has undergone significant change since the last decade: the path from electricity generation to the consumer is more complex and unpredictable with the spread of green energy. All of this absolutely highlights the key role of security of supply. The lecture and the related publication deal with the structure and basic technical knowledge of the electricity sector as a critical infrastructure area. The basics and infrastructure of electricity supply and the operation of the Hungarian electricity system are described. It deals with the control, protection, automation and communication systems of the electricity system. The publication is the examination of the cybersecurity issues in power systems as the greatest cyber security risk nowadays.

Keywords: power systems, critical infrastructure, electronic information systems, cybersecurity risks

1 Introduction

One of the main tools and channels of globalization since the 1990s, the explosive development of the Internet and mobile data communication technologies. The infocommunication systems and other electronic systems for example power systems pose threat serious security risks everywhere in the world. It is very important to note that the protection of electricity systems is a burning issue not only in terms of cybersecurity but also in all other respects, as we are talking about critical infrastructures.

The failure of a given system element can trigger an avalanche in the system due to interdependence, just think of the relationship between nuclear power plants,

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internet service providers and banks as an example. Based on the topic raised we have two main questions, to which we are looking for answers:

- Will there be high quality and high secure power systems services available?

- Will there be cyber security conscious users?

2 The global trends driving the cybersecurity issues in power systems

However, since the development of information technology in the early 2000s the World Wide Web has used risen dramatically. We have built ourselves an infrastructure system that supports our daily lives and makes them more comfortable, but these systems rely almost entirely on IT systems (Kralovánszky, 2021). The electricity system is essential for our everyday lives, and the continuous supply of electricity has become a matter of civilization. As a vital component of the system, its impact on the population is extremely significant. That is why its protection is of paramount importance, as its continuous, intact operation is essential to the functioning of society.

However, potential operational problems in the electricity supply may not only affect the daily lives of the population, but may also affect other critical infrastructures, which is why we consider them to be the most critical critical infrastructure. Electricity has undergone tremendous development in recent decades. In the last century, it was still completely natural to check all instruments manually, record the data they measured on paper, and use the fewest digital instruments in the various processes. However, technological innovations and the opportunities they offer quickly spread to the sector, as it became possible to perform increasingly complex tasks in an increasingly shorter period of time, and the sector is now highly IT-dependent (Kralovánszky, 2019). As a result of technological advances, humanity has become increasingly vulnerable to the operation of information systems.

However, everything requires power systems.

Slogan: 'If there is electricity, everything is there!'

Hypothesis: 'Without IT, there is no electricity!'

The electricity system is indispensable for our everyday lives, and the continuous supply of electricity has become a matter of civilization (see Fig. 1). As a vital component of the system, its impact on the population is extremely significant. That is why its protection is of paramount importance, as its continuous, intact operation is essential to the functioning of society.

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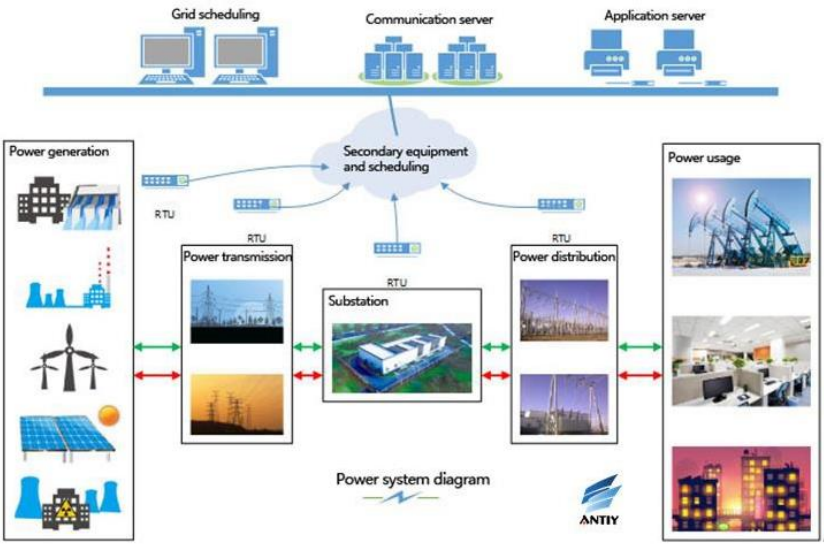

Figure 1 Power system diagram

Source: Antiy Labs (2016) available: https://www.antiy.net/p/comprehensive-analysis-report-on-ukraine-power-system-attacks/

However, potential operational problems in the electricity supply may not only affect the daily lives of the population, but may also affect other critical infrastructures, which is why we consider them to be the most critical critical infrastructure (Kralovánszky, 2021). Modernization, together with the impact of technological penetration, is also showing an increasing trend in the variety of attacks against them. As facilities that are particularly important for the operation of the state are currently regulated by technical means, special attention must be paid to their protection and safety. In the event that the technical equipment of the above facilities is not adequately protected, the object of the location's function may be compromised in the event of a cyber attack. The first precedent in our history for a cyber attack that caused a problem in an entire country occurred in Ukraine on December 23, 2015 (see Fig. 2).

