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Bogumiła Zuga 32A Str.
01-811 Warsaw, Poland
T: +48 22 701 50 15

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BACKWARD INTEGRATION POLICY AND MANUFACTURING FIRMS VALUE ADDED IN NIGERIA

Ayodele Folorunso Oshodi

University of Ilorin, Ilorin, Nigeria, ayodele.f.oshodi@gmail.com

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Abstract

Research Purpose: The paper investigates the impact of the backward integration policy on manufacturing firms' value added in Nigeria. It complements the existing literature and extends the frontier of knowledge by evaluating the impact of backward integration policy (local raw materials as proxy) on manufacturing firms' value added in Nigeria.

Design/Methodology/Approach: Firm-level data were sourced from the annual reports and statement of accounts of 49 sampled manufacturing firms, Central Bank of Nigeria statistical bulletin, National Bureau of Statistics annual abstract and Nigeria Customs Service tariff books for the period (2002-2020). The Fisher-type Augmented Dickey-Fuller (ADF) unit root test procedure was employed to examine the stationarity properties of each of the variables used in the study. The test was necessary to verify the time series property of the panel data employed. Thereafter, the Pooled Ordinary Least Squares (OLS) method was employed for the regression.

Findings: The findings show that backward integration policy through the use of local raw materials in production significantly led to an increase in manufacturing firms' value added in Nigeria. An increase in the use of local raw materials in production leads to an increase in value added by all sampled firms across manufacturing industries in Nigeria. The findings also reveal that fixed assets, employment, energy cost and exchange rate have a significant positive influence on the value added of all sampled manufacturing firms, while the tax has a significant negative coefficient, implying that as tax paid by firms increases, the value added of manufacturing firms declines in Nigeria.

Originality/Value/Practical implications: Most previous studies focused on a single industry, but this study investigates the impact of backward integration policy on manufacturing firms' value added in Nigeria. The study covers a wide range of firms and industries more than previous studies. It uses firm-level and panel data of manufacturing firms in Nigeria, which makes the study unique. It is the first study that hypothesises that backward integration can be used to improve the value added of manufacturing firms and consequently reduce import dependency, promote Nigeria's product competitiveness and create more employment in Nigeria.

Keywords: Backward integration; Manufacturing; Value-added; Nigeria.

JEL Codes: L25; L60; O14

Introduction

Improving manufacturing industry performance is critical for rapid industrialisation and economic growth in any economy (Chete et al., 2014). Successive Nigerian governments have implemented several policies to promote productivity and enhance the sector's contribution to Gross Domestic Products (GDP) in the country. Such policies include the import substitution industrialisation strategy implemented during the First National Development Plan (1962-1968), the indigenisation decree of 1972 and 1977, the Structural Adjustment Programme (SAP) of 2006, and the export promotion strategy, to name but a few. Also, sector-specific intervention policies were equally implemented and targeted specific sub-sectors such as the textile, sugar, shoe and leather industries.

Despite the implementation of these policies, manufacturing industries continue to depend on imported raw materials for production with its negative consequences on the nation's foreign exchange, resulting in high cost of production and making Nigeria's products uncompetitive in the international market. It is not surprising, therefore, that Nigeria's manufacturing industries' operations are characterised by low value addition along the manufacturing supply chain, which constrains the sector from contributing substantially to the Gross Domestic Product (GDP) in Nigeria (Soludo, 2003; National Bureau of Statistics (NBS), 2014). The sector accounts for 4 per cent of Nigeria's GDP in 2011, which increased to 10 per cent annually between 2012 and 2014 (Chete et al., 2014). The sector's contribution to GDP declined marginally to 9.2 per cent in 2016 (NBS, 2014; NBS, 2017). The relative share of the sector to GDP remains low when compared with countries of similar socio-economic development, while many industries are inefficient, uncompetitive and have low capacity utilisation (McCulloch et al., 2017; Oshodi, 2019).

Therefore, the backward integration policy (BIP) was introduced in 2002 by the Nigerian government to encourage the use of local raw materials at every stage in the manufacturing supply chains in order to increase value-addition, reduce Nigeria's dependence on imported raw materials, conserve foreign exchange, and make Nigerian firms more competitive, create jobs and diversify the economy (Nigeria Industrial Revolution Plan (NIRP), 2014). The expectation of the Nigerian government is that industries would look inward by substituting local raw materials for imported raw materials in order to improve their competitiveness in the international market, create more jobs and consequently deepen economic growth (Eze, 2018).

Various efforts by the government and the Central Bank of Nigeria (CBN) through incentives or waivers to manufacturing industries to promote BIP in Nigeria have produced mixed results. Some firms have fully embraced the policy, while others are at different stages of implementing the policy, and some have not even started implementing the policy. The need to assess the impact of BIP in Nigeria after several years of its implementation is the justification for this study. The paper will provide the answers to these questions: Does the use of local raw materials boost manufacturing firms' value added in Nigeria? What policies should be put in place to strengthen BIP in Nigeria? Therefore, the paper investigates the impact of the backward integration policy on manufacturing firms' value added in Nigeria.

This paper contributes to existing literature both theoretically and empirically in a number of ways. To begin with, it is the first to investigate the impact of the backward integration policy on manufacturing firms' value added in Nigeria. Second, unlike previous studies, which focused on individual industries within the economy, this study covers a wide range of firms and industries. Third, on the theoretical front, it is the first study to identify that backward integration through the use of local raw materials can be used to boost value added in manufacturing firms in Nigeria.

The rest of the paper is organised as follows: Section 2 reviews relevant literature; Section 3 presents the methodology of the study; Section 4 reports the empirical results, while section 5 concludes the study.

Literature review

Vertical integration involves a company taking control of different production stages along the supply chains. When a company takes control of its suppliers, it is called backward integration, and when it takes control of its distributors, it is referred to as forward integration (Kenton, 2019). It is presumed that a company increases the control of the supply chain in vertical integration when it increases its market share by taking over its competitors in the related markets at the same level of the supply chain in horizontal integration. However, diversification occurs when a company grows by adding new products to its existing portfolio (Abedrabbo Ode, 2020).

Kenton (2019) looks at backward integration strategy as an offshoot of vertical integration strategy in which an organisation undertakes tasks previously embarked upon by businesses in the supply chain through merging with or acquiring businesses or doing it on their own. He asserts that the company

engages in backward integration in order to improve efficiency and save costs. For, Nagambu (2020), backward integration enables a company to have control over the supply chain and have direct access to the required raw materials, which enables them to achieve efficiency and competitiveness over other companies in the industry.

Vertical integration theory has its root in transaction costs economics traceable to the Coase (1937) seminar work titled "The nature of the firms". Coase (1937) argues that a firm would not exist if there were no explicit transaction costs. He emphasised that all activities embarked upon by firms can be explained if transaction costs exist. According to him, with a limited and uncertain environment, economic agents would always seek the most cost-effective means of achieving their goals. What then determines the size of a firm depends on consideration of the marketing costs (the costs of using the price mechanism) and the costs of organising within the firm? The principle of marginalism comes into play in decision making. At the margin, these "costs must be equal to each other or equal to the costs involved in leaving the transaction" to be "organised" by the price mechanism. The firm would undertake the task or embark on production if the cost of embarking on production through the market price mechanism is higher than that of embarking on the production within the firm. But if the cost of undertaking the task or production within the firm is higher, it pays the firm to allow the goods to be produced or task to be undertaken through the price mechanism.

Transaction costs economists believe that high profits connote efficiency rather than market power and that firms may become so large and profitable not because of lower production and distribution costs but because of organisational economies, which help to reduce management costs (Ferguson & Ferguson, 1994). Furthermore, Ferguson and Ferguson (1994) opined that transaction costs economics focuses on an individual firm and its uniqueness. Moreover, that although a firm may produce what other firms produce and compete with them, what is different is that the firm is likely to be organised differently or use different technologies.

Coase's transaction costs economics was developed and extended by Williamson (1975), who identified factors that favour undertaking activities within a firm instead of relying on the market forces. He opined that a firm might either use its own advertising experts or contract its advertising to an agency. Transaction costs are the costs that arise when using the market (arranging, monitoring and policy contract) as distinct from management costs. On the other hand, Maddigan (1981) opined that vertical integration is the use of management control to organise the use of inputs and outputs instead of the use of market forces. It is desirable and enables the management of a firm to increase profitability and reduce risks (Maddigan, 1981). It also allows a firm to reduce cost, increase efficiency, and reduce and restrict competition (Koch, 1980).

On the measurement of vertical integration, Maddigan (1981) identified two strategies of measuring vertical integration by previous authors. These include the following: firstly, the ratio of value added over sales, which has the advantage of easy calculation but is flawed because the ratio is influenced by other factors besides that of vertical integration. The second measure reflects the vertical integration of a firm as a percentage of total products, which is a part of a firm vertical chain (vertical ratio). The problem with the vertical ratio is that it requires the breakdown of the total value of production by product line, which is not available. Nonetheless, the take-home from Maddigan's (1981) work is that vertical integration can be used to measure the impact of structure on firms' performance.

Empirically, some studies have examined the impact of backward integration policy and vertical integration policy on different industries in different countries. Few studies on Nigeria include; Ohimain (2014); Orji et al. (2014); Olanrewaju (2016); Oloda (2017); McCulloch et al. (2017), while some studies on other countries include: Kiyota et al. (2008); Benmehaia, and Brabez (2016); Gunathilake and De Mel (2016); McCulloch et al., (2017); Del Prete and Rungi (2019); and Nasambu (2020);. All these studies glossed over the effects of backward integration on manufacturing firms/industries in Nigeria, which is the focus of this paper.

The study on Nigeria by Ohimain (2014) shows that the implementation of the backward integration policy in the Nigerian cement industry led to an increase in cement production from 2MMTPA before the introduction of the policy to 28MMTPA after ten years of implementation of the policy. By 2014,

the country became self-sufficient in cement production and is now an exporter of cement, as eight clinkers vessels were exported to Senegal by June 2020 (Dangote Cement, 2020). Also, the BUA group started exporting cement to the Republic of Niger in 2019. This was achieved by using local raw materials such as limestone, gypsum and other materials for making cement. Similarly, the study by Orji et al. (2014) concurred with Ohimain's (2014) study that implementing the backward integration policy led to increased output of cement in Nigeria. Thus, BIP was largely successful in the Nigerian cement industry.

Oloda's (2017) study shows that there exists a positive and significant relationship between vertical integration and organisational survival in selected manufacturing firms in Port Harcourt (River States, Nigeria). While, Olanrewaju's (2016) finding shows that backward integration has both positive and negative effects on rural areas in Nigeria, with the benefits exceeding its negative impacts. Amongst the benefits identified are an increase in employment of local people, improvement in road networks and the provision of social amenities such as water, schools, electricity and hospitals for rural development in Nigeria.

Benmehaia and Brabez (2016) investigated the effects of vertical integration on the food manufacturing sector in Algeria and found that food industry structure, transaction costs and market conditions independently and significantly influenced the level of vertical integration in Algeria's food manufacturing sector. On the other hand, Nasambu (2020) showed that the policy has a positive influence on the organisational efficiency of cement manufacturing firms and helps cement firms' managers to strategise in order to face stiff competition as well as improve their efficiency. He submits that cement manufacturing firms were to integrate with limestone and clinker mining firms to take full advantage of the policy in Kenya.

The determinants of vertical integration in the Egyptian clothing industry were studied by El-Haddad (2008). His study identified high-end market segments, more volatile output market conditions and political power as determinants that make firms increase integration, while volatile and uncertain market inputs, sales variability and financial constraints limit the integration of firms. Another study on the textile industry was carried out by Gunathilake and De Mel (2016). It reveals that Sri Lanka's textile and apparel industry embraced the backward vertical integration through fabric manufacturing and engaged in a joint venture with foreign apparel manufacturers. For Sri Lanka's garment industry to retain its market share due to immense global competition, the industry had to improve the quality of garments and reduce costs through the use of local inputs. This resulted in a decline in imports of raw materials, minimised lead time, and achieved the industry benchmark of 60 days in specific production categories (Gunathilake & De Mel, 2016).

McCulloch et al. (2017) reported Bangladesh and Indonesia's experiences. According to the authors, Bangladesh's experience provides an example of a country with successful local content policies, which led to the rapid expansion of its garment industry after independence. They attributed the success to government incentives, the transfer of technology through partnership with foreign investors as well as the development of local technology through collaboration between local technology institutions and domestic machinery manufacturers. On the other hand, McCulloch et al. (2017) opine that the local content policy was not successful in Indonesia since the policy did not lead to a reduction in imported inputs as a result of the inability of the government to enforce the local content laws.

Afuah (2001) emphasised the importance of technology in backward integration. He opined that firms that are vertically integrated into new technology would perform better, while firms that had been vertically integrated into old technology would perform worse. While Del Prete and Rungi's (2019) study on backward and forward integration along global value chains observed that integration is not unidirectional but bi-directional as companies can either integrate backwards or forward. Their finding shows that decision to integrate falls within activities that have a relatively low elasticity of substitution and are often targeted at production stages that are technologically close along the supply chain, possibly to maximise coordination efforts. Kiyota et al. (2008) examine the determinants of backward vertical linkages of Japanese foreign affiliates in manufacturing for the period 1994 -2000 with a focus on local backward linkages in the host country, showing that foreign affiliates in Japanese multinationals in some

East and Southeast Asian countries embarked on local backward linkages and gained experience in local operations.

It is not in all cases that vertical integration is desirable, as pointed out by Desyllas (2008), who investigated the performance consequences of firms in the United Kingdom. According to the author, firms may experience a short-lived decline in performance in post-integration due to restructuring costs. However, vertical disintegration offers the potential for achieving improved operating performance in the long run. The positive effects of disintegration, in the long run, were attributable to firms focusing limited resources on core operations and avoiding production and administration inefficiencies associated with vertical integration.

Thus, backward integration policy is not without some challenges, as pointed out by Anuda & Faminu (2019), Olarenwaju (2016), and Desyllas (2008). In Nigeria, firms faced litigations from host communities for acquiring plots of land meant for the BIP even when compensations were made or promised. A case in point is that it took eight years before the BUA group could use the land it purchased and acquired at Lafiagi, Kwara state, for nursery, plantation and production of sugar. Other problems identified include the cost of acquiring hectares of land, which involves substantial financial outlay, which some firms cannot afford; the incessant clashes between herders and farmers, which makes the acquisition of large hectares of land difficult, insecurity problems and high cost of electricity (Olarenwaju, 2016; Anuda & Faminu, 2019).

Based on the empirical literature and vertical integration theories, the study postulates that firms should embark on vertical integration (backward integration) in order to reduce costs, enhance profitability and increase efficiency. Hence, this study hypothesised that *backward integration through the use of local raw materials has a significant impact on manufacturing firms' value added (performance) in Nigeria.*

Research methodology

In line with Maddigan's (1981) work, which suggested the use of vertical integration to measure the impact of structure on firms' performance, this study aligned with that work by investigating the impact of backward integration (vertical integration) on manufacturing firm's value added in Nigeria using local raw materials as a proxy for backward integration policy and value added as a proxy for measuring manufacturing performance.

To test this hypothesis and empirically investigate the impact of backward integration policy on the value added of all sampled manufacturing firms in Nigeria, the econometrics model specified is given as:

$$lnVAD_{it} = \alpha_0 + \alpha_1 lnFA_{it} + \alpha_2 lnEMP_{it} + \alpha_3 TAR_{it} + \alpha_4 lnCE_{it} + \alpha_5 lnCF_{it} + \alpha_6 REER_{it} + \alpha_7 INF_{it} + \alpha_8 lnIRM_{it} + \alpha_9 lnLRM_{it} + \alpha_{10} lnTAX_{it} + \mu_{it}. \quad (1)$$

where VAD_{it} is value added. It is the dependent variable and is measured by the wealth created or consumed by a firm for the number of years, which proxied firm's performance;

LRM_{it} is the key independent variable, which is measured by the cost of local raw materials in monetary terms;

FA_{it} is fixed assets measured by costs of plant and machinery used by a firm in production;

EMP_{it} is labour/workers employed in each manufacturing firm for the number of years;

TAR_{it} is tariff imposed on imported raw materials;

CE_{it} is cost of energy proxied by cost of electricity/diesel/factory power used by each firm for the number of years,

CF_{it} is cost of finance of each firm for the number of years;

$REER_{it}$ is real effective exchange rate;

INF_{it} is inflation measured by the composite consumer price index per year;

IRM_{it} is measured by the cost of imported raw materials in monetary terms;

TAX_{it} is taxation of each firm for the number of years;

μ_{it} is the stochastic error term.

The data on value added, fixed assets (plant and machinery), the number of workers employed, cost of energy, cost of finance, cost of local raw materials, cost of imported raw materials, and taxation were sourced from the annual reports and statement of accounts of quoted manufacturing firms on the Nigerian Stock Exchange (NSE). The tariff data were obtained from Nigeria Customs and Excise Tariff books (1995, 2005, 2009, 2016, 2017); while inflation rate data were sourced from the Central Bank of Nigeria Statistical Bulletin and National Bureau of Statistics Annual Abstract (2006, 2011, 2012, 2014, 2017, 2019) and the real effective exchange rate data were obtained from CBN Statistical Bulletin (2010, 2011, 2012, 2013, 2014, 2015, 2016, 2020). Annual firm-level data for 49 sampled manufacturing firms were used for the period between 2002 and 2020. The choice of sampled manufacturing firms was based on the availability of data on variables of concern.

The study adopts a panel regression analysis in investigating the impact of the backward integration policy on manufacturing firms' value added in Nigeria. Specifically, the Pooled Ordinary Least Squares (OLS) estimation technique was employed. In general, panel data analysis has the following advantages: The ability to model common and individual behaviour of groups. Superiority to time series analysis in identifying and measuring statistical impacts. The ability to minimise estimation biases. The ability to handle more information, variability and efficiency. As a result of these advantages, the pooled OLS is widely used in firm-related studies (see Cardellichio, 1990; Fukao et al., 2006; Salawu, 2009; Okumu et al., 2019).

This Pooled OLS model is a model with constant coefficients relating to both intercepts and slopes. Researchers can use this approach to pool all of the data and perform an ordinary least squares regression model on it. As such, the Pooled Ordinary Least Squares (OLS) is based on the assumption that individual units in the panel data are identical and are treated thus (Asteriou & Hall, 2016). This helps the researcher to provide a uniform policy recommendation in line with the findings generated from the study. Prior to applying the Pooled OLS method, the Fisher-type augmented Dickey-Fuller (ADF) unit root test procedure was employed to examine the stationarity properties of each of the variables employed in the study.

Research results

The empirical results are presented and discussed in this section. The results include descriptive statistics presented in Table 1, correlation analysis presented in Table 2, Fisher-type ADF unit root test results presented in Table 3 and Pooled Ordinary Least Squares Regression results for all sampled manufacturing firms are reported in Table 4.

Table 1. Descriptive Statistics (Source: Author's Computation)

Variable	Mean	Std. Dev.	Min	Max
Value Added	10,500,000	25,000,000	-5,493,505	311,000,000
Fixed Asset	18,400,000	49,700,000	4,849	523,000,000
Employment	890.8	1,553.43	10	14,409
Tariff	17.74	16.04	0.00	100.0
Energy Cost	837,020	2,646,686	-81,678	43,100,000

Finance Cost	1,578,401	6,481,878	-707,800	86,400,000
Real Effective Exchange Rate	96.26	26.1	58.25	155.75
Inflation	12.43	3.31	5.40	18.9
Imported Raw Materials	11,500,000	29,300,000	0.00	306,000,000
Local Raw Materials	12,600,000	36,900,000	-28,927	635,000,000
Taxation	-790,810.6	3,000,219	-25,400,000	19,200,000

Table 1 presents the descriptive statistics, which shows the mean, standard deviation, minimum and maximum values of the variables used for the study. This shows that value added of the sample firms averaged 10.5 million nairas, with a spread of 25 million nairas, minimum of -5.5 million nairas and a maximum of 311 million nairas. The fixed assets of these firms averaged 18.4 million nairas, with a spread of 49.7 million nairas, minimum of 4.8 thousand nairas and a maximum of 523 million nairas. Employment in these firms averaged 891 individuals, with a spread of 1,553 individuals, minimum of 10 individuals and a maximum of 14,409 individuals. Tariff of these firms averaged 17.74 per cent, with a spread of 16.04 per cent, a minimum of 0.0 per cent and a maximum of 100 per cent. Energy costs averaged about 837 thousand nairas, with a spread of about 2.6 million nairas and a minimum of about -81.7 thousand nairas and a maximum of 43.1 million nairas. The finance cost of these firms averaged about 1.6 million nairas, with a spread of about 6.5 million nairas, minimum of -707.8 thousand nairas and a maximum of 86.4 million nairas. The real effective exchange rate averaged 96.26 nairas, with a spread of 26.1 nairas, minimum of 58.25 nairas and a maximum of 155.75 nairas. Inflation averaged 12.43 per cent, with a spread of 3.31 per cent, a minimum of 5.4 per cent and a maximum of 18.9 per cent. Imported raw materials of these firms averaged 11.5 million nairas, with a spread of 29.3 million nairas, minimum of zero and maximum of 306 million nairas. Local raw materials of these firms averaged 12.6 million nairas, with a spread of 36.9 million nairas, minimum of about -28.9 thousand nairas and a maximum of 635 million nairas. Taxation averaged about -790.8 thousand nairas, with a spread of about 3 million nairas, minimum of about -25.4 million nairas and a maximum of 19.2 million nairas.

Table 2. Correlation Analysis (Source: Author's Computation)

Variable	**VA**	**FA**	**EMP**	**TAR**	**EC**	**FC**	**REER**	**INF**	**IRM**	**LRM**	**TAX**
VA	1										
FA	0.41*	1									
EMP	0.41*	0.56*	1								
TAR	0.11*	0.05	0.34*	1							
EC	0.37*	0.56*	0.51*	0.24*	1						
FC	0.18*	0.36*	0.27*	0.11*	0.42*	1					
REER	0.01	-0.16*	0.03	0.06	-0.04	-0.02	1				
INF	-0.03	-0.04	0.01	0.17*	-0.04	-0.00	-0.18*	1			
IRM	0.32*	0.56*	0.49*	0.14*	0.46*	0.28*	-0.07*	-0.05	1		
LRM	0.39*	0.52*	0.50*	0.18*	0.49*	0.27*	-0.07*	-0.00	0.41*	1	
TAX	-0.11*	-0.12*	-0.06	0.08*	-0.07*	-0.00	-0.02	-0.01	-0.09*	-0.04	1

Note: VA, FA, EMP, TAR, EC, FC, REER, INF, IRM, LRM, TAX denotes value added, fixed asset, employment, tariff, energy costs, finance cost, real effective exchange rate, inflation, imported raw materials, local raw materials and taxation respectively.

The results of correlation analysis show how these variables relate to each other. The results show that value added is significantly and positively related to fixed assets, employment, tariff, energy cost, finance cost, imported raw materials and local raw materials, but significantly and negatively related to tax. The fixed asset is significantly and positively related to employment, energy cost, finance cost, imported raw materials and local raw materials, but significantly and negatively related to real effective exchange rate and tax. Employment is significantly and positively related to a tariff, energy cost, finance cost, imported raw materials and local raw materials. Tariff is significantly and positively related to energy cost, finance cost, inflation, imported raw materials, local raw materials and tax. Energy cost is significantly and positively related to finance cost, imported raw materials and local raw materials, but significantly and negatively related to tax. Finance cost is significantly and positively related to imported raw materials and local raw materials; the real effective exchange rate is significantly and negatively related to inflation, imported raw material and local raw materials; imported raw materials is significantly and positively related to local raw material, but is significantly and negatively related to tax. In general, none of these correlation coefficients is as high as 0.8, and according to the suggested rule of thumb (see, Asteriou & Hall, 2016), this suggests that including these variables together in a regression model will not cause severe multicollinearity problem.

Due to the relatively long time series for each panel member, the unit root test was conducted to examine the stationarity properties of these variables. The Fisher-type augmented Dickey-Fuller procedure was employed here due to the unbalanced nature of the data. The results in Table 3 revealed that all the variables are stationary, judging from each of their high unit root statistics and low p-values. This also suggests that all variables are integrated of zero-order, and the regression results from such variables would not be spurious.

Table 3. Fisher-type ADF Unit Root Test Results (Source: Author's Computation).

Variable	Statistic	p-value	Order of Integration
VA	3.182	0.000	I(0)
FA	2.542	0.005	I(0)
EMP	3.681	0.000	I(0)
TAR	42.38	0.000	I(0)
EC	3.005	0.001	I(0)
FC	5.448	0.000	I(0)
REER	12.58	0.000	I(0)
INF	16.67	0.000	I(0)
IRM	10.92	0.000	I(0)
LRM	4.718	0.000	I(0)
TAX	10.13	0.000	I(0)

Note: Modified inverse chi-squared (Pm) statistics are reported. VA, FA, EMP, TAR, EC, FC, REER, INF, IRM, LRM, and TAX denotes value added, fixed asset, employment, tariff, energy costs, finance cost, real effective exchange rate, inflation, imported raw materials, local raw materials and taxation respectively.

The results of Table 4 are those presented to examine the impact of local and imported raw materials on the value added of all sampled manufacturing firms in Nigeria.

Table 4. Pooled Ordinary Least Squares Regression Results for All Manufacturing Firms (Source: Created by Author)

Variable	Coeff.	Robust Std. Err.	T	p-value
LogFA	0.364***	0.115	3.15	0.002
LogEMP	0.711***	0.165	4.30	0.000
TAR	-0.001	0.008	-0.20	0.843
logEC	0.216**	0.083	2.59	0.010
logFC	-0.022	0.028	-0.80	0.425
REER	0.011**	0.005	2.10	0.036
INF	-0.015	0.046	-0.33	0.741
LogIRM	0.080	0.077	1.04	0.300
LogLRM	0.258***	0.092	2.80	0.005
logTAX	-0.039***	0.015	-2.64	0.009
Constant	-4.424***	1.684	-2.63	0.009
R-squared	0.257			
F-statistic	23.13***			0.000

*Note: *** indicates significance at 1%; ** indicates significance at 5%; and * indicates significance at 10%.* VA, FA, EMP, TAR, EC, FC, REER, INF, IRM, LRM, and TAX denotes value added, fixed asset, employment, tariff, energy costs, finance cost, real effective exchange rate, inflation, imported raw materials, local raw materials and taxation respectively.

The pooled ordinary least squares were employed with robust estimates of the standard error to correct for likely heteroskedasticity and autocorrelation. The results revealed that local raw materials were significant in raising the value added of manufacturing firms, while the imported raw materials are not significant in affecting the value added of manufacturing firms in Nigeria. This can be seen from the significant positive coefficient of local raw materials, which was 0.258 (with a p-value of 0.005) and the insignificant coefficient of imported raw materials, which was 0.080 (with a p-value of 0.300). Thus, this finding supports the tested hypotheses that backward integration through the use of local raw materials has a significant impact on manufacturing firms' value added (performance) in Nigeria. An increase in the use of local raw materials by all sampled firms led to an increase in the value added of manufacturing firms across all industries in Nigeria. This could be attributed to the fact that some Nigerian firms in the food and beverages, paints and breweries have fully embraced the BIP, which enables them to have easy access to raw materials resulting in a reduction in the cost of production and enhancing their efficiency. This suggests that Nigerian firms are more competitive and would be able to export their products and subsequently employ more workers. The current findings concurred with the findings of Orji et al. (2014) and Ohimain (2014) on Nigeria, which opined that the implementation of the backward integration policy led to increased output of cement in Nigeria. It also conforms with the finding of Nasambu (2020), which reported that the policy led to improved organisational efficiency of cement manufacturing firms in Kenya.

Other variables such as fixed assets, employment, energy cost and exchange rate have a significant positive influence on the value added of all manufacturing firms. Fixed assets and employment conform to a priori expectations, while energy cost and real effective exchange rate do not. The tax has a significant negative coefficient of -0.039 (with a p-value of 0.009), implying that as tax paid by firms increases, the value added of manufacturing firms declines in Nigeria. Tariffs, inflation and finance cost do not affect the value added of these firms. The model is well fitted with a significant F-statistic value

of 23.13 (p-value of 0.000) and R-squared of 0.257, suggesting that about 25.7 per cent of variations in firms' value added is explained by the model.

The finding that employment has a positive and significant impact on the value added of manufacturing firms in Nigeria signifies that BIP would not only create more direct employment in the manufacturing firms and industries but also boost indirect employment down the supply value chain. This would help to reduce the high unemployment rate, youth restiveness and all forms of crimes and criminality resulting from job insecurity in the country. The current findings on employment are in agreement with the previous study by Olarenwaju (2016), which opined that BIP in rural areas in Nigeria led to an increase in employment of the rural people.

The implications of these findings show that the use of local raw materials helps to reduce costs of production and enhance manufacturing performance, thereby having the potential to deepen the economy. It would also make the country self-sufficient in the production of other products besides cement. In the long run, if most Nigerian firms embraced the policy, it would make Nigerian products more competitive and Nigerian firms produce for exports. It is, therefore, imperative that the backward integration policy should be vigorously pursued and embraced by firms that have not yet implemented the policy, with the government helping them to remove all bottlenecks to its implementation while reducing company income taxes so that Nigeria can derive maximum benefits from the policy. Moreover, firms should adopt the use of local technology in the processing of local raw materials as it was done in Bangladesh (McCulloch et al., 2017).

Conclusions

This paper has investigated the impact of the backward integration policy on manufacturing firms' value added in Nigeria for the period 2002 and 2020. Firm-level data for 49 manufacturing firms quoted on the NSE were used, while pooled OLS estimation technique was employed. In doing this, the study used local raw materials as a proxy for backward integration policy, while value added was used as a measure of the manufacturing firm's performance. The findings validated the hypothesis that the backward integration policy, which involves using local raw materials in production, led to a significant increase in manufacturing firms' value added in Nigeria. Thus, the more a firm uses local raw materials in production, the more value addition is created along the production supply chain, the less reliance on imported raw materials for production, and the more self-sufficient the country becomes. Thus, Nigeria needs to leverage the abundant local raw materials available in the country and use local technology for optimum production in order to increase value added at every stage along the manufacturing value chains and produce for exports.

What are the policy suggestions to strengthen BIP in Nigeria from the foregoing? First, the government should encourage more firms and industries to engage in backward integration, particularly in areas where Nigeria has a comparative advantage in production, such as rubber, brewery, hides and skin, pulp and paper industries. Second, make it easier for firms to acquire land without encumbrance. Third, reduce company income tax paid by firms in Nigeria since the tax was found to have negatively impacted manufacturing value added in Nigeria. Fourth, firms, private investors, research institutions and universities should embark on research on using local raw materials and adapting local technology to make use of local inputs. Fifth, the need to remove other bottlenecks to manufacturing performance and improve the ease of doing business in Nigeria becomes imperative. If all the above policies are implemented, more Nigerian firms will embrace BIP. Firms would add more value to their products, the foreign exchange would be conserved, manufacturing firms' products would become more competitive in the international market, more jobs would be created, and the Nigerian economy would become more diversified. The major limitation to this study is the non-use of 2021 data due to the delay in publishing the annual reports of many sampled firms (from where the 2021 data would have been extracted). Most of the firms published their annual reports from March to May 2022 for the 2021 financial year, which ended 31st December, 2021. Nevertheless, the outcome of the findings of this paper is not adversely affected. Future research could use such data and specifically look at the effects of the policy on exporting firms in Nigeria.

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ACADEMICS' PERCEPTIONS OF CONSTRAINTS TO QUALITY ASSURANCE IMPLEMENTATION IN HIGHER EDUCATION IN ALGERIA

Belimane Wissam[1], Chahed Amina[2]

[1]LIMGE Lab, National High School of Management ENSM, Kolea, Algeria, w.belimane@ensm.dz

[2]National High Veterinary School ENSV, Algiers, Algeria, a.chahed12@gmail.com

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Abstract

Research purpose. This paper aims to explore Algerian academics' perceptions of constraints to quality assurance recently implemented in higher education.

Design / Methodology / Approach. Data was collected through a survey. An online questionnaire with a 5-point Likert scale was distributed to the Algerian academics through a snowball sampling method. In total, 121 answers were collected and treated using descriptive statistics.

Findings. The analysis reveals that academics perceived constraints in all dimensions examined in this study. The main constraints were: the low involvement of different stakeholders in quality assurance projects, the weakness of internal and external communication, the absence of evidence of compliance with the national standard, the lack of involvement of academics in the development of action plans and the lack of follow-up.

These constraints seem to hinder the quality assurance implementation process at the Higher Education Institutions (of the sample). These results may represent a challenge for institutions.

Originality / Value / Practical implications. The study is original in that it examines a recent subject that is little dealt with in Algeria. The main contribution of this research is an analytical discussion of perceptions of academics about quality barriers encountered in Higher Education Institutions, leading to a significant enrichment of the literature.

Keywords: Higher education; Quality assurance; Academics; Constraints; Perception.

JEL codes: I23

Introduction

In an evolving and complex environment, many elements have stimulated a profound process of change in the public sector. Indeed, the New Public Management (NPM), born in Great Britain at the beginning of the 1980s, challenged the way the public sector operated, which was considered rigid, non-innovative and with an overly centralized hierarchy (Amar & Berthier, 2007). Its main idea is that it was possible to transpose private sector management methods to the public sector (Amar & Berthier, 2007) and thus reorient the management of public organizations towards performance, transparency and accountability (Sanni-Yaya, 2005).

The New Public Management (NPM) has changed public organizations in general and pushed the development of Higher Education Institutions (HEIs) in particular throughout the world. In Europe, NMP has brought about new modes of governance influenced by intergovernmental agreements for Higher Education (HE), such as the Bologna Process (Manatos, 2017), as a framework that defines the European space for HE. This intergovernmental initiative, signed in 1999, accelerated the introduction and development of an institutionalized Quality Assurance (QA) system (Seyfried & Pohlenz, 2018).

The Bologna Process or the LMD system (Licence-Maîtrise- Doctorat), as it is called in France and the Francophone countries of West Africa, was adopted by African universities in 2003 in order to align and harmonize their practices with those of universities in the North (Charlier, Croché, & Ndoye, 2009). (European Commission, 2010-2013)

In Algeria, the LMD system was officially adopted in 2003. This new reform included requirements related to quality and standardization. Nevertheless, it was only in 2010 that the Quality Assurance (QA) project was born with the creation of the Commission for the Quality Assurance Implementation in Higher Education (CIAQES). It has been implemented through a set of actions that have outlined the legal and regulatory framework.

The first actions carried out by CIAQES in 2011 were the name and training of pilots at the level of all the institutions, i.e., Quality Assurance Units (QAUs) chaired by Quality Assurance Managers (QAMs). Between 2014 and 2016, a National Reference for quality assurance in higher education (RNAQES) was created, approved and popularized. It is primarily inspired by European standards and the Maghrebian institutional self-assessment reference created during 2010-2013 in the framework of the European project AqiUmed (Internal Quality Assurance in Mediterranean Universities), in which Algeria took part (European Commission, 2010-2013). Also, a self-assessment guide has been developed. These two support documents were made available to all institutions in order to carry out the institutional self-assessment operation launched in 2017.

In 2018, 18 institutions benefited from external evaluation expertise, and during the same year, the HEIs developed and transmitted their institutional projects based on the assessment results.

Therefore, we can say that significant efforts have been made over the past ten years to establish a QA system in HEIs in Algeria. Nevertheless, like any new project, we assume that it has faced implementation constraints. From this perspective, the research question was formulated as follows: "*What are the main constraints to QA implementation in HEIs in Algeria?"*

In order to answer this question, a questionnaire was developed and administered to a sample of 121 academics directly involved in the QA project in their institutions. This study is exploratory in nature, as it addresses a new issue in Algeria for which there is still limited research available. Indeed, very few studies have been conducted on the perception of constraints to QA in Algeria, as the operation has only recently been launched. The few studies available have explored the constraints encountered from the QAMs' perspective (Belimane & Chahed, 2021; Musette, 2022).

Literature review

Beginning in the 1990s, the notion of quality, which was used in the context of production and product compliance, spread from industry and business to the public sector, including higher education (Woodhouse, 2004). It has since become a key topic of discussion in the literature.

The term quality has different meanings and has been defined in various ways (Cheng & Tam, 1997). It has been described as pluralistic (Pham & Starkey, 2016), polysemous (Scharager Goldenberg, 2018) and elusive, dynamic and changing (Schindler et al., 2015). We find, therefore, that there is no consensus on a single, common, comprehensive definition of quality in HE.

However, we find in the literature some attempts to define the concept. Some are general but can be adapted and transposed to the education sector; others are specific to its objectives.

We borrow the definition from (Schindler et al., 2015) that QA is "*A set of processes, policies, or actions carried out externally by quality assurance agencies and accreditation bodies or internally by the institution*". This definition emphasizes actions taken both inside and outside the HEI. Indeed, we distinguish two types of QA (internal and external), depending on the individuals involved in its implementation and assessment and on the goals sought by the institution. External goals are aimed at compliance and externally imposed accountability, and internal goals are aimed at improving internal processes and strengthening institutional self-regulation (Martin, 2019). Our research focuses on Internal Quality Assurance (IQA) based on assessment, monitoring, and improvement activities.

Internal quality assurance: Conceptualizing the implementation process

Several dimensions, deriving from relevant literature, are used to reflect the IAQ process:

Planning:

Any process or activity requires planning of the expected progress and all the steps to be implemented. Indeed, the quality process is not launched on a whim but must be planned (Ritchie & Dale, 2000). Empirical studies have shown that not planning the process and not knowing where to start can hinder its success (Ritchie & Dale, 2000; Tari, 2010; Tari, 2011).

Planning is primarily about timing, choosing the right people to carry out the process, and choosing which approach to take. This planning is essential in order to allow for prior technical and human preparation (Balbaster Benavent, Cruz Ros, & Moreno-Luz, 2005). Thus, it must anticipate whether QA will be implemented locally in individual functions or throughout the organization (Aly, 1997).

Communication:

Communication refers to the process of sharing information among individuals/employees in the organization (Keng Boon & all, 2007a). The QA approach must be fully explained and communicated throughout the organization (Balbaster Benavent, Cruz Ros, & Moreno-Luz, 2005; Mishra, 2013/2). Its objectives, approaches, and results must be communicated internally and externally.

The study conducted by (Ahmed, Yang, & Dale, 2003) demonstrated that open communication and feedback between structures is essential for the success of a self-assessment and is considered the second priority after management commitment. Indeed, it is a source of motivation for the members of the organization (Jain, Jain, & Triandis, 1997) and the development and maintenance of a quality culture (Harvey & Stensaker, 2008).

Self-assessment:

The self-assessment process requires methodological rigour in collecting, analysing, and processing data and information, as this makes the conclusions drawn and the strengths and weaknesses identified in different areas valid and relevant (CNA, 2008).

The data collection methods used for self-assessment activities depend primarily on the approach adopted (Teo & Dale, 1997). This choice involves deciding whether to centralize or decentralize the operation. Centralization, as opposed to decentralization, is the extent to which self-assessment is deployed at higher levels of the organization (Balbaster Benavent, Cruz Ros, & Moreno-Luz, 2005). These authors explained that in the early stages of the QA project, the institution typically uses self-assessment at higher levels - a high degree of centralization - to learn about its major problems. Nevertheless, as the project matures and major problems are resolved, the institution tends to scale down the self-assessment to lower structural levels-decentralization-to get more detail and identify more minor problems.

The self-assessment process should result in a report (Vlăsceanu, Grünberg, & Pârlea, 2007) that typically details the strengths of the organization and the opportunities for improvement identified by the assessors (Matthew, Ford & Evans, 2006).

Developing action Plans:

Once the self-assessment is completed, and areas for improvement are identified, the organization defines specific actions to attempt to eliminate, or at least diminish, these weaknesses (Hillman, 1994; Balbaster Benavent, Cruz Ros, & Moreno-Luz, 2005). The action plan defines corrective actions, and then the institution must be able to establish its priorities among all the actions identified (Black & Crumley, 1997).

The development of the action plan is not an isolated exercise by the self-assessment committee or the institution's leadership. It must involve those responsible for the various activities so that the proposed actions are feasible.

Monitoring and Improvement:

The effectiveness of self-assessment is measured by the improvement that is generated. This can be verified through a regular monitoring process. Monitoring is "*A continuing function that uses systematic data collection on specified indicators to provide management and the main stakeholders of an ongoing development intervention with indications of the extent of progress and achievement of objectives and progress in the use of allocated funds*" (OCDE, 2002). It involves monitoring the implementation of action plans that have been developed.

Effective monitoring must be initiated and led by top management and cannot be delegated to lower-level employees (Matthew, Ford & Evans, 2006) who generally lack the strategic perspective and authority to implement such changes (Wruck & Jensen, 1994). However, management must allocate the necessary resources and time to implement the improvement actions and, therefore, produce results (Balbaster Benavent, Cruz Ros, & Moreno-Luz, 2005).

This step of monitoring and reviewing the implementation of improvement actions is usually the last in the entire process, and a new process can then begin (Balbaster Benavent, Cruz Ros, & Moreno-Luz, 2005).

Academic perceptions of quality:

This research aims to explore the constraints encountered as perceived by the academics directly involved in the IQA process. Perception can be defined as "*the process that allows the individual to become aware of the elements that characterize his environment and relate them to his own frame of reference*" (Le Duff, 1999). Therefore, the notion of perception is closely linked to that of the stakeholder's experience. Indeed, perception gives meaning to experience (Eggen & Kauchak, 2001), which gives it a cognitive dimension.

As central stakeholders in the improvement of teaching and learning, academics are probably the most qualified to assess the effects of IQA (Tavares et al., 2017). Indeed, they have been recognized for decades as essential actors with legitimate authority to express their views (Middlehurst, 1992). However, some research has revealed that academics are not frequently consulted and involved in the process of quality implementation and self-assessment (Cardoso & al, 2013), and they are not much solicited to give their views regarding it (Barandiaran-Galdós et al., 2012).

Academics may take a stance toward quality management that varies from a favourable attitude, acceptance, and support to resistance or neglect and lack of concern (Manatos, Rosa, & Sarrico, 2015).

A limited amount of research has demonstrated positive attitudes toward QA on the part of academics. The study conducted by (Kleijnen & all, 2011) showed a positive stance of academics in Dutch HEIs towards quality management. Indeed, they believe that quality management leads to improvement and not just control. The authors considered these results as striking, as they are in contrast to the literature that rather indicates a negative attitude of academics towards quality. Moreover, in the Portuguese context, academics also seem to show acceptance and support for quality management (Rosa, Sarrico, & Amaral, 2012; Cardoso & al, 2013). The literature shows that these academics are generally those directly involved in QA activities and have a more in-depth knowledge of the quality management system and a more optimistic view of its activities (Rosa, Tavares, & Amaral, 2006; Manatos M., 2017).

In addition, the positions reflecting academics' resistance to QA can be interpreted as arising from some concerns they have regarding its implementation (Cardoso & al, 2013). Indeed, the literature shows that academics tend to resist quality, as they often associate it with an administrative and financial burden, a bureaucratic and time-consuming process (Harvey, 2006; Stensaker et al., 2011; Elassy, 2015). Thus, they perceive it as disjointed from their academic work (Harvey & Williams, 2010) and believe it distracts their attention from the fundamental aspects of academic life, namely teaching and research (Harvey, 2006). Moreover, they perceive it as an approach to compliance with requirements, monitoring and control rather than continuous improvement and excellence (Houston, 2010; Cardoso & al, 2013).

Research methodology

The empirical data used in this study were collected through a survey of the perceptions of Algerian academics about the constraints to IQA encountered in their HEIs.

Target Population:

All academics directly involved in IQA in their institutions were eligible to participate in our research. They are academics who have been members of the Self-Assessment Committees (SACs) and QAUs. In what follows, the term "*Project Teams*" will be used to refer to the members of both the QAUs and the SACs.