The day before, as a result of a cyber attack, an electricity supply facility collapsed, leaving the majority of consumers unserved. Studying cases like this is important from a preventive point of view to avoid carrying out attacks like this in the future. It is known that the operation of critical infrastructures (for example: utilities, transport, etc.) is inconceivable without a continuous supply of electricity. Given this dependency, the electricity system can be considered, with a slight exaggeration, even the most critical infrastructure to be protected, including the continuous strengthening of its cyber security in line with current threats. As a concrete precedent, the cyber-attacks against the Ukrainian electricity (power) system in 2015 and 2016 provided a sobering signal. However, the number of cyber security incidents in the energy sector has increased in recent years. These facts absolutely highlights the key role of security of power system (Görgey, 2020):

The lessons learned from the attacks on the Ukrainian electricity system have been presented and analyzed in a number of reports, studies and articles. Most of these cases have been examined from the cyber security the point of view. One of the possible reasons for this professional imbalance is that there is no current protocol for with incidents affecting the electricity system with cyber security and energy aspects together. Already the target choices of the 2015 attack indicated that the attacker had a thorough knowledge of the electricity supply process and its practical details. But when analyzing what happened in the 2016 attack, we know for sure, that although the attacker had a clear knowledge and plan for physically damaging the attacked power grid, the criminals could not cause actual physical damage due to their encryption error. The analysis of the 2016 attack showed that an effective analysis of a cyber attack on the electricity system is only possible in close cooperation involving all the disciplines affected by the attack, including electricity professionals. There had been no protocol for this integrated approach to incident investigations before this incident.

3 The risks and challenges of deploying power systems

Electricity has undergone tremendous development in recent decades. In the last century, it was still completely natural to check all instruments manually, record the data they measured on paper, and use the fewest digital instruments in the various processes. However, technological innovations and the opportunities they offer quickly spread to the sector, as it became possible to perform increasingly complex tasks in an increasingly shorter period of time, and the sector is now highly IT-dependent (Kralovánszky, 2019).

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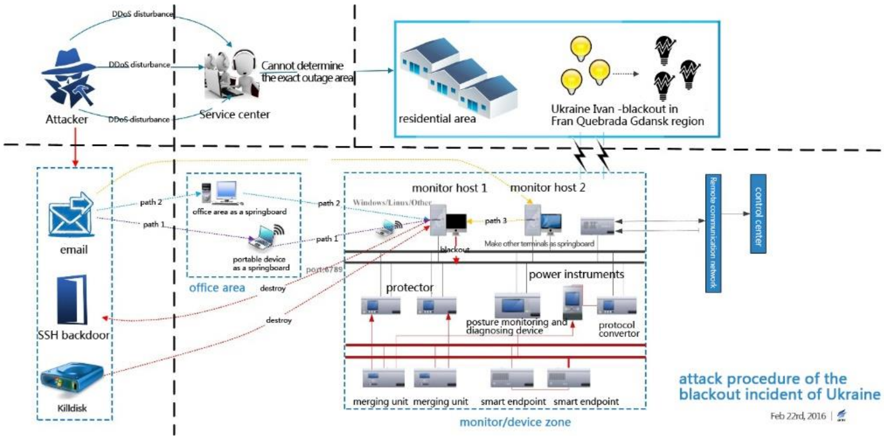

Figure 2 Attack procedure of the blackout incident of Ukraine
Source: Antiy Labs (2016) available: https://www.antiy.net/p/comprehensive-analysis-report-on-ukraine-power-system-attacks/

But as in all sectors, including electricity, the spread of new - computing - innovations has created more and more cyber security vulnerabilities, so much so that the possibility of cyber-attacks is now a growing threat to the sector. The first “warning” for this was given by Stuxnet in 2010 (David, 2013). The attack exploited 4 different Windows 0-day vulnerabilities to spread a malware and replaced the WinCC DLL with a man-in-the-middle attack against PLCs (Programmable Logic Controller) controlling uranium enrichment centrifuges. The significance of this attack lay in the fact that it was the first cyber attack that also caused physical damage to the attacked system. In 2016, an attack on the Ukrainian electricity grid took place along a similar principle (Antiy Labs, 2016).