Sampling Method:

Given the geographic dispersion of the target population and the lack of a reliable sampling base, the "network" or "snowball" sampling method was chosen. It is a non-probabilistic sample first introduced by (Coleman, 1958) and (Goodman, 1961). Its principle is to distribute the questionnaire to a small number of people who satisfy the eligibility criteria and to ask them to pass it on to other people with a similar profile in their circle. These new profiles are then asked to pass on the questionnaire to others, and so on.

This is called snowballing because the sample size increases as the social connections of the initial respondents increase like a ball rolled down a slope and gets bigger. This method was considered to be the only one that would yield a substantial sample size.

Method:

The questionnaire was chosen as the data collection instrument. It was composed of two parts: the first part is the demographic data, and the second part is the dimensions focusing on academics' perceptions as identified in the theoretical framework. Overall, there are 16 items which are emerged from the literature.

The questionnaire utilized a five-point Likert scale (i.e., 1 = strongly disagree, 2 = disagree, 3 = neutral, 4 = agree, and 5 = strongly agree). Then, the responses were mapped using interpretation scale (table 1).

Table 1. Interpretation scale (Source: Developed by the authors)

Likert scale	Average class	Degree of agreement
1	[01 – 1.80]	Very low
2	[1.80 – 2.60]	Low
3	[2.60 – 3.40]	Medium
4	[3.40 – 4.20]	High
5	[4.20 – 05]	Very high

To test the reliability of items in the questionnaire, the Cronbach's alpha test was performed, and a pilot study was conducted. The questionnaire was presented to a group of 20 people from the target population. The results show that the Cronbach's Alpha of the 16 items in the questionnaire is 0.924, which is higher than 0.7. Therefore, it can be concluded that the questionnaire is reliable for measuring academics' perceptions.

Perceptions are collected using the online questionnaire that was distributed to the academics using the sampling method chosen. A questionnaire was sent by email to a sample of teachers concerned by the study. Their email addresses were given to us by the QAMs. Some academics responded to the questionnaires and forwarded them to their colleagues and contacts. Others gave us the email addresses of new people to whom we sent requests for collaboration, and so on.

Goodman pointed out that data obtained through a snowball sampling procedure can be used to make statistical inferences about various aspects of relationships present in the population (Goodman, 1961).

Research results

A total of 121 academics answered the questionnaire from November 2020 to January 2021. These participants belong to 45 institutions, representing 42% of all HEIs in Algeria (the total number of institutions is 106, including 52 universities, 13 university centres, and 41 higher schools).

The responses from the pilot study (n=20) were included in the overall study, as they demonstrated the reliability of the data and did not result in any adjustments or modifications to the questionnaire.

Demographic Data:

Table 2. Respondents' distribution (Source: Developed by the authors from the SPSS data)

		Nbr	%
Region (geographic location)	Centre	54	45%
	East	49	40%
	West	18	15%
Institution type	University	81	67%
	School	32	26%
	University Centre	8	7%
Sex	Female	38	31%
	Male	83	69%
Number of years of experience	Less than 5 years	23	19%
	Between [05 and 10 years old [	31	25,6%
	Between [10 and 20 years old [	44	36,4%
	20 years and more	23	19%
Discipline	Economic, management and commercial sciences	27	22%
	Science and Technology	21	17%
	Mathematics and Computer Science	17	14%
	Languages and Literature	16	13%
	Natural and Life Sciences	12	10%
	Science of the material	8	7%
	Humanities and Social Sciences	6	5%
	Earth and Universe Sciences	4	3%
	Law and political science	4	3%
	Architecture, urban planning and city professions	4	3%
	Sciences and techniques of physical and sports activities	2	2%

Table 2 indicates that the respondents are mainly from universities and are distributed between different regions. They are predominantly men (69%). Concerning the experience, more than half of the

respondents have held positions in their HEIs for more than five years. Table 2 also indicates heterogeneity in relation to the respondents' discipline.

Descriptive results:

Given the exploratory objectives of the study, the academics' responses were analysed using descriptive statistics.

Table 3. Descriptive Statistics of Items (Source: Developed by the authors)

Dimension	Items		Mean	Degree of agreement	Importance	Rank
Planning	1	Insufficient preparation of the IQA process	3.56	High	71.2%	4
	2	Low involvement of institutions' managers and administrative staff in the project teams	3.60	High	72.0%	3
	3	Low involvement of academics in the project teams	3.67	High	73.4%	2
	4	Low involvement of students in the project teams	3.73	High	74.6%	1
Communication	5	Reluctance of academics to share information	3.84	High	76.8%	2
	6	Lack of feedback to evaluate actors on their performance in terms of quality	3.85	High	77.0%	1
	7	Lack of external sharing of self-assessment results	3.82	High	76.4%	3
Self-assessment	8	Implementation of the process without sufficiently precise planning	3.64	High	72,8%	2
	9	Absence/non-availability of the evaluated parties during the self-assessment	3.46	High	69,2%	3
	10	Absence of documented evidence to verify compliance with the standard criteria	3.74	High	74,8%	1
Developing Action Plans	11	The action plans are not drawn up by the evaluated structures, following the self-assessment	3.70	High	74,0%	2
	12	The actions defined do not allow the removal of the detected non-conformities	3.68	High	73,6%	3
	13	Academics are not involved in the development of action plans resulting from the self-assessment	3.81	High	76,2%	1
Monitoring & Improvement	14	The results of the self-assessment are not used to improve the institution's performance	4.20	Very high	84,0%	2
	15	Lack of follow-up on the status of implementation of improvement actions by institutions' managers	4.21	Very high	84,2%	1
	16	Lack of resources allocated to monitoring the implementation of improvement actions	4.11	High	82,2%	1

Table 3 presents questions asked about the perception of constraints. It appears that academics view the barriers related to the *Monitoring and Improvement* dimension as those that seriously undermine the IQA process.

Discussion and conclusions

The results indicate that academics agree that there are barriers in all dimensions of IQA of varying importance. To test whether academics' perceptions differed significantly, we used the nonparametric statistical test *Wilcoxon One-Sample Test* (because the sample data did not follow a normal distribution) (Table 4).

Table 4. Wilcoxon single sample test (Source: Developed by the authors from the SPSS data)

Dimension	Observed median	Ws test statistics	Sign. (Bilateral)	
Planning	3.75	6.238	0.000	Significant
Communication	4.00	7.896	0.000	Significant
Self-assessment	3.67	6.603	0.000	Significant
Developing Action Plans	3.67	6.665	0.000	Significant
Monitoring & Improvement	4.00	9.250	0.000	Significant
Total	3.81	8.546	0.000	Significant

The Wilcoxon test results were significant ($p=0.000$ <0.05 for all dimensions)

Planning:

As a reminder, HEIs have entrusted the mission of quality planning, implementation and assessment to two particular bodies, namely the SAC & the QAU (project teams). These two bodies were made up of representative members of internal actors. The involvement of academics is a strong point in the literature and an element that should facilitate the adaptation of quality processes to the needs of the communities through the establishment of a common language (Scharager Goldenberg, 2017). However, the academics questioned felt that they were not sufficiently involved (level of agreement 73.4%).

Regarding students, academics confirmed the low involvement of students who should be considered as actors directly involved in the implementation of change (Nguyen, 2016) and as the second main stakeholder at the heart of the teaching and learning process (Barandiaran-Galdós et al., 2012; Elassy, 2015; Nguyen, 2016).

The low involvement of institutions' managers in project teams seems to have also hindered the success of the process (level of agreement 72%). Indeed, managers are the QA practitioners at the top of the hierarchy (Pham & Starkey, 2016). Their role as initiators, leaders, and stewards of quality is considered an important factor in the adoption and implementation of the QA initiative in universities (Mulu, 2012). For the purposes of this study, we define university leaders as heads of institutions (rector or director), vice-rectors, assistant directors, and deans of faculties.

In addition, the non-involvement of the administrative staff was reported. They are professional administrators and managers with expertise in functional areas such as student life services, finance and human resources (Gordon & Whitchurch, 2007). These actors, although not directly involved in academic and research work, have an impact on teaching-learning processes and curriculum development (from the perspective of experts interviewed by (Alzafari & Kratzer, 2019)).

Regarding planning activity, the approach to be followed was indicated by the ministry with a bi-monthly follow-up of the operation progress. Nevertheless, each institution had to develop its own provisional schedule in order to ensure that the operation was well organized and that its objectives were achieved within the set deadlines. However, it seems that the procedures were not sufficiently prepared and planned. The insufficient preparation for the process was a significant obstacle from the academics' point of view. This finding corroborates that obtained by (Mulu, 2012), who considered the lack of solid preparation as one of the major challenges for the implementation of quality initiatives.

Communication:

Academics reported that evaluated actors lacked feedback on the results of the evaluation of their practices (level of agreement 77%). In addition, they reported the stakeholder's reluctance to share information related to HEI practices (level of agreement 76.8%). This reluctance was perceived during the conduct of the self-assessment surveys.

Therefore, this could have a negative impact on the involvement of internal stakeholders in future IQA processes. These actors are reluctant at the base and risk becoming more so with a lack of visibility on the results obtained.

Regarding external communication, academics thought that the communication of self-assessment results externally was also an important obstacle to the success of the IQA process (76.4%). Indeed, the literature emphasizes transparency and information sharing with stakeholders for effective QA (Mulu, 2012).

External communication was limited to the transmission of self-assessment reports to the ministry. This seems obvious, as HEIs were required to communicate the results of their self-assessment. However, we looked at the HEIs' websites and noted that very few HEIs had made their reports visible and accessible online (only 05 HEIs). Other HEIs do not even have a dedicated QA section on their websites. Sometimes a space is reserved for QA, but it is not up to date. This problem seems to stem from a lack of information-sharing culture within the HEIs.

Self-assessment:

Academics interviewed pointed out the absence of documented evidence to confirm compliance with the criteria of the standard and note the practices (level of agreement 74.8%).

Thus, they feel that the process implementation was done without sufficiently precise planning (level of agreement 72.8%). It seems that the evaluators were only referring to the schedules communicated by the ministry and carrying out the operational tasks.

Academics also reported the absence/non-availability of the evaluated parties during the evaluation (level of agreement 69.2%). This could be due to their workload or to the lack of motivation and commitment of these actors.

All of these elements led to a multiplicity of time spent on the operation, which was, at the base, considered insufficient (Belimane & Chahed, 2021).

Developing action plans:

Following the self-assessment, all the HEIs proceeded to develop action plans. This step was essential and should have served as a basis for developing the establishment projects. However, academics felt that their lack of involvement in developing the action plans was the most crucial obstacle of the dimension (level of agreement 76.2%). We infer that their mission was limited to carrying out the evaluation work and providing the results and conclusions to the institutions' managers. They were not involved in the decision-making that resulted from this work.

In addition, academics believe that the action plans are not developed by the structures evaluated (level of agreement 74%). Indeed, the first obstacle implies the second. The majority of academics were not involved in developing the action plans, so they did not know if they were developed or not.

Furthermore, academics confirmed that the actions defined did not make it possible to eliminate the non-conformities detected (level of agreement 73.6%). Indeed, the non-involvement of the evaluating academics can explain the non-adaptation of the proposed actions to the reported non-conformities.

Monitoring and improvement:

The academics confirm the non-use of the self-assessment results & the lack of follow-up of the progress by the institutions' managers (levels of agreement 84%, 84.2%, respectively). Therefore, we infer that the results of the self-assessment were not systematically used for improvement.

It appears that the self-assessment was conducted in response to a request from the ministry. Indeed, Harvey has explained that when an approach is based on the obligation to respond to external pressures, improvement objectives and initiatives become a secondary function of the monitoring and oversight process (Harvey, 1995). This seems to be the case with HEIs in Algeria that adopt an approach based on meeting external requirements.

Another reason for the lack of follow-up on implementing action plans seems to be the lack of resources, as confirmed by academics (level of agreement 82.2%). We emphasize here the problem of limited autonomy granted to HEIs, which considerably limits the missions of managers and prevents them from allocating the resources necessary for the implementation of improvement measures (Belimane & Chahed, 2021).

The current study explored the constraints that inhibit IQA implementation in HEIs in Algeria. The data was obtained through a survey of a sample of 121 academics directly involved in the project in their institutions. This sample was drawn through a snowball sampling method.

The results show an explicit agreement that there are multiple barriers to the implementation of IQA in HEIs in Algeria in all dimensions examined in this study. The main constraints were: *the low involvement of different stakeholders in the QA project, the weakness of internal and external communication, the absence of evidence of compliance with the national standard, the lack of involvement of academics in the development of action plans and the lack of follow-up*. This last constraint was perceived as the most blocking the IQA process.

Although academics' perceptions are of varying importance, they are not dependent on certain academic characteristics such as gender (Mann Whitney test; p= 0.656) and the number of years of experience (Spearman test; p= 0.195).

We believe our research has important and original contributions. On the theoretical level, it will serve to enrich the literature on QA practices in HE. On a practical level, it will show managers and all interested parties in the HE sector (especially internal actors) with constraints to overcome to better design and implement an IQA approach.

A limitation of this study is that it was conducted with a small number of academics. Future work should build on this study by expanding the sample beyond other actors.

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ADAPTATION AND APPROPRIATION OF DIFFERENT WEB-BASED IDEA MANAGEMENT SYSTEM TYPES

Elina Mikelsone[1], Aivars Spilbergs[2], Jean-Pierre Segers[3], Janis Frisfelds[4]

[1]*Idea Innovation Institute Ltd., Jelgava district, Latvia, mikelsone.elina@gmail.com, ORCID:* https://orcid.org/0000-0002-8979-8308

[2]*BA School of Business and Finance, Riga, Latvia, aivars.spilbergs@ba.lv, ORCID:* https://orcid.org/0000-0003-2537-8053

[3]*Riga Technical University, Riga, Latvia, jean-pierre.segers@rtu.lv, ORCID:* https://orcid.org/0000-0002-2252-5479

[4]*Idea Innovation Institute Ltd., Jelgava district, Latvia, jfrisfelds@gmail.com, ORCID:* https://orcid.org/0000-0003-2389-744X

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Abstract

Research purpose. Adaptive Structuration Theory (AST), developed by Poole and DeSanctis (1990), implies that the application of information communication technologies (ICT) alone does not automatically lead to better outcomes and is dependent on the appropriation by the users of these ICT systems. So, authors in this paper research web-based idea management system (IMS) application adaptation and their relations with different IMS types and how it is all related to idea quantity (number of ideas generated). Do different IMS application types have different adaptation and appropriation levels?

Design / Methodology / Approach. The method applied for data collection was a global survey of >500 web-based IMS experienced organisations. The survey creation was based on the AST to evaluate web-based IMS in 8 different AST areas. In this paper, the authors analyse blocks about appropriation and adaptation. The survey was distributed through 100 web-based IMS developers that shared it with their clients (organisations that use web-based IMS). The holistic answer to the research question was based on 500 responses from diverse enterprises (different sizes, industries, and countries): the data analysis - statistical analysis. The study only deals with available commercial web-based IMS, not with privately designed or non-commercial IMS.

Findings. Different types of IMS applications have different adaptation and appropriation levels that could result in different outcomes. All adaptation and appropriation elements based on Innovation diffusion theory, Appropriation Scales and UTAUT models have a different impact on outputs. This paper answers the question: do different IMS application types have different adaptation and appropriation levels by exploring IMS application adaptation and their relations with different IMS types and how it is all related to idea quantity (number of ideas generated). Results prove that different IMS application types have different adaptation and appropriation levels: (H1) Active IMS provide higher adaptation and appropriation levels in the idea generation process than passive; (H2) External IMS provide higher adaptation and appropriation levels in the idea generation process than internal; (H3) Mixed IMS provides higher adaptation and appropriation level in idea generation process than internal.

Originality / Value / Practical implications. The research contributions can be summarised as follows: (1) the practical contribution helps organisations to predict what kind of idea quantity organisations could expect from different IMS application types based on their different adaptations and appropriations in the companies; (2) the research results highlight the elements of adoption of different types of IMS for organisations.

Keywords: Idea Management Systems; Web-based; Adaptation; Appropriation; Idea Quality

JEL codes: M15; O36; O32

Introduction

Current ongoing shifts in digitalisation/digital transformation and the impact of COVID-19 (Hanelt et al., 2021) stimulate the application of different information technologies (IT) in organisations has become a vital part of succeeding in the business environment nowadays, and it is not only vital to utilise IT but to also understand how to get the best outcome from utilising these IT systems and applications. Adaptive Structuration Theory (AST), developed by Poole and DeSanctis (1990), implies that the application of information communication technologies (ICT) alone does not automatically lead to better outcomes and is dependent on the appropriation by the users of these ICT systems. In line with this, the AST implies that the effect of ICT on outcome depends on the adaptive structure and ICT structures that are appropriated or adapted for a particular use by the users of these ICT systems. These ICT structures and features are created and recreated through the structuration process as users appropriate them to fit their purpose and activities. This process is further influenced by several external factors, for example, the task, objective, rules, and culture that influence the structuration process. Based on research by Poole (2013), there are additional factors that have a direct influence on the structuration process – including the characteristics of the ICT (complexity, restrictions, and uniformity); the characteristics of the task (complexity and difficulty); the characteristics of the system environment (maturity and interdependence); the characteristics of the organisation of the internal systems (culture, norms, and leadership). The aforementioned factors are all sources of structure; however, the system is mainly influenced by the factors which influence the activities the system is being appropriated to (Poole and DeSanctis, 1990).

The AST was initially developed and used to study decision systems of different groups (e.g. DeSanctis & Poole, 1994; Gophal, Bostrom & Chin, 1992). This research adopts the well-known AST to study web-based IMS and research the different adaptation and appropriate levels of different IMS application types, and determine their impact on the outcome (idea quality). Outcomes according to AST could be different in each case, for example, effectiveness, efficiency, new structures, commitment, learning and cohesion, etc.

In this research, authors will research idea quality as the output of web-based IMS systems and two classifications of web-based IMS: (1) based on IMS focus (passive or active IMS); (2) based on IMS involved idea creators (internal/ external/ mixed IMS) (Mikelsone et al., 2021). The research aim was to explore web-based idea management system (IMS) application adaptation and their relations with different IMS types and how it is all related to idea quantity (number of ideas generated). Do different IMS application types have different adaptation and appropriation levels? To answer the research question – "do different IMS application types have different diffusion, adaptation and appropriation levels" - four hypotheses were tested that are based on the 5 IMS application types:

(H1) *Active IMS provide higher diffusion, adaptation, and appropriation level in the idea generation process than passive.*

(H2) *External IMS provide higher diffusion, adaptation, and appropriation level in the idea generation process than internal.*

(H3) *Mixed IMS provides higher diffusion, adaptation, and appropriation level in the idea generation process than internal.*

(H4) *Mixed IMS provides higher diffusion, adaptation, and appropriation level in the idea generation process than external.*

Literature Review

Theoretical framework development is based on a systematic and acritical literature review. Literature review data collection was divided into three stages: (1) scanning of scientific databases to explore literature where the term ''adaptive structuration theory'' is mentioned, every term was researched in 7 databases (-2020 January); (2) selecting literature directly about AST; (3) to exclude duplicates. In Table 4, see the literature review sources' selection process by stages.

Table 1. Count of the Literature Sources in Stages *(Source: created by authors)*

	Stage 1 of the literature review In the article title or/and keywords mentioned term AST	Stage 2 - directly about AST (full text available)	Stage 3 - unique AST sources
Scopus	240	54	204
ScienceDirect	521	15	
Google Scholar	18300	11	
Sage Journals	590	63	
Ebsco	316	17	
Emerald	445	9	
Web of Science	161	61	
Jstor	755	26	
Taylor & Francis	1647	2	
Sum:	22975	258	

All unique literature sources remaining after stage 3 of the critical literature review are further included in a systematic literature analysis to identify the overall trends in research. The systematic literature analysis followed a 3-step process based on a methodology developed by Boiral (2012). As a first step, a review protocol was developed to have a structured approach and achieve the intended result in the research process. The review protocol is key to enabling proper classification and codification of the different studies to help researchers find an answer to the specific research question. In the second step, after the classification and codification of the different studies were completed, the data were extracted for further analysis. The third and final step is an improved version of Boiral's (2021) third step, in which the authors conducted a more systematic and improved information analysis. The authors used content analysis, as it is a technique that helps to identify and analyse gathered qualitative data more effectively and efficiently. This technique is descriptive; however, it can also be used in deductive and inductive approaches. In this case, since not only qualitative but also quantitative insights are valuable to the research, the content analysis is a more appropriate technique than, for instance - thematic analysis, as it can provide quantitative insights necessary to identify the frequency of applied AST dimensions in the literature.

The model used for the content analysis within this research is based on the work of Vaismoradi et al. (2013) content analysis model comprising three main steps:

1. the Preparation – this step consists of reviewing all literature source review protocols that are fit for purpose (Vaismoradi et al., 2013);
2. the organisation – this step comprises the initial coding of the information using data-driven and pre-defined coding. The coding was conducted non-linearly, and all data gathered as a result of literature source review protocols were classified and coded. Furthermore, a 3-level network of categories was created consisting of basic, organising, and global categories. Each category within this step was described based on the basic descriptions developed using the available data within each category (Vaismoradi et al., 2013);
3. the Report development – this step consists of a description of the most important categories that are relevant to the research and helps the authors to find an answer to a specific research question (Vaismoradi et al., 2013).

Figure 1. shows cases the category network used for content analysis. The authors took the aforementioned approach, as it was deemed to be the most effective and efficient way to analyse the information based on the type and the aim of this research.

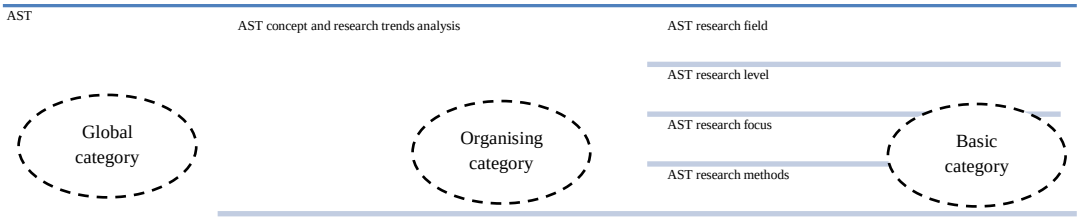

Fig. 1. Category Network *(Source: Adapted from Vaismoradi et al. (2013))*

The theoretical framework of the research and the derived hypothesis was based on the applied content analysis in the literature review process. To research the overall trends, all selected literature sources from stage 3 of the critical literature review were used. For the hypothesis and meta-analysis development, only the detailed literature from published 2-4* ABS ranking journal articles, scientific institutions, and doctoral dissertation research papers was used.

In the literature, there are several examples of AST being applied in different types and focuses of research. Some of these examples consist of applying AST in virtual teams (e.g. Maznevski & Chudoba, 2000; Thomas & Bostrom, 2010; Charlier et al., 2016), diffusion of innovations (e.g. Aijan et al., 2016), product lifecycle management (e.g. Kung et al., 2015; Feeney & Pierce, 2016). These studies mainly focus on the decision-making process and tools, for example, in group decision support systems (e.g. Gray & Mandviwalla, 1999; Niederman et al., 2008; DeSanctis & Poole, 1994). These studies use the AST framework in combination with primary data collected mainly through surveys, interviews, observations, and experiments. The most used data analysis methods in these studies consist of statistical methods, document, and text analysis. Part of the content analysis results of the AST basic framework used in this paper can be seen in Appendix A.

The Theoretical ground of AST developed by (Poole and DeSanctis, 1990) can be found in a structuration theory brought forward by Giddens (1984). Structuration theory is based on the "duality of structure" concept, implying that the structural properties or synthesis of structure depend on its use and exist through human actions – user activities. The original intent of AST applied to the study of group decision systems (e.g. DeSanctis & Poole, 1994; Gophal, Bostrom & Chin, 1992). However, more recently, there has been an increase in research that focuses on the study of systems at either individual or organisational level (e.g. Schimtz, Teng & Webb, 2016; Wang, Xiang & Fesenmaier, 2014). These studies primarily focus on the processes and aspects of specific ICTs and non-ICTs (e.g. Edgington, Raghu & Vinze, 2010; Holweg & Pil, 2008). Therefore, AST theory is helpful for studying not only ICT but also non-ICT topics, in many fields, like marketing, virtual teams, process, strategy, supply chain etc. (e.g. Droge, Vickery & Jacobs, 2012; Kirkman & Mathieu, 2005; Nicholson, Brennan & Midgley, 2014). Poole (2013), one of the fathers of AST, emphasises that AST structures and systems in organisations and groups are explained based on their activity in the structures, and the structuration is the result of the creation and reproduction of this system through the adaption of the system to rules and resources users need to perform a certain activity (produce an output). At the core of this AST definition, "structure" and "system" are the two terms that stand out. The summary of the AST construct is visible in Figure 2. (DeSanctis & Poole, 1994).

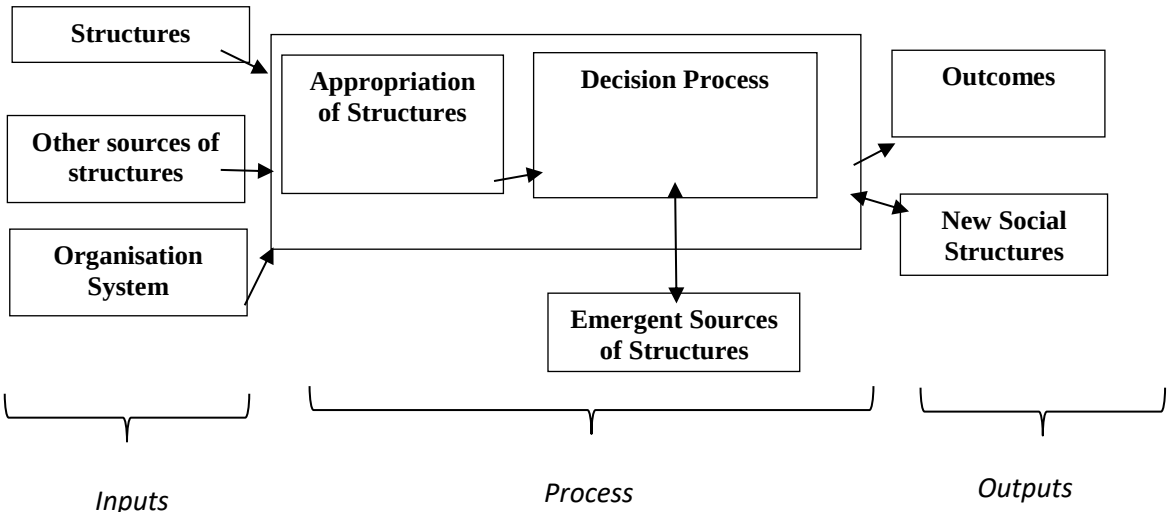

Fig. 2. Summary AST Constructs *(Source: DeSanctis & Poole (1994))*

In practice, AST has facilitated the development of new knowledge regarding the implementation and its related aspects in the field of ICT. For instance, Lee (2012), based on additive and order consistency, developed an approach for group decision making. A different development by Mutch (2002) offers a more productive way to approach IT. A proposed framework by Kand (2003) and Santhanam (2004) encourages continued engagement between trainers and users to refine user knowledge throughout the appropriation process. Group support systems are also effective in developing more efficient processes and systems, among other things (Reining and Shin, 2002).

Learning to read the process of AST is a crucial competence ICT management should develop to channel it in a productive direction and reap the benefits (Poole, 2013). It is important to mention that, in contrast to the interpretive-critical approach of Giddens (1984), AST has been criticised as being viewed as too positive and, therefore, inconsistent with the approach of Giddens (1984). Poole (2013) points out that AST was developed to bridge the interpretative and quantitative approaches of an inquiry while emphasising the attention to the validity of measurements and the definition of prior constructs. However, some studies include critical analysis, structural equation modelling and laboratory experiments that have been done via the application of AST, which adds additional credibility and verification of the validity of this theory. To further elaborate, appropriation of structures, according to AST, further improves the decision-making processes of an organisation through structuration – through the act of users bringing other structures, resources and processes into appropriation of the ICT system to lead to better outcomes (Aijan et al., 2016). In this paper, the act of appropriation is therefore defining it as "the extent to which structures in use are consistent or aligned with innovation spirit (Aijan et al., 2016; Desanctis & Poole, 1994)". According to the decision making in AST, the construct is defined as an idea management process based on the context.

The idea management system (IMS) is a tool, tool kit or complex system which provides a systematic, manageable process of idea generation, evaluation and continuation (Miķelsone & Lielā, 2015). Web-based idea management systems (IMS) are applied by many well-known organisations such as Panasonic, Fujitsu, Volvo, etc. Many cases show the positive effect that the use of web-based IMS has on organisation performance (Quandt et al., 2019). Many organisations apply these systems because there are so many benefits four main groups are: the benefits of an IM process (f.e., identifying new ideas, storing ideas and developing opportunities for new ideas), the benefits of innovation management (f.e., improving an overall innovation uptake, developing an innovation culture, and providing ideas for new products), the benefits of cooperation (f.e., based on the results of the average survey, are: an increased engagement and strengthened confidence in the company, improved internal cooperation, and improved networking), and the benefits of general management (Mikelsone et al., 2021).

Research Methodology

For data collection, a survey globally for web-based IMS experienced organisations was created. The survey creation was based on the AST to evaluate web-based IMS in 8 different AST areas. In this paper, the authors analyse blocks about appropriation and adaptation. The survey was distributed through 100 web-based IMS developers that shared it with their clients (organisations that use web-based IMS). The holistic answer to the research question was based on 500 responses from diverse enterprises (different sizes, industries, and countries).

Assessment of the measurement models includes evaluating the reliability of measures on two levels: (1) indicator reliability at the indicator level; (2) internal consistency reliability at the construct level (Hair et al., 2019). The validity assessment is focused on: (1) using the average variance extracted (AVE) -measure's convergent validity; (2) to evaluate a reflectively measured construct's discriminant validity in comparison with other construct measures - heterotrait–monotrait (HTMT) ratio of correlations (Hair et al., 2022). Package SEMinR (Ray et al., 2021) was used to assess reflective model reliability and validity.

Internal consistency measures the degree of homogeneity among the indicators in the construct, such that they are consistent with one another and measure the same thing (Dillon, W.R., Goldstein, M., 1984). The following internal consistency reliability indicators were used in the study:

- composite reliability rho_C;
- Cronbach's alpha;
- reliability coefficient $rho_{A.}$

Based on literature analysis, adaption variables are grouped as follows:

Table 2. Data Variable Grouping Based on Literature Analysis. *(Source: created by authors)*

Variable	**Abbr.**	**Measurement scale**	**Construct**	**Source**
Effective IM	Di_1	Likert 1 - 7	Diffusion of innovation	(Rogers, 2003)
Complexity	Di_2	Likert 1 - 7		
Compatibility with strategies	Di_3	Likert 1 - 7		
Compatibility with technologies	Di_4	Likert 1 - 7		
Ability to explain	Di_5	Likert 1 - 7		
Observability	Di_6	Likert 1 - 7		
Trialability	Di_7	Likert 1 - 7		
Ability to associate with performance expectancy	Ac_1	Likert 1 - 7	Acceptance and use of IMS	UTAUT model (Venkatesh et al., 2003)
Ability to associate with effort expectancy	Ac_2	Likert 1 - 7		
Ability to associate with social influence	Ac_3	Likert 1 - 7		
Facilitating conditions	Ac_4	Likert 1 - 7		
Appropriation	Ap_1	Likert 1 - 7	Appropriation	(Salisbury et al., 2002)
Consensus to use IMS to perform a task	Ap_2	Likert 1 - 7		
Consensus to use IMS for work	Ap_3	Likert 1 - 7		
Incorporation	Ap_4	Likert 1 - 7		
Mutual understanding	Ap_5	Likert 1 - 7		
Degree of respect	Re_1	Likert 1 - 7	Respect	Poole (2013)

Research Results

The indicator's reliability.

The indicator's reliability assessment aims to examine how much of each indicator's variance is explained by its construct. Indicators explained variance is assessed using squares of each indicator factor loading, which shows the bivariate correlation between indicator and construct, see following table 3.

Table 3. Indicators Explained Variances. (*Source: created by authors)*

Indicator	Diffusion	Acceptance	Appropriation	Respect
Di_1	0.678	0.000	0.000	0.000
Di_2	0.659	0.000	0.000	0.000
Di_3	0.647	0.000	0.000	0.000
Di_4	0.674	0.000	0.000	0.000
Di_5	0.655	0.000	0.000	0.000
Di_6	0.620	0.000	0.000	0.000
Di_7	0.670	0.000	0.000	0.000
Ac_1	0.000	0.728	0.000	0.000
Ac_2	0.000	0.732	0.000	0.000
Ac_3	0.000	0.757	0.000	0.000
Ac_4	0.000	0.822	0.000	0.000
Ap_1	0.000	0.000	0.770	0.000
Ap_2	0.000	0.000	0.796	0.000
Ap_3	0.000	0.000	0.797	0.000
Ap_4	0.000	0.000	0.795	0.000
Ap_5	0.000	0.000	0.794	0.000
Re_1	0.000	0.000	0.000	1.000

As one can see, all construct's squared indicator's loadings are above 0.5 and thus provide acceptable indicator reliability. For the construct 'Appropriation', the smallest indicator-explained variance is 0.770, and for the construct 'Acceptance' 0.728, which shows that the indicator's reliability is of sufficient levels. For construct 'Diffusion', the smallest indicator-explained variance is 0.620, which suggests an acceptable level of indicator's reliability (Chan and Idris, 2017; Flynn et al., 1990).

Internal consistency reliability & validity

Internal consistency measures the degree of homogeneity among the indicators in the construct, such that they are consistent with one another and measure the same thing (Dillon, W.R., Goldstein, M., 1984). The following internal consistency reliability indicators were used in the study:

- composite reliability rho_C;
- Cronbach's alpha;
- reliability coefficient rho_A. See Table 4.

Table 4. Internal Consistency and Convergent Validity Ratios. (*Source: created by authors)*

Construct	*alpha*	rho_c	*AVE*	rho_a
Diffusion	0.884	0.896	0.658	0.889
Acceptance	0.865	0.877	0.760	0.871
Appropriation	0.887	0.898	0.791	0.891
Respect	1.000	1.000	1.000	1.000
Ideas generated	0.731	0.840	0.515	0.828

Cronbach's alpha and rho_C values between 0.731 and 0.898 are considered "satisfactory" (Cronbach, 1951). Considering that *Cronbach's alpha* is rather conservative and composite reliability rho_c may be too liberal, an alternative measure can be considered the exact (or consistent) reliability coefficient rho_A (Dijkstra & Henseler, 2015). As can be seen, the values of the confidence factor rho_A are between *Cronbach's alpha* and the composite reliability rho_C; it can be concluded that the internal consistency is satisfactory.

Convergent validity

The metric used for evaluating a construct's convergent validity was the average variance extracted **(***AVE***)** for all indicators on each construct. The minimum *AVE* (0.515) indicates that the construct explains 51.5 per cent and more of the indicators' variance that makes up the construct (Hair et al., 2022).

Discriminant validity

As a discriminant validity measure, the heterotrait–monotrait ratio (*HTMT***)** of correlations was used. It is the mean value of the indicator correlations across constructs relative to the geometric mean of the average correlations for the indicators measuring the same construct (Henseler et al., 2015). Discriminant validity problems are present when *HTMT* values are high. Henseler et al. (2015) propose a threshold value of 0.90 for structural models with constructs that are conceptually very similar, such as cognitive satisfaction, affective satisfaction, and loyalty.

As shown in Table 5, the correlations across constructs are below this threshold.

Table 5. Indicator's Correlations Across Constructs. (*Source: created by authors)*

Construct	Diffusion	Acceptance	Appropriation	Respect
Diffusion	.	.	.	.
Acceptance	0.841	.	.	.
Appropriation	0.846	0.839	.	.
Respect	0.739	0.714	0.810	.
Ideas generated	0.418	0.389	0.365	0.295

In addition, bootstrap confidence intervals were calculated to test if the *HTMT* is a significantly different threshold value of 0.9. The authors considered a 95% one-sided bootstrap confidence interval. Its upper boundary is identical to the one produced when computing a 90% two-sided bootstrap confidence interval. See Table 6.

Table 6. Bootstrapped *HTMT* Mean Values and Confidence Intervals Across Constructs. (*Source: created by authors)*

Construct pairs	Original Estimate	Bootstrap Mean	Bootstrap SD	5% CI	95% CI
DIT->ACT	0.841	0.840	0.021	0.806	0.876
DIT->APT	0.846	0.846	0.027	0.800	0.889
DIT->RES	0.739	0.742	0.032	0.685	0.793
DIT->ICA	0.418	0.432	0.044	0.357	0.506
ACT->APT	0.839	0.839	0.023	0.801	0.877
ACT->RES	0.714	0.716	0.037	0.652	0.776
ACT->ICA	0.389	0.400	0.043	0.331	0.473
APT->RES	0.810	0.812	0.030	0.760	0.861
ACT->ICA	0.365	0.374	0.043	0.305	0.444
RES->ICA	0.295	0.300	0.040	0.237	0.365

As one can see from table 5, the *HTMT* ratios confidence intervals' upper boundaries are lower than the threshold value of 0.90 and hence demonstrate the discriminant validity of the constructs.

Indicator collinearity

High levels of collinearity can even cause significant changes in the variable weights, which leads to confusion of interpretation. The standard metric for estimating the collinearity of variables is the variance inflation factor (*VIF*). The higher the *VIF* values, the higher the level of collinearity. *VIF* values of 5 or higher indicate collinearity problems (Hair et al., 2022). As shown in the table below, the maximum *VIF* value is below 3.5, and thus it can be concluded that the collinearity in the formative measurement model is not significant. See Table 7.

Table 7. VIF Values of Indicators. (*Source: created by authors)*

DIT	Di_1	Di_2	Di_3	Di_4	Di_5	Di_6	Di_7
VIF	2.235	2.342	2.374	2.274	2.322	2.284	2.315
ACT	Ac_1	AC_2	AC_3	AC_4			
VIF	2.353	2.471	2.488	2.917			
APT	Ap_1	Ap_2	Ap_3	Ap_4	Ap_5		
VIF	2.847	3.107	3.253	3.449	3.327		
ICL	IC_1	CI_2	IC_3	IC_4	IC_5		
VIF	2.042	1.470	1.173	1.769	1.625		

Normality

Skewness and kurtosis were inspected to determine data normality. Skewness measures the degree to which a variable's distribution is symmetrical, whereas kurtosis measures the distribution's peakedness. Table 7 shows the mean values, skewness, kurtosis, and 95% confidence intervals of ideas generated using five studied IMS types. The computed values indicate that the response distribution is approximately normal. See Table 8.

Table 8. Descriptive statistics by IMS types. (*Source: created by authors)*

IMS type	***N***	***Mean***	***Skewness***	***Kurtosis***	***ME***	***LCL***	***UCL***
Active IMS	370	4 412.4	-0.829	-0.249	180.3	4 232.2	4 592.7
Passive IMS	83	1 015.8	0.605	-0.593	209.8	806.0	1 225.6
Internal IMS	201	1 199.0	-0.101	-0.500	144.9	1 054.1	1 343.9
External IMS	152	5 738.6	-0.324	-1.486	279.7	5 458.9	6 018.3
Mixed IMS	228	5 789.5	0.011	-1,674	226.1	5 563.4	6 015.6

Hypothesis tested:

(H1) Active IMS provide higher adaptation and appropriation level in idea generation process than passive:

H_{10}: $\bar{x}_{AIC} - \bar{x}_{PIC} \leq 0$ and H_{1A}: $\bar{x}_{AIC} - \bar{x}_{PIC} > 0$

(H2) External IMS provide higher adaptation and appropriation levels in idea generation process than internal:

H_{10}: $\bar{x}_{EIC} - \bar{x}_{IIC} \leq 0$ and H_{1A}: $\bar{x}_{EIC} - \bar{x}_{IIC} > 0$

(H3) Mixed IMS provides higher adaptation and appropriation levels in idea generation process than internal:

H_{10}: $\bar{x}_{MIC} - \bar{x}_{IIC} \leq 0$ and H_{1A}: $\bar{x}_{MIC} - \bar{x}_{IIC} > 0$

(H4) *Mixed IMS provides higher adaptation and appropriation level in idea generation process than external:*

H_{10}: $\bar{x}_{MIC} - \bar{x}_{EIC} \leq 0$ and H_{1A}: $\bar{x}_{MIC} - \bar{x}_{EIC} > 0$

As sample sizes and standard deviations differ, the test statistics are calculated as follows (Moore et al., 2016):

$$t = \frac{\bar{x}_i - \bar{x}_j}{\sqrt{\frac{s_i^2}{n_i} \cdot \frac{s_j^2}{n_j}}} \quad (1)$$

where $\bar{x}_i$ and $\bar{x}_j$ means of comparable sample variables,

s_i^2 and s_j^2 variance (standard deviation squared) of comparable samples variables,

n_i and n_j sample sizes of comparable samples.

Degrees of freedom (*df*) for the *t*-test statistics are calculated as follows:

$$df = \frac{\left[\left(\frac{s_i^2}{n_i}\right) + \left(\frac{s_j^2}{n_j}\right)\right]^2}{\frac{\left(\frac{s_i^2}{n_i}\right)^2}{(n_i - 1)} + \frac{\left(\frac{s_j^2}{n_j}\right)^2}{(n_j - 1)}} \quad (2)$$

Calculated *t*-statistics, degrees of freedom (*df*), critical values (t_{crit}) and *p*-values are aggregated in the following Table 9. First, three hypotheses were supported by very low p-values (<0,0001). Regarding (H4), authors cannot reject the null hypothesis because t < tc and p-value >0,05 – so sample data does not give sufficient evidence that mixed IMS provide higher adaptation and appropriation level in idea generation process than external.

Table 9. Hypothesis Test Statistics for Idea Quantity. (*Source: created by authors)*

IMS pairs tested	*t*-statistic	*df*	*t*-critical	*p*-value
AIMS vs PIMS	12.280	220.357	1.971	<0.0001
EIMS vs IIMS	14.412	229.708	1,970	<0.0001
MIMS vs IIMS	17.094	379.693	1.966	<0.0001
MIMS vs EIMS	0.141	320.872	1.967	0.4438

Conclusions

This paper answers the question: do different IMS application types have different adaptation and appropriation levels by exploring IMS application adaptation and their relations with different IMS types and how it is all related to idea quantity (number of ideas generated).

Results prove that different IMS application types have different adaptation and appropriation levels:

(H1) Active IMS provide higher adaptation and appropriation level in idea generation process than passive;

(H2) External IMS provide higher adaptation and appropriation level in idea generation process than internal;

(H3) Mixed IMS provides higher adaptation and appropriation level in idea generation process than internal.

Regarding (H4), authors cannot reject the null hypothesis because t < tc and p-value >0,05 – so sample data does not give sufficient evidence that mixed IMS provide higher adaptation and appropriation level in idea generation process than external.

The research contributions can be summarised as follows: (1) the practical contribution helps organisations to predict what kind of idea quantity organisations could expect from different IMS application types based on their different adaptations and appropriations in the companies; (2) the research results highlight the elements of adoption of different types of IMS.

In this paper, the authors have filled the research gap holistically, providing answers applying IMS application types and idea quality. However, future research directions should explore in detail how different AST system and structure elements influence adaptation and appropriation, for example, different tasks, different moderation elements, and different organisation system elements (f.e. size, the industry of organisation). Also, different outcomes could be included in future researches, for example, idea quality and involvement levels.