On December 17, 2016, there was a 24-hour power outage in Ukraine, affecting nearly 250,000 households. The paralysis of the Ukrainian electricity network, like Stuxnet, was caused by a malware identified as Win32 / Industroyer (Todros, 2018). The attacker attacked the substation of the Ukrainian electricity system near Kiev (Pivnichna North). It should be noted that prior to the attack, several images and videos were uploaded to the Internet in connection with the renovation of the substation, which presumably facilitated the attack using OSINT (Open Source Intelligence) methods. The attack affected only one substation, but caused 200 MW of lost power. Industroyer/CrashOverride is a modular malware. Its danger lies in its ability to directly control the switches and circuit breakers of the power substation, so it can operate automatically, with the slightest manual intervention by attackers (Todros, 2018). It uses industrial communication protocols that are used in other supply infrastructures, transport management systems and other critical networks (water, gas) worldwide, so Industroyer/CrashOverride malware

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can be used with virtually any change to attack any other ICS (Industrial Control System) (Pongrátz, 2020).

The key to this is to leave an backdoor open for an attacker to install, control, remotely connect to, receive, and send commands to. And the program code used by the malware shows that their writer has serious professional knowledge of how industrial control systems work. It should be emphasized that in the case of Industroyer/Crashoverride we are not talking about a single attack, but a series of attacks (Todros, 2018). It is also interesting to think about the fact that the extent of the damage caused by cyber attacks today does not depend on the attacker's abilities, but rather on his intentions.

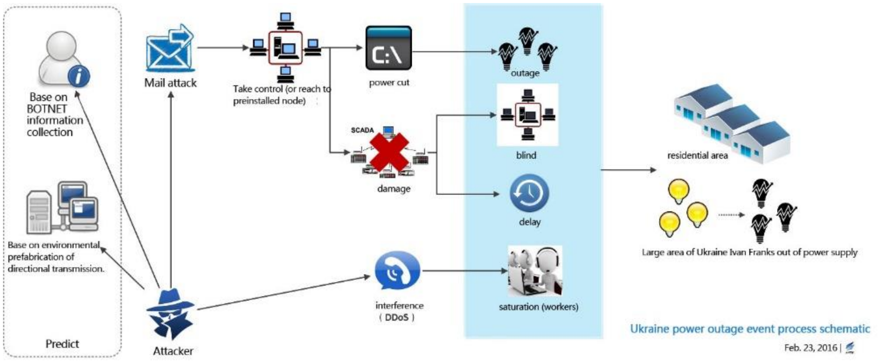

Figure 3 Summary of Ukraine power outage attacks
Source: Antiy Labs (2016) available: https://www.antiy.net/p/comprehensive-analysis-report-on-ukraine-power-system-attacks/

In terms of industroyer, therefore, much greater damage could have been done by the attacker (see Fig. 3). Yet Joe Slowik's analysis in 2019 shows that the attack would not have ended in disruption, but that the attackers may have had the additional goal of conducting a much larger-scale attack in parallel with disabling substation defenses (Slowik, 2019). According to Slowik, the attackers were prepared to disable more protection with DoS (Denial-of-service attack) attacks after Uskenergo's work restored the service after causing the disruption, and then the substation equipment thus left vulnerable could even suffer fatal damage in the event of an overload. months, half a year, could have caused power outages. According to the analysis, this did not happen in the end just because the attackers made a mistake in developing the computer code used for the DoS attack (Pongrátz, 2020). That is, the attack was a series of attacks that presumably did not achieve their original purpose, presumably due to the attackers' fault. The vulnerability and inadequate protection of electricity systems has been repeatedly demonstrated, which has affected the daily lives of society. As I mentioned above, several images and videos were uploaded to the Internet prior to the attack, which may have helped make the attack more accurate. This is because, for political reasons, the media gained insight into the substation, as the power at the time wanted to boast of the investment. This is a good example of the fact that electricity supply, like other critical infrastructure, should not be intertwined with political interests.

4 The human firewall and cyber awareness program

Last year and this year was a year of blackmail viruses, and all indications are that this type of threat has reached its peak. However, cybercriminals are not expected to give up this lucrative source next year, and will even expand the pool of opportunities. Experts predict that the number of newly discovered blackmail virus families will increase as criminals look for new targets: industrial systems and power systems will be targeted. Even the best-built enterprise system cannot be protected if only one person is responsible for security. Experts believe that the only solution is to regulate users. The most significant vulnerability is the human side (Szabó, 2018). What is the solution to the restructuring of the existing system? The answer seems obvious: on the one hand, new rules are needed, and, on the other, compliance with the rules needs to be promoted.