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AGEING OF THE EUROPEAN POPULATION AND DEPRIVATION

Ivana Malá

[1]Prague University of Economics and Business, Prague, Czech Republic, malai@vse.cz, ORCID: https://orcid.org/0000-0002-8043-847X

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Abstract

Research purpose. To quantify such a subjective phenomenon as deprivation, we can use direct questions or more objective composite indicators, including more characteristics of the situation of individuals. Moreover, when ageing is of interest, the usually used indicators should be updated to reflect the needs of ageing citizens. The European Survey of Health, Ageing and Retirement in Europe provides a vast database connected to the European population over 50. Two indicators for material and social deprivation from the survey are used to describe both types of deprivation in European welfare countries. The well-being of elderly inhabitants is a challenging problem for European economies; for this reason, information on the development of deprivation might be helpful to address future problems even before they become.

Design / Methodology / Approach. Data from the survey are used to describe differences between both deprivations and to analyse the impact of age, education and gender on the deprivation level. Regression and correlation analysis are used for the analysis.

Findings. The welfare countries relatively control material deprivation, but social deprivation is a more serious problem. The deprivation is slowly increasing with age with the positive impact of education. The gender is less significant. The situation is not similar in European countries, and the clustering of countries corresponds with the quality of life indicators and the country's welfare.

Originality / Value / Practical implications. Quantification of the subjective phenomenon is shown. Data-driven information on deprivation during the ageing process in the European Union is given.

Keywords: deprivation; composite indicator; ageing

JEL codes: P46; I31

Introduction

The population in Europe is ageing, and it causes challenging tasks for countries, authorities and society to cope with this reality. There exist demographic projections for particular countries as well as for the European Union (EU); the 50 years horizon is challenging but enables us to prepare for a long-term development (for example, Bijak et al., 2007 and many others). The growing numbers of elderly inhabitants are at the centre of the perception of the EU authorities, and the 2020 Strategy was launched in 2010 (EUROPE 2020; Pasimeni & Pasimeni, 2016, Chłoń-Domińczak et al., 2014). The developed welfare European countries consider not only material but also social exclusion and deprivation as a severe problem; for this reason, we consider it essential to analyse separately (and in dependence) material and social deprivation.

The reality of ageing is addressed from a large spectrum of views. To prevent problems caused by the low quality of life or, on the other hand, high deprivation level (lack of material benefits or the state of being kept from a social relationship, enjoying, or other substantive needs for everyday life). To ensure a dignified life for citizens in their later age, data are also important for all responsible for the strategies. The SHARE survey (Survey of Health, Ageing and Retirement in Europe) has been devised, organised and funded by the EU to obtain comprehensive, relevant, reliable and between-country comparable data to support decisions and strategies concerning the ageing process of the population and growing group of inhabitants of higher ages.

In the text, we present an analysis of two indices of deprivation – a material deprivation index (referring to the household level) and a social deprivation index (referring to the individual level) (Adena et al., 2015). Taking into account an adequacy gap, we formulate results based on the analysed indices to illustrate the situation in 2013, before the covid epidemic period (Chłoń-Domińczak & Holzer-Żelażewska, 2021 based on SHARE Covid survey, Börsch-Supan, 2022a, 2022b) or present war in Ukraine and the impact on the whole society. The authors define severe deprivation for respondents included in upper quartiles (based on the entire sample) for both indices.

The situation in member states of the EU is highly different for central tendency characteristics as well as the empirical distribution and its shape for both indices. In the text, only characteristics are of interest; the clustering of countries concerning the probability distribution is shown in Malá (2021).

We show the weak relationship between age and material deprivation. It might be caused by the welfare attitudes of the EU members. In a part of participating countries, the zero values of the material index (no deprivation) are found in a high percentage (Table 1). The dependence on age is stronger for social deprivation with increasing problems with increasing age. It suggests that the attention to social integration and the fight against loneliness and isolation should be strengthened. Resources given to this purpose might positively impact the situation of the elderly with a positive effect on their health, mental state, and quality of life. The linear regression models for deprivation indices, including covariates such as gender, age, size of household and country of origin, are statistically significant. Still, the amount of described variance is low (up to 20 per cent). The logistic regression model for no material deprivation with the same covariates predicts correctly (in sample) 71 per cent of respondents.

Literature review

There are two main approaches to quantifying such subjective phenomena as the quality of life or deprivation, asking a direct question or trying to construct a more objective composite indicator. Composite indicators are a very powerful tool, but there are two primary questions to answer, which issues should be included and how to specify the weights of particular included issues (Saisana et al., 2005; Bellani, 2013). Usually, there is no one generally accepted indicator. Moreover, for our purpose, the indices oriented or adapted to inhabitants at later ages are needed (van Leeuwen et al., 2019 discuss the basics of perception of deprivation in later ages).

In SHARE, a large spectrum of questions concerning the subjective and objective perception of the material and social situation are included in all waves. But the wave 5 was more concentrated on deprivation and quality of life (Börsch-Supan et al., 2015; Börsch-Supan, 2022d). In (Myck et al., 2019), the authors address the close relationship between deprivation and the health situation of elderly people. There are more papers based on information from the SHARE survey and addressing different aspects of the life of the elderly population as well as the impact on the whole society (Akdede & Giovanis, 2022 deals with migration; Axelrad and Luski in (Axelrad & Luski, 2021) addressed the problem of the impact of retiring age).

Material and social deprivation is regularly quantified by Eurostat (EUROSTAT, 2021); the results are presented for the population 18 - 65 and over 65. According to their samples, the population under 65 years and females are more likely to experience material deprivation. It coincides with our results based on different and more complex composite indicators.

Bellani and D'Ambrosio in (Bellani & D'Ambrosio, 2011) gave basics for constructing these new indices. In (Blane et al., 2007), the authors describe and quantify the impact of the socio-economic situation on the higher ages in life from the point of view of demography. The negative health consequences of deprivation (and positive for the high quality of life) are well described in a large spectrum of papers, for example, Garcia & Navarro, 2018 or Myck et al., 2019. It influenced family life (Silverstein & Giarrusso, 2005) or population inequality (Goldstein, Lee, 2014). In (Poterba, 2014), the problem of retirement security is of interest; the data from the SHARE survey are also used as a basis for proposing the necessary reforms of pension systems of the EU members. There are a lot of papers from various aspects of economics, for example, a recent paper by Sánchez and Díaz (Sánchez & Díaz,

2021). Hungary takes part in the survey from the last eighth wave. However, the research on material conditions of silver generation (ages 65+) is described in (Csoba & Ladancsik, 2022) to add results information on the situation in post-communist countries (represented in our study only by the Czech Republic, Slovenia and Estonia). The silver generation is frequently researched in literature; the ages of 50+ are more suitable for searching for the process of ageing than for a state or situation. In the study based on a sample survey in Finland from 2015 (Ilmakunnas & Mäkinen, 2021), a significant percentage of respondents (more than 50%) in the age groups 50–59 and 60–70 years is included, but the indices of material deprivation are not oriented on this group (the range of respondents is 18-70). The study concentrates on age differences related to material deprivation.

The income from an active life period impacts the income after retirement. In the SHARE data, information about jobs, positions etc., is included in the survey (in all waves, concentrated in the Job Episodes Panel, 2022). Except for attempts to quantify differences in deprivation level (measured by analysed indices) between deprivation for men and women, the impact of the glass ceiling for women might influence the situation (for American society, see Newman, 2016).

In (SHARE results, 2022), more results based on data SHARE are given. For example, the evidence is given that most older Europeans live in environmentally satisfactory neighbourhoods with socially cohesive relationships with their neighbours, but between-countries differences exist. The importance of social relationships is stressed in the social deprivation index. The predominant pattern found in Europe is that migrants are significantly more often deprived materially in later life, and to a lesser extent socially, compared to natives (Akdede & Giovanis, 2022).

In our research, only quantitative data-oriented analyses of extensive data were performed. The problem also allows qualitative analysis of a small number of respondents as in (Gilhooly, 2007) pairing health and unhealth respondents in ages 72-89 searching for "successful" ageing, taking into account also level of deprivation in Scotland.

Research methodology

The European population above 50 is the target population of the extensive Survey of Health, Ageing and Retirement in Europe (Börsch-Supan, 2022a, 2022b, 2022c). This panel survey is organised in waves (the first wave from 2004/2005, the 8th from 2020), and at present, it includes all members of the EU, Israel, and Switzerland. Households are surveyed in participant countries (country-specific sample frame), and all members above the age of 50 and their partners (even if they are younger) are included in the survey. Then they are followed until the end of their life. We obtain in-depth information on the long process of ageing.

Table 1. Definition of the index of material deprivation (Source: Börsch-Supan, 2022c, description of proposed indices)

Variable	Weight	Problem (questions from the questionnaire)
Meat	0.120	Your household does not eat meat, fish or chicken more often than three times per week because you cannot afford it.
Fruit	0.128	Your household does not eat fruits or vegetables more often than three times per week because you cannot afford to eat them.
Groceries	0.119	Can your household afford to regularly buy necessary groceries and household supplies?
Holiday	0.194	Could your household afford to go for a week-long holiday away from home at least once a year?
Expense	0.086	Could your household afford to pay an unexpected expense without borrowing any money?
		In the last twelve months, to help you keep your living costs down, have you

Clothing	0.054	continued wearing clothing that was worn out because you could not afford replacement?
Shoes	0.029	continued wearing shoes that were worn out because you could not afford replacement?
Heating	0.064	put up with feeling cold to save heating costs?
Glasses	0.064	gone without or not replaced glasses you needed because you could not afford new ones?
Dentist	0.042	postponed visits to the dentist?
Doctor	0.100	Was there a time in the past 12 months when you needed to see a doctor but could not because of the cost?

We use data from wave five from 2013. In this wave, two composite deprivation indicators (material and social deprivation) were proposed. Only in this wave a deprivation module was included. For this reason, only cross-sectional data can be analysed, and no time dimension or index evaluation part are available because of lack of data. The problem is that not all items included in the indices are available in the survey questionnaires for the following waves. There were only 15 participating countries, 13 EU members (Table 4), Israel and Switzerland. Israel was excluded from this analysis, but we included Switzerland.

In Tables 1 and 2, the items included in both indices are presented to show that these indices are adapted for the perception of deprivation of residents of higher ages. They include questions asked in the survey and use hedonic weights to construct indicators standardised on a 0/1 scale (the higher the index, the higher level of deprivation, a value of zero means no deprivation). Hedonic weighting scheme was constructed based on an ordered probit regression of self-reported life satisfaction (subjective question included in the survey) on all the items considered and country dummies (for details, Bertoni et al., 2015). These indicators try to access problems specific to the elderly inhabitants of EU countries eligible for the survey. The indices are positively correlated, as they reflect different but related phenomena.

The descriptive analysis presents results from this data-driven analysis of two indices. We compare levels of deprivation through statistics.

- Mean value of the social deprivation index.
- Percentage of respondents suffering from severe deprivation.
- Percentage of respondents without material deprivation.
- Mean of the material index (for all values).
- Mean of the material index for positive values of the index.

with respect to countries, age and gender.

The empirical distributions were analysed through graphical analysis. The linear regression models are used to assess the dependence of both indices on covariates (respondents' socio-demographic characteristics and country of living), and logistic regression is applied to predict the probability of being without any material problems included in the index (material index equals 0).

All computations are performed in the freeware R (R Core Team, 2020). No special packages were needed.

Research results

The dataset includes 53,590 respondents with both indices; participating countries are listed in Table 4. The Spearman correlation coefficient between both indices is equal to 0.39 for both genders (0.40 for all respondents), quantifying a medium positive strength of dependence.

Correlations between age and indices (Spearman) were evaluated as 0.001 for material deprivation and 0.195 for social deprivation. These values are for men 0.024 (0.169, respectively) and for women -0.028 (0.270, respectively).

Table 2. Definition of the index of social deprivation (Source: Börsch-Supan, 2022c, description of proposed indices)

Variable	Weight	Problem (questions from the questionnaire)
Room	0.044	Less than one room per person in the household.
Literacy	0.077	Poor reading or writing skills.
IT	0.041	Poor computer skills or never used a computer.
Feeling	0.104	Not feeling part of the local area.
Vandalism	0.035	Vandalism in the local area.
Clean area	0.053	Local area not clean.
Help in area	0.090	No helpful people in local area.
Bank access	0.005	Difficult access to bank.
Shop access	0.041	Difficult access to grocery shop.
Pharmacy access	0.017	Difficult access to pharmacy.
Doctor	0.088	Waiting too long to see a doctor.
Course	0.055	Not attending any course in the past 12 months.
Organisation	0.037	Not taking part in any organisation in the past 12 months.
Trust	0.076	People cannot be trusted.
Isolation	0.237	Feeling left out of things.

The basic characteristics of the sample are given in Table 3 for the whole sample and for men and women separately. Both gender sub-groups are comparable regarding age; in the sample, both genders are of almost equal mean age (with slightly higher variance in women). We should emphasise that the material index is quantified at the household level and is equal for all members of one household, and it might make differences between gender difficult to be evaluated. Moreover, we treat indices as continuous; however, only discrete values are possible. For this reason, in some countries, medians are precisely equal. All characteristics are worse for women, but the differences are not statistically significant. The highest difference is equal to 5 percentage points (p.p.) in the percentage of respondents with no material deprivation.

Table 3. Characteristics for the EU (**mean (SD, min, max))** (Source: own computations)

Characteristics	sample	men	women
age (years)	66.7 (9.8, 50, 102)	66.9 (9.5, 50, 99)	66.6 (10.0, 50, 102)
social index	0.17 (0.14, 0, 0.91)	0.16 (0.13, 0, 0.83)	0.18 (0.13, 0, 0.91)
material index	0.13 (0.19, 0, 1)	0.12 (0.18, 0, 1)	0.14 (0.19, 0, 1)
positive material index	0.27 (0.02, 0, 1)	0.27 (0.18, 0.02, 1)	0.28 (0.18, 0.02, 1)
material index = 0 (%)	52.1	54.7	49.8

In Table 4, sample sizes are given (first column); countries are ordered according to the percentage of respondents with severe deprivation (second column). The inhomogeneous situation in the participating countries is visible. For Denmark, there are more than three-thirds of respondents without any material distribution, followed by the Netherlands and Sweden; the lowest percentage is 15% for Estonia, distant from the following countries as Slovenia and Italy with more than 30%. These numbers might depend on the index, but the tendency should be real, as it also follows from the severe material deprivation index used by Eurostat (EUROSTAT, 2021). Denmark also has the lowest mean social deprivation index. There are high standard deviations in both indices, but we have large samples, and even minor differences are statistically significant, resulting in clusters of countries.

Table 4. Characteristics for countries (Source: Malá, 2021, own computations)

Country	***n***	**severe dep.**	**social**	**positive material**	**material**	**material index=0**
Denmark	3,524	1.7%	0.09 (0.10)	0.19 (0.14)	0.04 (0.10)	76.9%
Sweden	3,868	3.0%	0.12 (0.11)	0.19 (0.14)	0.05 (0.11)	73.9%
Switzerland	2,720	3.1%	0.12 (0.11)	0.18 (0.14)	0.06 (0.12)	65.8%
Netherlands	3,337	3.4%	0.11 (0.11)	0.21 (0.16)	0.05 (0.12)	74.0%
Austria	4,029	4.3%	0.13 (0.10)	0.23 (0.16)	0.08 (0.15)	63.5%
Luxembourg	1,429	5.3%	0.15 (0.12)	0.20 (0.16)	0.07 (0.13)	67.0%
Belgium	4,861	6.8%	0.16 (0.13)	0.23 (0.17)	0.09 (0.15)	60.4%
Germany	4,857	8.3%	0.15 (0.12)	0.25 (0.17)	0.11 (0.17)	57.0%
Slovenia	2,560	10.0%	0.15 (0.11)	0.28 (0.16)	0.19 (0.19)	32.4%
France	3,999	12.0%	0.19 (0.14)	0.25 (0.17)	0.13 (0.18)	48.7%
Spain	5,343	13.0%	0.20 (0.14)	0.29 (0.18)	0.18 (0.20)	39.9%
Czech Republic	3,954	17.1%	0.25 (0.14)	0.26 (0.17)	0.15 (0.18)	40.4%
Italy	4,025	24.5%	0.25 (0.12)	0.34 (0.20)	0.22 (0.23)	35.5%
Estonia	5,084	27.2%	0.22 (0.15)	0.36 (0.19)	0.31 (0.22)	15.3%

In Figures 1 to 3, the dependence of indices on age is plotted; five-year-long groups are used (50-54, 55-59, …, the last one is open to the right group 85+). The bold line in all figures describes the means of the sample; countries above and below the mean are shown.

In Figure 1 for the material deprivation index, the relative frequency of respondents with the material index equal to zero is given. France represents a mean country with all values similar to the sample mean. The worse situation is for countries below the mean (the Czech Republic and Spain, then Italy and Slovenia), extremely low value for Estonia. The relative frequencies are similar in the age groups 50-55 and 85+ (+/-5 p.p.) for all countries (almost constant curves in Fig. 1) with the exception of -12 p.p. in Estonia and Slovenia, -19 p.p. in Italy (decreasing curves in Fig. 1, bold) and +11 p.p. in Luxemburg (increasing curves in Fig. 1, bold).

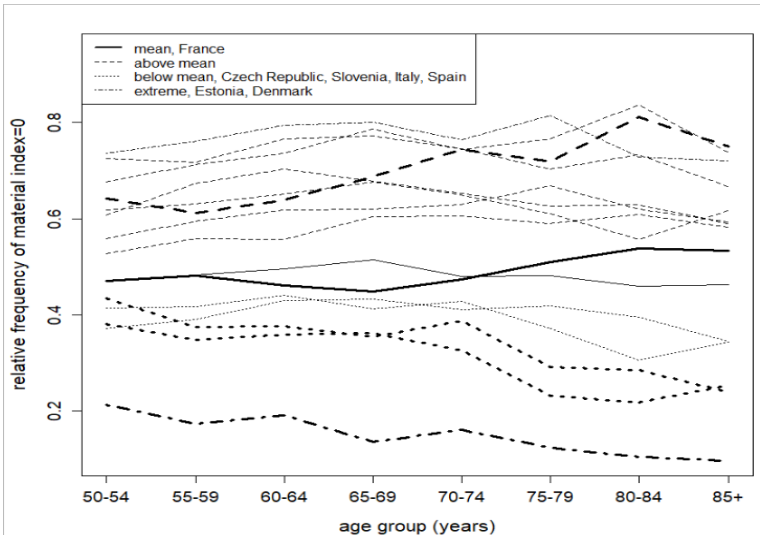

Fig. 1. Dependence of no material deprivation index on age (Source: own computations)

The logistic regression model for the probability of being without any material deprivation (material deprivation is equal to 0) with covariates age, gender, and country allows for 71% of correctly assigned values with the bandwidth for classification equal to 0.5, all explanatory variables being highly significant (Wald test).

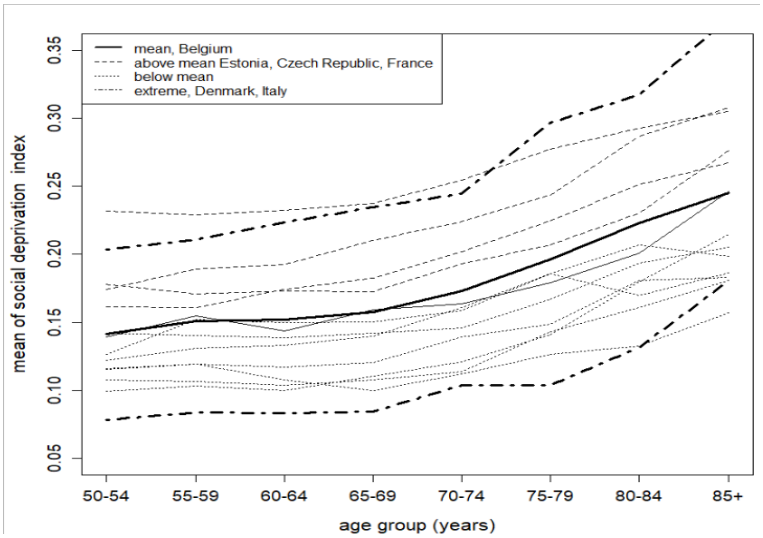

Fig. 2. Dependence of social deprivation index on age (Source: own computations)

Figure 2 plots the dependence of the mean social index on age groups. The increase from the first age group, 50-55, to the last 85+, occurred in all countries, from 32% for the Czech Republic to 130% for Denmark. For this index, Belgium seems to be a mean country copying the mean of countries, close is also Luxemburg. The best country is Denmark (below the mean), and the worst countries are the Czech Republic and Italy (in bold). The linear regression model with covariates age categories, gender, and country account only for R^2=18% of the variability of the index, all covariates being significant as well as the whole model.

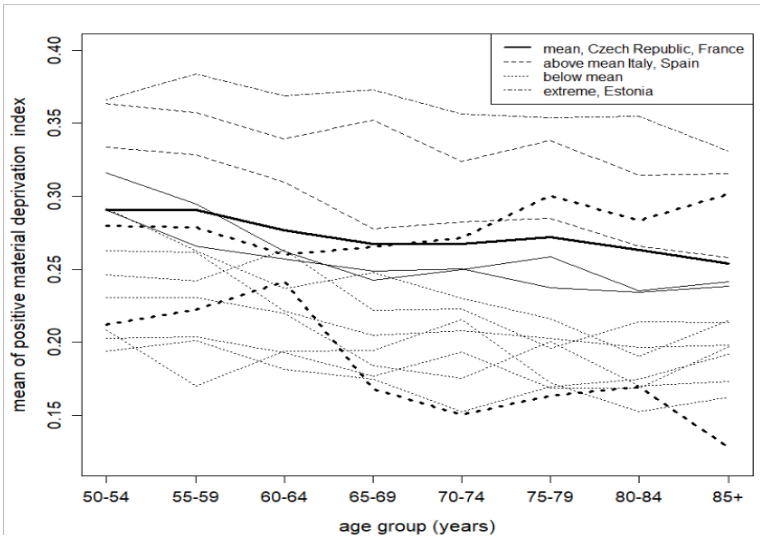

Fig. 3. Dependence of positive material deprivation index on age (Source: own computations)

The means of positive values of material index decrease, for all participating countries the decrease from the first age group 50-55 to the last 85+ is from 40% for Luxemburg (bold below the mean) to 2% for Sweden and Switzerland, the only country with an increase by 7% is Slovenia (bold close to and above the mean). For this index, the linear model accounts for 16% of the variance of the index, the model being significant. The significant coefficient for gender supports the observed worse situation for women than men.

Conclusions

The results of the data-driven analysis presented in the text suggest that social deprivation is a more severe problem for the ageing population in the EU than material deprivation, and residents in highly developed welfare countries might suffer from a lack of social support and relationship. For this reason, attention should be paid not only to the material security of the elderly inhabitants and pension systems but also to social relations, the position of such residents in society and the support of active participation in public life until high ages. The support of family life is also essential; a higher level of both indices between respondents living alone follows from our analysis (not given in the text). The negative impact of living alone is visible on both analysed issues – material and social situation of the respondents. From the structure of respondents, we can derive that living alone for women in high age groups (a significantly higher rate than for men) causes worse results for women. For women living alone, the impact of the pay gap and probably also of the glass ceiling on income results in higher values of the material index. On the other hand, having children and children living in the neighbourhood seems to decrease both indices.

A highly inhomogeneous situation (described by analysed indices, but these results correspond to Eurostat results and indices on the country level) through the EU is well visible. Possible clustering of participating countries enables finding a group of north European countries with a better situation. Only three countries from the former eastern countries participated in the survey; Estonia, the Czech Republic, and Slovenia are comparable to others. Estonia shows worse results in the material deprivation index. Also, the probability distributions of indices for these countries differ from the distributions of old EU countries.

European countries are inhomogenous, not only concerning characteristics as central tendency but also in the empirical distribution. The distributions are not normal; they are positively skewed with more modes. This property limits the use of linear regression models even in the case of thousands of data.

In this text, only basic comparisons were given; however, highly sophisticated regression models could be applied to answer a large spectrum of research questions and support decisions, measures, politics or remedies to problems with statistical analysis. The quality of the SHARE data is high, and these datasets are reliable and carefully collected, prepared, and offered to analysts in a user-friendly manner. Unfortunately, due to the lack of data to evaluate analysed indices, no panel values of indices are available. For this reason, these indices seem to be an interesting attempt at constructing elderly population-oriented indices of deprivation. However, it does not provide a chance to make a deep analysis and generalisation of the population. Subjective questions related to deprivation, loneliness, quality of life, and expectation are included in further waves. It is possible to use data to study deprivation, but the indices analysed in this text are not available.

To overcome the problem, we constructed the proxy for these indices that are highly correlated, not equal. We hope that the analysis of these proxy indices might substitute for the original ones.

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INVESTIGATION OF FACTORS DETERMINING LITHUANIAN PUBLIC DEBT TO FOREIGN COUNTRIES

Milena Seržanė[1], Viktorija Askoldavičiūtė[2]

[1]*Vilnius Gediminas Technical University, Vilnius, Lithuania, ORCID:* https://orcid.org/0000-0002-2919-115X

[2] *Vilnius Gediminas Technical University, Vilnius, Lithuania, ORCID:* https://orcid.org/0000-0003-3215-1703

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Abstract

Research purpose. The study aims to examine which indicators influence the amount of Lithuanian public debt to foreign countries.

Design / Methodology / Approach. First of all, in order to find out what could be preliminary indicators influencing the public debt, a comprehensive literature review has been done. This was implemented with the main goal of finding out the influencing independent variables, which were used for the next calculation. Successively was the selection procedure of the appropriate methodology for solving similar tasks. The pairwise and multivariate regression analyses have been carried out with the collected data.

Findings. Empirical research has shown that all independent variables are significant and can be used for pairwise regression analysis. After doing this, the authors found that no regression equation could be completed with no variable, which means that none of the variables affects the dependent variable (altogether). A multivariate regression analysis was also performed to check the impact of the selected variables on public debt. The regression equation was succeeded only when the criterion "population" had been eliminated. The results show that GDP, the unemployment rate, inflation and the minimum wage (in composition) may have an impact on the government's external debt.

Originality / Value / Practical implications. Due to the emergency (pandemic) situation, the Lithuanian state borrowed a considerable amount of money from the European Commission - last year, it was planned to borrow 2.7 billion according to the initial budget, but due to the situation, the debt was increased by 5.1 billion Euros. The concept of reasoning the amount of public debt to foreign countries is valuable not only in the concept of the COVID pandemic. This empirical research analyses the critical substances which affect the public debt based on factual statistics, correlation analysis and pairwise and multivariate regression.

Keywords: public debt; impact calculation; regression analysis; unemployment; Lithuanian economy.

JEL codes: E01; D20

Introduction

Public debt makes a significant impact on the state, its government, and the country's citizens and future generation of it. However, first and foremost, public debt is a problem for public finances. Borrowing on behalf of the government is required to cover the difference between revenue and expenditure (deficit) to balance the cash flow, repay previous debts, and in other cases provided by the Law on Public Debt of the Republic of Lithuania. Usually, Governments borrow domestically by issuing government securities (liabilities) or borrowing on foreign capital markets by issuing Eurobonds and lending from international financial institutions.

In 2020, the coronavirus pandemic hit the Lithuanian and global economies (COVID-19). Due to the emergency, Lithuanian states borrowed money from the European Commission - last year, according to the first budget, it was planned to borrow 2.7 billion. Still, due to the situation, the debt was increased by EUR 5.1 billion (Committee on budgets and finance, 2020). Thus, in 2020, governments borrowed EUR 7.9 billion - public debt to the European Union jumped to historic highs. According to the Bank of Lithuania's data, in 2020, at the end of the year, the public debt amounted to EUR 24.8 billion. This

corresponds to almost 51% of gross domestic product (GDP). In 2019, Lithuanian schools reached 35.9% of GDP - it grew by 15% during the year. This phenomenon is explained by the inevitable consequence of the pandemic. According to the July data of the Ministry of Finance of the Republic of Lithuania, the government intends to borrow EUR 5.2 billion, which is EUR 0.1 million less than had been planned in December, to cover the budget deficit for other purposes as well (Ministry of Finance, 2022).

This study examines the dependence of government debt on foreign countries by several macroeconomic variables, such as inflation, minimum wage, GDP, unemployment rate and Country population.

The research problem was formulated as follows: what factors impact the Lithuanian state debt to foreign countries? Accordingly, the research object is the debts of the Lithuanian state to foreign countries. Before the final empirical research results, a brief scientific literature analysis is done.

Literature review

This section reviews the scientific publications/scholars who have analysed the potential impact of inflation, GDP, population, minimum wage, and unemployment rates on foreign debt. Later on, by conducting an empirical study, the theory will be confirmed or refuted concerning the information obtained in literature analyses.

Rapidly rising public spending risks overheating the economy and raising inflation. This is confirmed by a study by José Pablo Barquero Romero & Kerry Loaiza Marín (2017), whose results show that the increase in the debt-to-GDP ratio is not significant in developed countries but that the increase in the debt-to-debt ratio in indebted developing countries is strongly linked to high inflation. Thus, according to them, an increase in government debt tends to increase inflation in countries with high public debt (Bleaney M, 2017). Also, the results of the non-linear effects of government debt on inflation examined by Bogdan Dumitrescu et al. (2021) confirm the information from the source analysed earlier. The authors examined 22 economically developing countries and concluded that there is a marginal effect between inflation and government debt. The authors also predict that if the shadow economy exceeds a certain threshold (no threshold is specified), higher public debt increases inflation (Dumitrescu et al., 2021). Thus, inflation affects government debt when the government is developing, and its debt is already high.

However, from another hand, the Government debt-to-GDP ratio is one of the most important indicators for measuring the level of Government debt. This indicator shows the country's ability to repay debt and accrued interest. According to the data published in the 2019 issue of the "National Debt", the government’s debt-to-GDP ratio increased by 2.4 per cent (from 33.8 per cent of GDP in 2018). Based on this, we can see that the possibilities for the government to pay off the public debt have decreased. Vladimir Arčabić et al. (Arčabić et al., 2018) examine in their work that a debt-to-GDP ratio of more than 90% has a detrimental effect on long-term economic growth. Moreover, a state of sustainability is achieved when the public debt-to-GDP ratio is at least 60%, reports Mihaiu Diana Marieta (Mihaiu Diana Marieta, 2017). They also found that the maximum sustainability of public debt in developed countries is 183-192% of GDP and 60-80% of GDP. Other researchers have analysed the impact of GDP on public debt. Chudik et al. (Chudik et al., 2018), in a study using data from 40 developing economies and four decades, have shown that long-term public debt is associated with lower levels of economic activity. They argue that rising public debt slows GDP growth in the long run. The more the state is forced to borrow from abroad, the harder the economy will grow, and the level of prosperity shown by GDP per capita will increase. This is also statistically proven by Law et al. (Law et al., 2021).

Another critical indicator which potentially can have an impact on public debt is the level of population in the country. Moreover, the ageing of the population is a topical problem in the Lithuanian state. The increase in the number of older people and the decrease in the number of young people - the search for a better life and the opportunity to pursue a career abroad are encouraging emigration. This process encourages the state to allocate more funds for the maintenance of the elderly. The departure of young people is also reducing the number of taxpayers, which is forcing the state to borrow in order to keep its

citizens. One foreign scholar (Narciso, 2010) predicts that public debt will rise sharply due to an ageing population. He argues that an ageing population is a challenge facing industrialised countries. An empirical study by the author does not prove that population ageing has affected public debt to date but presumes that this may change in the future. Abd Rahman et al. (Abd Rahman et al., 2021) also say the population is a current demographic challenge that could force the government to borrow more money. Furthermore, this is influenced by an ageing population - an increase in the population aged 65 and over. Public debt could increase due to rising health care costs, social security and pensions. Nevertheless, the author also has a different view: older people are minimally dependent on public finances for their savings. Therefore, the ratio of old age to external debt is insignificant. Studies have shown that population size does not affect the size of a country's external debt, but it is being speculated that this may change.

Analysing the impact of minimum wage on government external debt, some interesting facts have been noted. For example, a certain amount of money is deducted from the salary for taxes to the state budget each month. According to the State Tax Inspectorate, the most significant part is the Personal Income Tax - 20% (from the gross salary, if the tax-free income is not applied - a tax-free amount). Two social insurance contributions are also deducted: compulsory health insurance - 6.98%, others - 12.52%. It is also possible to deduct a certain percentage allocated to the pension accumulation fund depending on the person. The higher the salary is, the more the person pays to the state. Consequently, the higher the minimum wage, the higher the taxes. However, according to the information stated in the blog "Peter G. Peterson Foundation" (2021) on Feb. 24, a higher minimum wage would increase the budget deficit due to additional government spending on wages. Consequently, the state budget would decrease - in the event of a budget deficit, the state is forced to borrow from other countries. The Foundation also states that the introduction of a higher minimum wage would reflect in increased government spending. However, it would be partially offset by higher tax revenues (Peter G. Peterson Foundation, 2021a). From this, it can be presumed that the increased wages will encourage the state to borrow more from foreign countries.

There is not much new evidence to presume that the unemployment rate affects the country's external debt. However, Marieta (2017) found that there is a direct correlation between public debt and unemployment rates but at a low intensity. Reducing foreign debt by 50% will also reduce unemployment, says Heer & Schubert (Heer & Schubert, 2012). From this, we can conclude, however, that unemployment impacts the state's foreign debt. This is confirmed by a study conducted by four economists in Nigeria. The results show that a long-term link between public debt and unemployment exists in Nigeria. Unemployment rises as public debt grows, and more government borrowing from abroad suggests that rising public debt increases unemployment and borrowing from abroad has a greater impact on rising unemployment than domestic debt (Gwazawa, 2021). In the situation of high unemployment, the state is forced to maintain society by paying incapacity benefits. Many people have lost their jobs or had to stop working as a result of the COVID-19 pandemic in the country and around the world. In order for the population to survive, the state was forced to provide benefits to the affected citizens from the state budget. As a result, public debt peaked during this period. The state was forced to borrow large amounts of money from the European Union.

To summarise, the fact that all of those factors have been recognised by various sources as possibly having a relationship and affecting the amount of public debt in various countries provides an assumption that offers a research question about whether or not this is indeed the case statistically. All of these studies lack a quantitative or statistical assessment, in which the authors would use previously collected data or conduct a case study to evaluate the level of impact, taking into consideration each individual economic element as well as a combination of multiple of these factors.

An analysis of the work of various researchers suggests that four of the five variables may have an impact on the chosen independent variable. To confirm or refute this fact, in the next stages of this study, empirical research will be conducted, and the methodology will be suggested.

Research methodology

All calculations, including correlation analyses and linear and multivariant regression analyses, are being processed with SPSS software. In order to analyse the data, we have collected thirty years' worth of data (1991-2020) about the public debt level in Lithuania as a dependent variable (Y) and measures of five independent variables (x_1, x_2…, x_5) (inflation, minimum wage, GDP, unemployment rate, and population) (Table 1).

Table 1. Statistical data for the research (Source: composed by author)

Public debt by Lithuania to foreign countries	Inflation, %	Minimum wage, EUR	GDP, billion US dollars	Unemployment rate, %	Population
14156,55	0,2	607,00	55,89	8,43	2794090
13239,90	2,7	555,00	54,64	6,26	2794184
11178,7	1,9	400,00	53,72	6,15	2808901
12151,6	3,9	380,00	47,76	7,07	2847904
10858,8	1,7	350,00	43,05	7,86	2888558
12306,2	-0,1	325,00	41,44	9,12	2921262
11476,42	-0,3	300,00	14,07	10,7	2943472
9489,34	0,4	299,76	13,37	11,77	2971905
10201,84	2,8	289,62	12,44	13,37	3003641
8951,95	3,4	246,18	12,62	15,39	3052588
7799,53	3,8	231,70	10,75	17,81	3141976
5515,38	1,3	202,73	10,83	13,79	3183856
32463,66	8,5	173,77	13,86	5,83	3212605
32653,3	8,1	173,77	11,5	4,25	3249983
29722,03	4,5	159,29	8,74	5,78	3289835
23300,44	2,7	159,29	7,56	8,33	3355220
21837,12	2,9	144,81	6,55	10,68	3398929
2150,9	-1,1	130,33	5,44	12,88	3431497
2669,51	0,4	124,51	4,13	13,01	3454637
2866,71	1,3	115,85	3,54	16,84	4386998
2878,63	0,9	95,57	3,34	15,93	3512074
2825,7	0,7	86,89	3,18	13,39	3536401
1959,52	5	60,82	3,26	13,71	3562261
1630,85	8,4	95,57	2,93	14,13	3588013
1400,49	13,1	43,44	2,43	16,4	3615212
977	26,7	28,96	1,94	17,54	3642991
577,36	45	1,28	7,47	13,8	3671296
359,21	118,7	1,28	8,6	13,8	3693929
340,05	1163	1,28	10,3	1,2	3706299
302,59	224,7	0,50	10,5	1,1	3704000

All calculations, including correlation analyses and linear and multivariant regression analyses, are processed with SPSS software.

Later the descriptive statistics are analysed. We performed calculations and systematised information about data centre measures: mode (most common value), median (divides the variation line into two equal parts), mean (mean value), data scatter measure: variance (data scatter about mean), and the highest and lowest values.

Next, we performed a correlation analysis of the coefficients. This method shows the relationship between the two phenomena, i.e. the influence of independent factors. The correlation coefficient must be between negative one and one. The closer the coefficient is to minus one, the stronger the connection.

In this case, the study checked whether the correlation is positive or negative, as well as is it linear or not. In order to analyse whether the variable a statistically significant or insignificant, the hypotheses are being raised:

H_0: $r = 0$ ($the\ correlation\ is\ considered\ statistically\ insignificant$)

In this case, the correlation between selected independent variables (inflation, minimum wage, GDP, unemployment rate, and population) would be considered as statistically insignificant)

H_1: $r \neq 0$ ($the\ correlation\ is\ considered\ statistically\ is\ significant$)

In this case, the correlation between selected independent variables (inflation, minimum wage, GDP, unemployment rate, and population) would be considered as statistically significant, and this assumption suggests using selected variables for the further determination with linear and multivariant regression.

The significance of correlation coefficients is being calculated with t statistics:

$$t = r\sqrt{\frac{n-2}{1-r^2}} \tag{1}$$

Here:

r - Correlation coefficient;

n is the number of samples.

The critical value with the confidence level alpha (0.05) is calculated with the formula below. Two sides (to the right and left from scratch) are examined, so alpha is divided in half:

$$p = \frac{\alpha}{2} \tag{2}$$

Here:

α is the confidence level.

The degree of freedom is calculated:

$$df = n - 2 \tag{3}$$

Here:

n is the number of samples.

The calculated value t is compared with the critical value t kr α, k. This is a condition for stochastic dependence. If the condition is met, the null hypothesis is rejected, and H_1 is accepted.

The correlation analysis is not enough to make statistical conclusions. Therefore, a pairwise regression is performed. The purpose of this method is to determine the functional relationship between several quantities and to predict the values of the dependent variable Y from the values of the independent variable X.

The regression line for the relationship between X and Y is being described as follows:

$$y = a_0 + a_1 * x \quad (5)$$

a_0 and a_1 coefficients are being calculated by the formulas:

$$a_1 = \frac{\overline{xy} - \bar{x} * \bar{y}}{x^2 - (\bar{x})^2} \quad (6)$$

$$a_0 = \bar{y} - a_1 \bar{x} \quad (7)$$

In order to interpret the equation, the coefficient of determination must be greater than 0.25, the significance coefficient less than 0.05, and the P-value less than 0.05. Only then the pairwise regression equation can be constructed.

Multivariate regression is also being performed, which determines the impact on Y by the more than one independent variable. Multivariate regression model:

$$\tilde{y} = a_0 + a_1 x_1 + \cdots + a_n x_n \quad (8)$$

A multivariate regression equation can also be constructed and interpreted if a few conditions are met. To form an equation, the coefficient of determination must be greater than 0.25, the coefficient of significance less than 0.05, and all P-values except intercept less than 0.05. Only then can a multivariate regression equation be constructed using "coefficients": a_0 - intercept, a_1, ..., a_n - independent variables.

In the next section, the empirical calculations will be performed using the presented methodology.

Research results

Correlation analysis was performed to determine whether there is a relationship between the factors under consideration. It identifies significant variables that will be followed up. The results of the calculation are presented in Table 2.

Table 2. Correlation coefficients (Source: composed by author)

	Public debt by Lithuania to foreign Countries
Public debt by Lithuania to foreign Countries	1
Inflation	-0,23763746
Minimum wage	0,369701309
GDP	0,237173296
Unemployment rate	-0,480182403
Population	-0,436684471

In order to determine whether the correlation relationship is statistically significant, the statistical hypotheses are raised:

H_0: correlation coefficient insignificant

H_1: correlation coefficient is significant

In order to check the significance of the coefficient, the t statistics are applied. It is calculated according to the formula provided in the methodology, and the results are listed in Table 3.

Table 3. t statistics results (Source: composed by author)

	t_{stat}
Inflation	-1,29454282
Minimum wage	2,105444832
GDP	1,291863392
Unemployment rate	-2,896690864
Population	-2,568562889

A critical value with a confidence level of alpha (0.05) is found below. Since we check two-sided, the alpha is 0.025, respectively. T critical in this case is 0.683353.

If the calculated statistic t is greater than the critical, then the null hypothesis is rejected, and the alternative is accepted: H1: the correlation coefficient is significant. We conclude that all values are statistically significant:

$$\left| -1{,}29454282 \right| > 0{,}683353$$

$$2{,}105444832 > 0{,}683353$$

$$1{,}291863392 > 0{,}683353 \left| -2{,}896690864 \right| > 0{,}683353$$

$$\left| -2{,}568562889 \right| > 0{,}683353$$

Before any further investigation, the information about the assumptions of linear regression needs to be checked. Are the residuals heteroscedastic, if the mean is not equal to zero, and if the variables are not multicollinear? In order to have evidence that all the assumptions related to linear regression are met, it is necessary to check the Variation Inflation Factor (VIF) and the tolerance. The results of VIF are below 4, and the tolerance is above 0,25, which indicates that there is no risk for multicollinearity, and further calculations can be done.

Next, we determine which data have the greatest influence on the independent variable by performing a pairwise regression. After several tests, the results showed that no pairwise regression equation could be constructed and interpreted with selected variables. All calculated parameters (p-value, significance F, R-square) show that we cannot construct a pairwise regression equation. This means that none of the selected variables has a significant statistical impact on the public debt of Lithuania.

Accordingly, the next step was to determine if the examined independent variables impact the public debt in its entirety or at least a part of it. Multivariate regression analysis is also being performed only with statistically significant indicators. First, the impact of all independent variables on public debt is being determined.

In a multivariate regression analysis, the same as in a pairwise regression analysis, the coefficient of determination (R Square) must be greater than 0.25. This shows what part of the variables explains the equation. In this case, the equation explains about 63 per cent (Table 4).

Table 4. Determination coefficients (Source: composed by author)

Regression Statistics	
R Square	0,625962415
Significance F	0,000144159

According to the calculations, it can be seen that there are x-es that affect Y because the significance level is less than 0.05 - the equation can be interpreted (Table 4). However, the results of the P-values (Table 5) calculation were contrary. The P-value results of the population variable are less than 0.05, meaning that the equation cannot be constructed and interpreted (Table 5). The value of the variable "population" is then eliminated, and new calculations are performed.