The ‘human firewall’ is more effective than anything else. It is not enough to deal with the ‘human factor’ at one level only. Secure corporate IT has more human aspects than you might think. So we need to look not only at systems, but also at people. The product of system you buy does not protect itself, even if you buy the best on the market. IT security is not a product but a state (Beláz - Szabó, 2020). It must be achieved, and, very importantly, further sustained through action; it must be operated. For proper regulation, information security must be ensured from hardware, software and communication, i.e. systems (physical layer), people (personal layer - training, what to do and why it is important) and processes (organizational layer - broken down into specific corporate actions; who pulls the plug, if necessary, who reports, etc.).

The critical issues are data leakage (when a colleague, for example, accidentally takes out sensitive data, e.g. sending a complete customer list instead of a quote) or denial of service. The latter can be crucial in the age of cloud computing. So the ‘human factor' is an integral part of IT security. To increase the level of IT security in the organization, we need to keep our colleagues as well as the machines operating as necessary (Beláz - Szabó, 2020). That's why state-of-the-art computing says that the chain of security awareness for people, employees, is the human firewall - and in addition to the technical firewall, the human firewall must be made.’ Based on the above, it is necessary to raise the security awareness and up-to-date information of the managers and employees of the organizations and to prepare them for the recognition of emergencies (ENISA, 2021). Based on international and domestic recommendations information security awareness material for users is warranted. The purpose of the training is not to communicate and account for lexical knowledge, but to transfer knowledge that can be used in practice.' The awareness program contains basic IT security knowledge and real-life examples. These are can help you identify IT security risks and effectively contribute to the implementation of security measures to prevent dangerous situations, damage, and security. Our motto is: 'Understand, know, and do so.'

5 The cybersecurity manual for electricity

Finally, in the framework of the cooperation between SeConSys (Security for Control Systems) - in addition to mentoring National University of Public Service (NKI) and the Hungarian Electrotechnical Association (MEE) a Cyber Security Handbook for Electrical Industrial Surveillance Systems was published by the National Cyber Defense Institute. SeConSys is a new type of PPP (Public Private Partnership) collaboration to strengthen the cyber security of the electricity system. SeConSys collaboration has been defined by members as a platform without legal personality, as a voluntary, non-profit, form of professional collaboration for members. The current goal is to create a system of recommendations to strengthen the cyber security of the electricity system. The manual (see Fig. 1) is available on the SeConSys website (www.seconsys.eu) and can be downloaded from there.

Figure 4 The cybersecurity manual for electricity
Source: SeConSys (2020) available:
https://seconsys.eu/wp-content/uploads/2021/05/20201208_SeConSys_kezikonyv_final_ONLINE.pdf

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Conclusion

Overall, Industroyer/CrashOverride malware is the fourth malware designed specifically against ICS (after Stuxnet, BlackEnergy, and Havex) and the first known malware created specifically to attack the power system. Its danger is raised to a high level by its modularity and high degree of autonomy. After Stuxnet, Industroyer/CrashOverride was the second malware targeting ICS that was able to disrupt ICS-driven physical processes without human intervention. Due to the current electricity situation in Europe, the conditions for conducting an APT (Advanced Persistent Threat) attack like the one above are more favorable than ever, as the resilience has been significantly reduced and the pronunciation of a single battery can cause a great deal of chaos in Europe. That is why preparedness against this type of attack would be particularly important, at least at national level, but even at European level. The material damage to civilian and state-owned companies is estimated at more than $10 billion worldwide, but a critical infrastructure under the control of terrorist, unauthorized hacker groups could generate unforeseen dangers, disregarding national borders. If the smuggling of malicious code capable of blocking or manipulating the control system of a nuclear power plant succeeds, it could lead to a global problem, triggering a chain reaction that could have serious consequences. It is important that power plants, as critical infrastructure, meet the required information security requirements.

Some of the electricity systems in use today operate along infrastructure that has been in place for decades and is probably outdated to meet today's expectations, so it is important to keep modernization in mind. The aim should be to reduce and possibly eliminate the interdependence of critical infrastructures and to focus on protection. Reserves must be maintained that can be deployed in times of turmoil and will not allow chaos to prevail. It is very important to prevent or at least reduce disaster. It is true that this requires modern regulation and a lot of work, but it pays off many times over through the devastation that has been left behind. You need to be prepared to deal with external and internal crises with plans, exercises, ongoing training, and lifelike simulations. The main economic factors of the future are cities. Unfortunately, globalization and urbanization are facts that are very difficult to change. The cities high level of dependence on the infocommunication and power systems and the services they provide. The infocommunication and power systems and other electronic systems pose threat serious security risks everywhere in the world. Finally, we would like to make some suggestions:

- We recommend the minimum secure systems conditions that are essential to being in cyberspace.

- We recommend reinforcing the human firewall such as experience-based education.

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