Table 5. P-value results and coefficients (Source: composed by author)

	Coefficients	**P-value**
Inflation	-21,21571708	0,00752199
Minimum wage	39,16959666	0,076930839
GDP	-475,4823054	0,00685691
Unemployment rate	-1814,468213	3,43891E-05
Population	-0,003534834	0,57404523

The determination of multivariate regression satisfied all the conditions in order to compose the equation and interpret it. In this case, the coefficient of determination was greater than 0.25– the equation can be interpreted, and it explains about 62 per cent. The significance level also satisfies the condition: 4.75311E-05 <0.05. In all cases, P-value values are significant, less than 0.05 meaning that the equation can be interpreted (Table 6). All coefficients met the conditions; the equation can be composed:

$$Y = 29992{,}38528 - 21{,}79238528 * x_1 + 46{,}16998154 * x_2 - 481{,}6014096 * x_3 - 1864{,}823463 * x_4$$

Table 6. P-value results and coefficients (Source: composed by author)

	Coefficients	**P-value**
Inflation	-21,79238528	0,005109717
Minimum wage	46,16998154	0,011971314
GDP	-481,6014096	0,005430128
Unemployment rate	-1864,823463	1,14836E-05

The equation can be interpreted statistically: if X_1 increases by one unit, the dependant variable Y will decrease by around 22 points, which says that economically an increase in government debt would decrease inflation by around 22. This will work statistically with the solution that the other variables remain unchanged.

Conclusions

1. Examining the literature prepared by different scholars, it can be seen that inflation affects the country's foreign debt when the country is developing and has already borrowed money. Also, according to the literature, GDP impacts public debt. In other words, rising public debt is slowing GDP growth. Upon examination of other variables, it can be concluded that it has not yet been demonstrated that population size can have an effect. However, researchers suggest that this may change in the future. Moreover, raising the minimum wage would increase governmental spending, but higher tax revenues would offset that. There is also a correlation between the state's external debt and the unemployment rate, but the low intensity will reduce unemployment by reducing foreign debt by 50%. Some studies

also show that the government found that rising public debt increases unemployment, and borrowing from abroad has a more significant impact on this variable than domestic debt.

2. Several statistical methods have been selected to analyse the data in order to achieve the scientific goal. First, the descriptive statistics were performed, then the correlation analysis was completed, and then the hypotheses were raised. Thus, significant dependent variables have been determined with which simple (pairwise) regression and multivariate regression were conducted. Pairwise regression analyses are the best methods to determine the dependence of one variable on another variable, as it defines the functional relationship of several variables. The multivariate regression was instrumental in determining the consequence of more than one independent variable on investigated Y.

3. Empirical research has shown that all independent variables are significant and can be used for pairwise regression analysis. After doing this, we found that no regression equation can be constructed with any investigated variables. This means that none of the variables (inflation, minimum wage, GDP, unemployment rate, population) directly (independently) affects the public debt of the country. This result confirmed the statement of only one of reviewed scientists, who declared that the size of the population might not affect the state's foreign debt. A multivariate regression analysis was also performed to check the dependence of public debt on all independent variables. The elimination of 'population' succeeded in constructing a regression equation, which means that GDP, the unemployment rate, inflation and the minimum wage (in composition) may have an impact on the government's external debt.

4. Empirical studies suggest that all independent variables are significant and can be used for pairwise regression analysis. After doing so, we found that the regression equation could not be constructed using one of the study variables. This means that none of the variables (inflation, minimum wage, GDP, unemployment rate, population) directly (independently) affects a country's public debt. This result confirmed the statement of reviewed researchers that the size of the population may not affect the amount of public debt directly. A multivariate regression analysis was also performed to examine the dependence of government debt on all independent variables. The omission of the 'population' has succeeded in constructing a regression equation, which means that GDP, the unemployment rate, inflation and the minimum wage (in terms of composition) may have an impact on the public debts of the government. This partly was confirmed by the reviewed scientific literature.

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THE PROJECT MANAGEMENT APPROACH. A CRITICAL SUCCESS FACTOR IN DIGITAL TRANSFORMATION INITIATIVES

Sofia Carujo [1], Pedro Fernandes Anunciação[2], João Rocha Santos[3]

[1]*Plátano Editora, Corroios, Portugal,* scarujo@hotmail.com

[2]*Research Center in Business Sciences, Setúbal, Portugal,* joao.rocha.santos@esce.ips.pt

[3]*Research Center in Business Sciences, Setúbal, Portugal,* pedro.anunciacao@esce.ips.pt

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Abstract

Research purpose. The main objective of this work is to highlight the adoption of project management practices in companies' digital transformation initiatives as a critical success factor. Thus, on the one hand, we will seek to systematize the importance of project management practices in the digital transformation of economic organizations and, on the other hand, analyze them based on a digital transformation project of one of the largest publishing groups in Portugal. Having previously studied the process of digital transformation of the warehouse through the adoption of a Warehouse Management System, it is now important to analyze to what extent the transformation process was successful and to what extent the management as a project contributed to the achievement of the intended objectives and generated economic value.

Design / Methodology / Approach. The first part of the study was carried out through surveys to managers for a general characterization; the second part through the adoption of the focus group technique for analysis and study in greater depth of a case study. In the first phase, the focus group adopts semi-structured interviews with the different managers of the group's different companies and respective departments. In the second phase, a joint reflection on the organizational and economic value creation was developed based on the different existing perspectives of the digital transformation project. This reflection allowed a more objective analysis of the results obtained, the adequacy of management options, and the deviations.

Findings. Technologies analysis investment is a management principle, and the project management approach facilitates this practice. It is essential to carry out a careful project management approach and analyze the economic and financial viability of the investment. The disruptive changes associated with digital transformation make it difficult, and it is not easy to achieve the strategic objectives associated with these investments. So, the adoption of a project management approach seems to be critical for the success of the implementation of digital transformation initiatives. The current study highlights three critical aspects in the global assessment of IST investment: the importance of analyzing the objectives achieved; the importance of economic and financial analysis in determining the return on investment; and the relevance of the analysis being carried out by the stakeholders involved as a way of perceiving, individually and collectively, the diversity of the benefits achieved.

Originality / Value / Practical implications. The digital transformation of companies is a current reality and justifies a project approach to guarantee success in economic and organizational initiatives. However, it is important to analyze how management adopts the associated practices and whether it is aware of the importance of evaluating the intended results.

Keywords: Project Management; Economic value; Digital Transformation; Warehouse Management System; Information Systems; Warehouse Management

JEL codes: M1; M15

Introduction

Digital transformation is all around us (McCausland, 2021). Integrating a digital dimension into the "DNA" ("Deoxyribonucleic acid") business model or organizational functioning becomes a sustainability management issue. The change in economy and society is not stoppable but can be

managed (Kleinert, 2021). We need to focus on enhancing elements that help us foster development (Martins, 2019). Digital transformation has become a critical management issue because it requires new ways of managerial thinking (Hassani, El Idrissi & Abouabdellah, 2018). Every organization and every innovation, including digital transformation, must be based on projects (Tommasi, 2018).

Digital transformation must correspond to a strategic purpose insofar as technological innovation and society's prompt adherence to information technologies put pressure on economic organizations for new digital positioning (Esteves & Anunciação, 2021). It is, therefore, an economic and organizational challenge with impacts on the level of sustainability (Anunciação, 2014). Project management is governed by specific management methodologies, standards, and other regulatory requirements (Berzisa & Grabis, 2009). In this sense, it must be properly planned, managed, and controlled (Choi & Ha, 2021). Digital transformation projects integrate a gradual movement that must be built and strengthened.

For this reason, projects in this area must be properly framed, analyzed, and managed to ensure the viability of digital transformation investments and the effective generation of value for their stakeholders. This need requires, from the managers, redoubled attention. The way to guarantee the success of any investment is to associate it with the development of a good project (Miguel, 2015). Projects should include the economic and financial viability analysis, the respective plan for operationalization and management, and the associated change management. Information systems and technologies (IST) project performance is defined by task, psychological, and organizational outcomes (Aladwani, 2002).

Given the complex nature of digital transformation, companies must frame the new reality in the different domains (strategic, organizational, and operational) (Esteves & Anunciação, 2021). So, the associated framework must include the diversity of the different natures, such as the development of digital products and services, the opening of new channels, the adoption of new operating cycles, the development of new skills and capabilities of human capital, the architecture of information systems, among other dimensions. This is one reason why IST projects are often complex and should be carefully managed, considering the various aspects that influence their success (Goncalves, Oliveira & Varajão, 2018).

Investments and IST projects are, in general, special projects and have some characteristics; namely, they imply continuous changes, involve people with different knowledge, provide multiple stakeholders' views of reality, are difficult to assess productivity, cover different areas of economic activity, require permanent updating of knowledge and techniques by the teams, among other characteristics (Miguel, 2019) (Miguel, 2015).

The investment in IST is a necessary condition for achieving greater levels of efficiency and competitiveness. However, it is not a sufficient condition insofar as project managers must administrate the various resources inherent to the nature of the investment itself (Oliveira, 2004). Therefore, it is important that managers are aware of this reality and assume the complementarity between investments and projects.

In the case studied, we sought to analyze how a warehousing project was planned, managed, and evaluated. It is the project management that allows investment operationalization and constitutes a roadmap to achieve the defined objectives. The need to increase the levels of efficiency and effectiveness, the improvement of flexibility in distribution, and the real-time response to economic dynamics, among other examples, justify the management's need to evaluate the project and the investment made. The evaluation of investments in digital transformation is not limited to a financial perspective or new performance management. However, it can probably include a decision to transform the company's operating modus operandi. The study presented here aimed to analyze the success of an investment in a digital transformation project of a group of companies in the publishing sector, highlighting the criticality of the adoption of instruments associated with project management, as well as the evaluation of predefined results. For this, the focus group technique was adopted, having integrated the different managers responsible for the different departments of the group of companies studied. With this methodology, we sought, through an int analysis, to analyze the adequacy of the instruments adopted and the results achieved.

From investment to project management

In digital transformation investments, we can find two distinct natures of projects (Esteves & Anunciação, 2021). The first refers to investment planning, management, and control. The second is related to change management. The project associated with the investment has a set of essential conditions for the success that must be observed, namely, the delimitation of the scope, the existence of an execution deadline, a definition of a budget, and the constitution of a team, among other things (Miguel, 2019). Regarding change, it is crucial to know the current situation (As-Is), to understand the starting point, to identify the future situation (To-Be), and to facilitate the definition of a roadmap to reach the objectives and preparation of the company for a new form of operation. In the digital transformation, the organizations face a radically changing context for their workforce, their workplace, and the organizational dynamics in general. So, it is critical to understand the context of this transformation (Lousa & Lousa, 2018).

As mentioned by Miguel (2015), investment projects associated with IST should focus on four important dimensions for a close relationship with a strategic plan:

- Analysis of the economic organization and its business strategy – should provide a clear view of strategic business units, key business processes, contribution to performance, and competitive advantages, among others;
- The assessment of the opportunity of new IST – must be based on the identification of competitors' activities on relevant technological trends, among others;
- Planning the IST strategy – should provide the identification of technological platforms, organizational implications, development problems, technical integration, and financial justification, among others;
- The implementation of IST – must be based on current architectures of the IST, areas of improvement, technical or business limitations, potential opportunities, defined strategy, and priority of the project, among other aspects.

Considering the complexity of digital projects regarding the high level of uncertainty, the only way to proceed is to use extreme caution and a refined sense of management. These are high-risk projects and should not be underestimated no matter how great the experience of those who lead them (Denic et al., 2014). Managers should pay particular attention to certain critical success factors, such as estimation, adjustments, and commitments. These critical factors are essential, especially for those who have responsibilities in the project leadership, and the respective nature can be specified as follow:

- Estimation – the effective estimation of the effort (resources and deadlines) and cost of technological solutions does not seem easy, being important for the project framework;
- Adjustments – estimates made at the beginning of the project are not as accurate as estimates made later;
- Commitments – Assuming commitments depends on understanding the size and nature of the project as well as the reliability of the estimates made.

It is important to make it clear that, despite the importance of the critical factors mentioned above, there is a central element that conditions all other factors and even the development of the project: the scope. Often through the scope, we can understand the existing problems that are sought to be solved with the investment. Also, in an investment in a warehouse management system (WMS), as in other projects, the delimitation of the scope and objective associated with the respective investment, which may be related, are very important; for example, to the existence of differences between inventories and physical stocks; the identification of the different resources, namely technological, for the implementation, for example, of a wireless network that covers the entire company; the period foreseen for the respective execution, for example, to communicate to the client’s new deadlines and delivery facilities; among other aspects.

The project evaluation must be based on the achievement of the defined objectives, allowing to determine to what extent the estimated benefits were generated. The success of a project depends on the fulfillment of objectives, the achievement of benefits, and the adequate adaptation to the new reality.

Methodology

Even though many studies found in the literature show results of software development projects, few studies address the success (socio-technical) of IST projects (Varajão et al., 2021). Considering this reality, based on the case study presented at ECTCH 2021, this study aims to analyze the success of the IST project associated with the viability of a strategic investment related to the digital transformation of the publishing warehouses' group case study. Whoever, this strategic decision must be followed by other management practices to control and assess the results of the investment. So, it is also the development of a parallel economic and financial analysis, the project management, and the change management that allows guaranteeing the investment success. In this sense, the project management, the project development assessment, as well as the change management are critical factors to achieving the expected results.

To fulfill the main objective of the present research work, to analyze the adoption of principles associated with project management throughout the investment cycle associated with the digital transformation, the research methodology was based on four central stages; namely, the assessment of investment viability study realized; the analysis of project management practices adopted; identification of change management practices adoption; and, finally, the assessment of the global results obtained.

To carry out this analysis, the focus group technique was adopted (Queirós & Lacerda, 2013) (Berg, 2001) (Morgan, 1996). All the experts involved in the previous study carried out in 2021 were invited. In this focus group, all the managers of the different departments of all group companies and top management participated. Confronted the focus group elements with the relevance of this new study proposal, in the continuation of the previous one, the availability and interest of participation and the opportunity to discuss the global results were evident.

The main mission of the focus group was to analyze and confirm the achievement of investment predicted results, the adequacy of project management practices, and the assessment of achievement of the defined objectives.

The focus group held several meetings to obtain a global consensus about the results of each dimension of the project management approach. That approach was centralized in the following central management factors: aim and objectives investment specification; viability of the investment; identification of the nature and associated costs; focus on the critical elements associated with project management (such as budget, period of life, …); risks project identification; benefits expected with the investment; and the technical and functional characteristics of IST.

It was considered that the participation of the same experts in this new study would allow a better assessment of the relevance of the investment in the digital transformation process, providing a more complete and rigorous analysis of the investment made and how the associated project was developed. This opportunity constituted a significant feedback opportunity for an individual and collective assessment of the value generated by the previously validated strategic decision. The methodology followed included several sequential meetings where each of the dimensions present in the previously mentioned phases was analyzed and evaluated.

Analysis of the case study

Recalling the case study presented is an editorial group composed of three publishers that operate in two business areas: school editions and general editions. The editorial group started the investment analysis of a WMS as part of the digital transformation strategy. The relevance and need for a WMS to support distribution and reverse logistics activities and the assumption of e-commerce as a vital commercial

channel were considered critical for the company's sustainability. The results of the first phase can be summarized as follows (Carujo, Anunciação & Santos, 2021):

- Starting assumptions: inventory was assumed as an important asset in the activity; stocks represent investments in articles with the expectation of future commercialization; need to balance inventory costs (product costs and storage costs) and expectations relative to market needs (minimization of excessive stocks or breakages);
- Existing needs: increase in service excellence levels; greater agility and precision in storage operations; improving the location of products in the warehouse; greater efficiency in the shipping process and product traceability; improvement of online channels by reducing the average time associated with the commercial cycle;
- Expected benefits: reduction of the average time to orders preparation; process simplification to goods localization; storage space optimization; permanent and real-time inventory; traceability of items from reception to the customer delivery; reduction of flight and dispatch errors; reduction of time in internal logistical flows; reduction of logistical costs; increased productivity; real-time decision-support information; adaptation to e-commerce needs; and omnichannel operations management;
- Management expectations associated with the investment: estimated earning of a predictable staff reduction of 30%; order cycle time reduction from 1h to 0.45h (25% of estimated earnings); increase of daily expeditions with estimated earnings of 25%); estimated a predictable reduction of 50% in the time associated with the reception and checking and storage of merchandise; a predictable decrease of 50% in the time related to the delivery routes; increase of about 30% in shipping speed; 30% reduction in shipping errors, 20% increase in the quantity of orders/day shipped; reduction of about 35% in consumables; earning front reduction of inventory counting 50%; and, elimination of printed orders;
- Investment: 50,000.00€ (some dimensions: software – 7,004.00€, project implementation – 6,368.00€, hardware – 5,084.50€);
- Identified costs: annual license – €3,151.80, maintenance contract/year – €2,500.00, consumables/year – €500, Wi-Fi network in the logistics center/year – 3,750.00€;
- Risks: highlighted the possible resistance to change by logistics operators; disruptive change in processes and practices; absence of appropriate training plan;
- Necessary technical characteristics: multi-warehouse; independent database (vertical solution); real-time operating system; and integration with ERP;
- Functional characteristics: picking; inventory; graphical drawing of the warehouse; management of document types; physical definition and layout logic products; traceability; customer and supplier management; order management; route management; radiofrequency terminals; operations management; and reverse logistics;
- Decision Criteria: safety; functionalities; integration with ERP; ease of use; compatibility with other technologies used; maintenance.

So, considering this first phase of the study, the study carried out allowed us to see that the proposed investment in digital transformation was viable given the assumptions considered. Also, the strategic decision-making associated with the digitalization of the warehouses was adequate. The focus group considered that the management dimensions, namely the financial nature, were important and adequate for a rigorous evaluation and a safe decision for the recommended investment.

In the first place, the focus group considered adequate the necessity of nature and amount assessment of the investment made, as well as the expected costs. Regarding these two dimensions, the nature and the amount of the investment, it was possible to determine, as can be seen in Table 1, the respective

adequacy. It should be noted that the estimated values for the global investment were adequate, namely, regarding considered nature (Software and Project implementation).

Table 1. Nature and amount of investment made

Investment	Adequate	Not adequate
• Total investment – 50,000.00 €		√ (↓34%)
• Software – 7,004.00 €	√	
• Hardware – 5,084.50 €		√ **(**↑ 10%)
• Project implementation – 6,368.00 €	√	

The focus group noted, as substantial evidence, that the mention, in Table 1, of the not adequate value of total investment corresponds in fact to a positive result, insofar as the overall value of the investment made was lower than expected. However, the previous value to hardware was insufficient, with an increase of 10% approximately.

Regarding the nature and amount of the costs considered, it was possible to determine, as can be seen in Table 2, the adequacy of the elements considered, except the wi-fi network.

Table 2. Nature and amount of associated costs

Costs	Confirmed	Not confirmed
• Annual License – 3,151.80 €	√	
• Maintenance contract/year – 2,500.00 €,	√	
• Consumables/year – 500.00 €	√	
• Wi-Fi network in the Logistics Center/year – 3,750.00 €		√ (↑ 125%)

It should be noted the existence of considered deviations referring to the wi-fi network, having registered an increase of 125% in the value initially foreseen. This value resulted from an incorrect technical analysis of the technical requirements regarding the constraints of the physical architecture of the warehouse.

Regarding the second phase of the study, the assessment of management project practices developed, it was possible to confirm the adoption of all critical dimensions that must structure a project, as can be seen in Table 3.

Table 3. Critical elements associated with project management

Adoption of critical dimensions associated with project management	Yes	No
• Delimitation and management of the scope and objectives of the project	√	
• Identification of the project team and respective person in charge	√	
• Definition of a deadline for the execution of the project	√	
• Definition of a budget for the project	√	
• Development of a Work Breakdown Structure and planning of associated activities	√	
• Control of the expected results regarding the investment	√	
• Identification and management of associated risks	√	
• Confirmed the assumptions of values adopted in the feasibility analysis	√	

Regarding the third phase, change management, an attempt was made to assess whether change management was considered, whether it was developed as a sub-project within the overall project, whether the most significant risks were identified, the probability of occurrence, and the respective impact.

In this case, it was possible to determine the development of a sub-project specifically related to the change. Regarding risks, the following were considered: resistance to change by logistics operators, disruptive change in processes and practices, and absence of an appropriate training plan. The focus group confirms the analysis of these risks, namely regarding the probability of occurrence and the respective impact.

Table 4. Risks in the digital transformation process

Risks	Organizational impacts	Financial Impacts
• Resistance to change by logistics operators has been highlighted	X	X
• Represent a disruptive change in processes and practices	√	√
• Absence of an appropriate training plan	X	X

In the analysis carried out, it was possible to verify, on the one hand, the non-occurrence of change resistance and, on the other hand, the development of an appropriate training plan to increase the professional competencies of workers. It is essential to highlight that the project of digital transformation represents a disruptive change that demands change management.

Regarding the last phase, the analysis of the global evaluation of the project was carried out, namely about the degree of fulfilment of the objectives and expected results with the respective implementation. It was possible to verify that this practice was adopted regarding the project control practice. About the objectives of the investment project, it was possible to identify that, as can be seen in Table 5, these were achieved.

Table 5. Objectives of the investment project

Needs associated with the investment	Increased	Not increased
• Levels of service excellence	√	
• Agility and precision in storage operations	√	
• Improved location of products in the warehouse	√	
• Efficient shipment process and product traceability	√	
• Support the online channel	√	
• Improvement in the average time associated with the commercial cycle	√	

Regarding the expected benefits of the investment, it appears that, globally, the identified benefits were achieved, as shown in Table 6.

Table 6. General benefits expected with the investment

Benefits expected	Achieved	Not achieved
• Reduction of the average time of preparation of orders	√	
• Simplification in the process of locating goods	√	
• Optimization of storage space	√	
• Permanent and real-time inventory	√	

• Traceability of items from reception to the end of the Sumer	√	
• Reduction of flight and dispatch errors	√	
• Reduction of time in internal logistical flows		√
• Reduction of logistical costs	√	
• Increased productivity	√	
• Real-time decision-support information	√	
• Adaptation to e-commerce needs	√	
• Omnichannel operations management		√

The only benefits that cannot be achieved with the investment were the reduction of time in internal logistical flows and the omnichannel operations management. It will be important to understand the reasons for this impossibility, insofar as it is to be expected that with the digitization and automation of warehouses, an almost automatic reduction of time in internal logistical flows will be obtained.

Regarding the specificity of management benefits, all of them were achieved, as can be seen in Table 7.

Table 7. Expectations of management benefits

Expectations of management benefits	Achieved	Not achieved
• Estimated earning of a predictable staff reduction of 30%;	√	
• OCT – Order Cycle time: reduction from 1h to 0,45h (% of estimated earnings: 25%);	√	
• Increase of daily expeditions with estimated earnings: 25%	√	
• Estimated a predictable reduction of 50% in the time associated with the reception and checking and storage of merchandise	√	
• Predictable decrease of 50% in the time related to the delivery routes	√	
• Increase of about 30% in shipping speed	√	
• 30% reduction in shipping errors, a 20% increase in the quantity of orders/day shipped	√	
• Reduction of about 35% in consumables	√	
• Earning front reduction of inventory counting 50%;	√	
• Elimination of printed orders	√	

Regarding the observation of the requirements associated with the acquired ICTs, it appears that the identified technical requirements were achieved, as shown in Table 8.

Table 8. Technical characteristics of ICT

Technical characteristics	Achieved	Not achieved
• Multi-warehouse	√	
• Independent database (vertical solution);	√	
• Real-time operating system	√	
• Integration with ERP	√	

Concerning functional requirements of the software, it was possible to verify that most of them were achieved, according to Table 9.

Table 9. Functional characteristics of the software

Functional characteristics	Achieved	Not achieved
• Picking	√	
• Inventory	√	
• Graphical drawing of the warehouse	√	
• Management of document types		√
• Physical definition and layout logic products	√	
• Traceability		
• Customer and supplier management		√
• Order management	√	
• Route management	√	
• Radiofrequency terminals	√	
• Operations management	√	
• Reverse logistics	√	

Globally, most of the functional characteristics were contemplated in the software. Only two of them need specific attention and eventual future development, namely, the management of document types and customer and supplier management.

Finally, regarding the selection and decision criteria to choose the best ICT solution, the criteria shown in Table 10 were adopted.

Table 10. Selection and decision criteria

Selection and decision criteria	Considered	Not considered
• Safety	√	
• Functionalities	√	
• Integration with ERP	√	
• Ease of use	√	
• Compatibility with other technologies used	√	
• Maintenance	√	

Conclusions

The digital transformation of companies is a reality. The pressure of technologies and, above all, the need for competitiveness in the market justify the need to digitize some organizational areas or processes to support the respective activities. The contingencies associated with the recent pandemic have increased the relationship with customers through digital channels and consequently require organizational responses to this new reality. As such, information systems also had to evolve and adapt

to this new modus operandi that reflects a transition from traditional and physical channels to virtual channels.

The case studied evidence that the digital transformation cannot only correspond to the introduction of more technologies. This process must be accompanied by an economic and financial analysis and assessment and complemented with adequate change management to allow the establishment of a new way of functioning. In a highly competitive economic context, it is important that management can determine the value generated by the investment to be able to identify the achievement of expected benefits.

The new storage automation strategy was, in this case, the trigger for the beginning of a digital transformation process. In the publishing sector, with the importance of electronic commerce channels, this has been a natural strategy for all the managers present in the focus group. Although the economic criticality of the warehousing management system, as we can see through the case analyzed, an adequate framework for the associated project ensures efficient and effective management of the expected value.

It seems to be evident that all investment projects require a viability study, and every investment project demands project management practices. It is also important to highlight that the project on digital transformation needs to change management practices' adoption to guarantee the predeterminate results. These are the major findings of this research work. It is also possible to highlight the relevance of collective results project assessment as a win-win practice between all the stakeholders that directly or indirectly participated in the project. That allowed a collective feeling of success.

In a global conclusion, as stated by Westerman (2018), it is not enough to acquire software associated with storage management to expect the automatic acquisition of competitive benefits.

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SECURITY MANAGEMENT POLICIES AND WORK ACCIDENTS

Nuno Monteiro[1], Pedro Anunciação[2]

[1]*Business School of Polytechnic Institute of Setúbal, Setúbal, Portugal, montteiro@sapo.pt*

[2]*Research Center in Business Sciences, Setúbal, Portugal, pedro.anunciacao@esce.ips.pt*

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Abstract

Research purpose. The aim of the research is to demonstrate the impacts of an absence of organizational policies and strategies in the field of work security on enterprise competitiveness. The movement of loads in the warehouses of industrial and distribution companies is critical in optimizing the times of availability of products to market. This is an activity that, in the field of management, appears to be simple and not very complex, duly framed by national and international laws. However, when poorly managed, it can express significant costs that affect competitiveness and even significantly affect the operational functioning of companies. Knowing that the safety of cargo handling by different equipment presupposes rules and safety policies at different levels, the present study aims to demonstrate the economic impacts based on a real situation in one of the largest handling equipment companies in Portugal.

Design / Methodology / Approach. Given the nature and objectives of the study, which seeks to demonstrate that the work security rules and policies compliance or non-compliance has benefits or costs and affects the competitiveness of economic organizations, the work was developed based on three phases. The first phase focused on direct observation of safety practices in operational activities. After this observation, in a second phase, we proceeded to collect and analyze existing data in the company under study, referring to the number of work accidents recorded in the past. In the last phase, we sought to understand and justify the results with the company's top management. This last phase provided the understanding of the administrators' view on the subject and the confrontation with the associated impacts, not only at the financial level but at the level of the company's operation.

Findings. This study made it possible to show the impact (associated costs) on organizational performance and that this reality, unfortunately, is not often part of top management's concern. As a management issue that is often relegated to middle management, this study demonstrates the frequent failure to comply with safety rules due to the pressure of daily activities, the increased number of accidents with the personnel growing in the company, and that this situation can be enhanced through the low degree of control by the enterprise top management over the existing reality. With this concrete study, it was possible to verify the weak relevance of the topic for the company's administration and the assumption of the difficulty in regularizing the existing situation. The need to review management practices and models in this field became evident.

Originality / Value / Practical implications. The relevance of this study made it possible to point out to the top management administration that, in terms of competitiveness. However, the direct costs of the operation are relevant; there are indirect and opportunity costs, such as accidents or unavailability of equipment, which represent costs that can compromise the competitiveness of the company. This study also had the advantage of providing management with evidence of the existing reality in the company, which tends to be undervalued or go unnoticed in the day-to-day company's current activities. In addition, it should also be noted that a proposal for an improvement plan for the company's safety was made available.

Keywords: Security Policies; Security Management; Cargo Handling; Work Accidents; Competitivity.

JEL codes: L91; M21

Introduction

Work accidents that happen in a company will cause harm to the workers and condition the company's activity (Nai'em, Darwis & Maksun, 2021). Most workplace accidents result in minor injuries with only limited health consequences, but in several cases, injured workers suffer from long-term health problems

or permanent disabilities (Mazzolini, 2020). Accidents are one of the phenomena that have been spreading along with the industrialization and advancement of technology, which not only imposes many human and financial losses but also on human societies (Nodoushan et al., 2020). Most companies use the equipment for moving loads in their work, and this equipment is essential for their respective operating capacity. The availability of this equipment is assumed as a critical factor in the operational response to the commercial strategies of economic organizations. Many of the work processes in industrial organizations have potentially catastrophic consequences for workers and the environment (Kim & Chi, 2019).

In this sense, safety is one of the organizational areas that deserve extra attention from management because the direct costs that can be associated with accidents are significant, as are the constraints and impacts that can be caused by the absence of specialized workers, for example, in the operation of specific equipment (Gravina, King & Austin, 2019). Occupational accidents and injuries are one of the causes of concern for workers and employers due to treatment costs and unemployment. These situations often result in loss of physical and mental health, time, and money, and in some cases, irreparable harm (Niu, 2010).

The impacts associated with work accidents can have significant consequences on the competitiveness of companies (Provan & Rae, 2019). On the one hand, they represent an unforeseeable and unwanted increase in costs, for example, associated with treatments or financial compensation, but, on the other hand, it can even condition or limit the operational capacity of companies, as it is difficult to replace certain specialized employees or those qualified to move of specific equipment.

Before developing and deepening the theme, it is important to define three fundamental concepts for understanding the reality associated with work accidents, namely, accident, incident, and risk. By work accident, we can understand that event that takes place at the place and time of work and directly or indirectly produces bodily injury, functional disturbance, or disease that results in a reduction in the ability to work or gain or death (Miguel, 2014). More simply, we can consider an accident as anything that can cause injury or material damage during or because of work performed by third parties. According to the Portuguese standard (NP4397, 2008) of the Portuguese Institute of Quality 2008, an incident will be the event related to work in which an injury, health condition, regardless of severity, or death occurred or could have occurred.

Another important concept is the concept of the incident. An incident is when there is no injury or material damage in the face of a certain occurrence. As an example, we can refer to a fall of a worker, but without causing any damage or injury to the individual.

Finally, the concept of risk refers, often rather vaguely, to situations in which it is possible but not certain that some undesirable event will occur (Hansson, 2018). According to the aforementioned standard, NP4397 of 2008, the risk is the combination of the probability of the occurrence of a hazardous event or exposure and the severity of injuries or health conditions that may be caused by the event or exposure (Miguel, 2014). Risk is anything that can contribute to the existence of an accident, either by exposure or by the event. According to the same standard, NP 4397 of 2008, the hazard will be the source, situation, or act with potential for harm in terms of injury or health condition, or a combination of these.

It is essential to consider that there are several types of risk, defined according to the different knowledge areas and cultures, among other aspects. Danger will therefore be anything that may cause risk in terms of injury or affection for the individual.

Wang et al. (2021) stress the importance of re-study and identifying the organization of critical safety systems and how to realize the organizational elements of high-level safety management under management pressure. The research work aims to demonstrate the economic impacts of an absence of organizational policies and strategies in the field of work security on enterprise competitiveness. When poorly managed, a lack of security can express significant costs that affect competitiveness.

The study was developed in 3 phases, namely, direct observation at the Company's facilities, complemented by conducting semi-structured interviews; collection and analysis of accidents data; and

interview with the company's General Director to present the results and balance of the study carried out.

Brief evolution of legislation and evolution of work accidents in Portugal

To minimize the occurrences associated with accidents and incidents, many economic organizations have adopted occupational safety and health management systems to minimize the associated risks. Such systems require significant preparation and implementation efforts due to the complexity and diversity of factors that may affect the safety of their employees (Kim, 2019; Neto, 2012).

The importance of the theme of accidents at work and the consequences that it can have on economic activities can be evidenced by the evolution of the legislation that frames it (Zhang et al., 2019). In the Portuguese case, some more significant evolutionary milestones (ACT, 2019) can be highlighted, such as:

- Resolution No. 204, of November 16, 1982, created the National Council for Occupational Hygiene and Safety, whose mission was to contribute to the formulation and application of the national policy on safety, workers' health, and the work environment and to provide opinion on the national plan for safety, workers' health and work environment.
- Government Decree No. 1/85 of 1985 marks the approval by Portugal of the International Labor Organization Convention No. 155 concerning the safety, health of workers, and the work environment.
- Framework Directive 89/391/EEC, of 1989, which refers to the application of measures to promote the improvement of the safety and health of workers at work.
- Decree-Law nº 441/91, of November 14, which transposes the Framework Directive to Portugal, and stipulates the employer's obligations in terms of promoting safety and health conditions at work, providing for information, consultation, and training of workers, as well as the election in companies of their representatives for the SHST.
- White Paper on Corporate Prevention Services, created in 1999, which proposes a set of measures to improve policies to promote health and safety at work.
- Resolution No. 44/2001, 2001, which establishes the National Day for Prevention and Safety at Work in Portugal, to be celebrated annually on April 28.
- Resolution of the Council of Ministers (R.C.M. nº 105/2004), of 2004, which approves the National Plan of Action for Prevention (PNAP), agreed by the Government and Social Partners in 2001 and with a duration of three years.

These, among many others, constitute some of the national landmarks of the legal path taken over the years in Portugal.

Although with a vast legal framework in the field of safety, accidents at work continue to occur despite a decreasing trend over time. According to the ACT, between 1990 and 2000, around 3,500 workers died in their workplaces in Portugal, and around 2.5 million serious accidents occurred. Fortunately, accidents have been greatly reduced in recent years.

The number of accidents takes on another relevance when they are detailed, for example, by profession, by type of injury, or by the material agent of the accident, as can be seen in the following tables. Thus, about occupational accidents by profession, as can be seen in Table 1, accidents occur more frequently in workers, craftsmen, and similar workers, followed by operators of installations and machines and assembly, and finally unskilled workers. It can also be seen that accidents occur more among workers who work with machines and that the workers most exposed to accidents are unskilled, or that senior management in public administration, managers and senior management of companies, and specialists in the professions of intellectuals and scientists are the ones that register fewer accidents at work.

Table 1. Accidents at work by profession (Source: ACT, 2019)

Code	Professional Groupe	2014	2015	2016	2017	2018	2019
10	Senior management of public administration, managers, and senior management	1	9	4	4	10	3
20	Specialists in the intellectual and scientific professions	0	1	1	2	1	0
30	Middle-level technicians and professionals	26	17	11	23	21	8
40	Administrative and similar personnel	4	4	2	12	7	2
50	Service personnel and vendors	7	11	9	7	13	4
60	Farmers and skilled workers in agriculture and fisheries	9	12	7	16	14	1
70	Workers, craftsmen, and similar workers	104	193	112	175	201	77
80	Installation and machine workers and assembly workers	72	65	43	75	101	28
90	Unskilled workers	61	98	71	100	104	26
	Under investigation	24	7	4	5	23	15
	Total	308	417	264	419	495	164

Regarding the type of injury suffered in accidents, it can be seen in the analysis of Table 2 that most accidents in Portugal are due to entrapment, crushing, but also blows (including vehicles), and contact with sharp agents.

Table 2. Type of injury (Source: ACT, 2019)

Code	Contact - Type of injury	2014	2015	2016	2017	2018	2019
00	Under investigation	-	-	-	9	8	1
10	Contact with electrical current, temperature, hazardous substance, via inhalation, skin/eye contact, or ingestion	24	39	18	31	30	10
20	Drowning, burial, envelopment	6	3	0	2	7	1
30	Crushing in vertical or horizontal motion on/against an immovable object	34	49	42	58	68	28
40	Hit by a moving object, collision with a moving object, including vehicles – collision with a person	32	62	39	52	58	22
50	Contact with sharp material	34	57	38	55	81	31
60	Trapping, crushing, pulling out (section of a limb, hand, finger), etc.	63	71	47	107	97	16
70	The physical embarrassment of the body, psychic embarrassment	11	20	10	20	18	9
80	Bite, kick (animal or human)	1	1	1	1	0	0
99	Other Contact – a type of injury not mentioned in this classification	62	92	61	84	128	46
	Total	308	417	264	419	495	164

About the material agent of the accident, we can see through table 3 that portable or mobile machines and equipment greatly contribute to accidents in Portugal.

Table 3. Accident material agent (Source: ACT, 2019)

Code	Material agent of the activity	2014	2015	2016	2017	2018	2019
00	No material agents or no information	7	27	10	7	12	2
01	Buildings, constructions, surfaces – at ground level (indoor or outdoor, fixed, or mobile, temporary, or not)	16	30	21	12	20	9
02	Buildings, constructions, above-ground surfaces (indoor or outdoor)	48	46	42	56	60	26
03	Buildings, constructions, surfaces below ground (indoor or outdoor)	4	5	6	4	6	0
04	Material distribution device, power supply, plumbing	8	5	2	0	9	2
05	Motors, energy transmission, and storage devices	10	9	8	8	9	3
06	Hand tools – non-powered	4	4	2	5	5	4
07	Hand-held or driven tools – mechanical	4	8	4	6	6	3
08	Hand tools – no motor specification	0	1	0	5	4	2
09	Portable or mobile machinery and equipment	41	66	29	85	104	32
10	Machinery and equipment – fixed	46	71	60	92	116	23
11	Transport and storage devices	18	17	15	34	25	5
12	Ground vehicles	20	27	9	23	17	7

Safety in cargo handling machines

Machines and equipment contribute significantly to occupational accidents in Portugal. The leading causes of accidents with load handling machines are essentially due to the following factors: lack of information/training of operators; lack of assessment of exposure level; failure to comply with basic safety rules; absence of protection systems; lack of maintenance or inadequate maintenance (ACT, 2019). Even though, in general, machines for handling loads in warehouses present few safety conditions, there are some positive developments, namely:

- the machine does not work if the belt is not fastened;
- blocking of the machine if the inverter (an instrument for choosing the direction of the machine) is not in a neutral position before starting the machine;
- automatic speed reduction in curves when changing the direction of a load handling machine;
- operation cabin as a single piece, not drilled or welded so as not to weaken the steel structure.

Any alteration of these instruments or safety features may compromise the financial compensation for accidents, namely indemnities from insurers. Regarding cargo handling machines in the logistics area, it can be assumed that they are divided into ten different types, as presented in Table 4.

Table 4. Types of equipment in the logistic area (Source: Awolusi, Song & Marks, 2017; Janicak & Cekada, 2016; Andel, 2014)

Types of equipment	Description
Pallet truck	Machines to transport loads only make a small elevation of about seven to eight centimeters to transport pallets
Stackers	A machine similar to pallet trucks but that allows lifting to 5500mm
Retractable	Machine for working indoors that allows working with a minimum of 2700 mm between shelves and has a lifting capacity of up to 11500 mm
Order picker	Equipment suitable for picking at level zero and level one of the racks (low-level order picker) and which can reach 10000mm in height (high-level order picker)
Trilateral forklifts	a machine that works at least 1800mm between racks and can reach a height of 16 meters
Drag tractors	Machines that drag trolleys with goods
Front counterweight forklifts	Equipment that allows transport, stacking, and dragging
Side loader forklifts	Suitable for transporting large loads with a load capacity between 3 and 6 tons
Large tonnage stackers (Reach stacker)	Load handling machines that can reach 80 tons of capacity
Explosive Atmosphere Machines	Load handling machines with few original protections that operate in an area considered to be explosive

All these types of equipment have their characteristics, suitable for the respective mission, which conditions the respective operation and gives rise to specific risks that must be considered in terms of safety.

Objectives and methodology

The main objective of the study was to demonstrate that the absence of work organizational security policies and strategies has economic and competitive impacts through the analysis of the evolution of the number of accidents in a cargo handling equipment repair company. The period of analysis corresponds to the last ten years of the company's activity.

The chosen period ends at the beginning of the pandemic. It was considered that the period corresponding to the pandemic and the government's instructions to close many sectors of economic activity, including non-essential industries for the supply of primary goods for the survival of people, marked a new reality for companies in the field of security in work. This reality should be the subject of a specific study, bearing in mind the specifics of the pandemic, such as the mandatory use of masks, mandatory distancing between employees, etc.

Suppose the results obtained in the analysis show significant gaps in the company's security policy and system. In that case, the objective of this study is to prepare a security improvement plan for the company in question.

The case study methodology was adopted insofar as, as mentioned by Yin (2015), it provides the investigation of a contemporary phenomenon (the "case"), in-depth and in a real operating context, being especially suitable for analyzing situations in which the boundaries between phenomenon and context are not evident. In these situations, case studies facilitate the explanation of the presumed causal relationships that occur in interventions in a real context, which may be too complex to be explained by research or experimental techniques; and allow describing intervention and the real context in which it took place.

Also, according to this author, the case study allows the use of various instruments, such as conducting interviews, surveys, direct observations, and the analysis of documents and records of organizations, for the clarification and understanding of the phenomenon that is intended to be studied.

The choice of the case studied focused on a company dedicated to the repair and commercialization of cargo handling machines. It is a reference company in Portugal, which is part of a business group composed of 3 more companies and which, together, had a turnover of around 17 million euros in 2018. The company is the market leader in repairing cargo handling equipment in Portugal and is also located in Spain. It currently has more than 70 technicians who ensure the provision of services in Portugal and Spain.

The study was developed in 3 phases, namely:

- 1st phase – direct observation for 32 hours at the Company's facilities, complemented by conducting semi-structured interviews to identify, analyze and understand the identified situations. The interviews were structured in three dimensions: movement dynamics, safety rules, and internal conditions to the occurrence of accidents.
- 2nd phase – collection and analysis of data provided by the company regarding the accidents that occurred.
- 3rd phase – final interview with the company's General Director to present the results and balance of the study carried out. This interview was structured in four dimensions: work security policies and strategies, accident costs, work security management strategy, and a plan to increase work security.

Results analysis

About the first phase of the study, direct observation of the company for a total of 32 hours. The observation was complemented with semi-structured interviews with some technicians to understand the identified situations. In this context, the most relevant points for characterizing the situation encountered are highlighted below:

- the workshop area is about 1000 square meters, divided in half by workbenches where technicians carry out the tasks of repairing the machines.
- the main source of the main accidents in recent years is filings, jamming of human limbs, and fractures, essentially due to the incorrect output of load handling machines.
- possibility for technicians to circulate throughout the workshop without any type of restriction.
- lack of places and means for immediate action in the event of an accident, such as the existence of an eyewash facility in the workshop.
- existence of only one extractor on the wall of the spray booth and a hole opened in the wall for a supposed second extractor. It was found that an extractor for an area of 1000 square meters is insufficient to extract the smoke existing in the workshop.
- absence of floor markings referring, for example, to machine zones. It would be beneficial to mark the floor with floor paint, tape, or barriers, to divide the pedestrian area and the machinery area, avoiding the risk of accidents.
- deficiencies in the storage of tools and materials, a situation made difficult by the high volume of work.
- non-application of the 5'S principle (use, organization, cleanliness, standardization, and discipline).
- simultaneous movement of people (technicians) and machines.
- existence of poorly packed cargo.

- poor or incorrect ergonomic position for lifting weights by technicians.

After this survey, the second phase of the study began, referring to the analysis of the history of accidents in the company, which has analyzed the data on accidents existing between 2009 and 2019. To facilitate the respective analysis, three periods were considered to which specific tables correspond, as shown below. In Table 5, referring to the nature of accidents in the company between 2009 and 2013, the permanence of fracture/sprain/strain/pain is highlighted as the most frequent consequences that occurred in the company over the period considered. This persistence should have given rise to a greater concern of the company in the respective minimization. In the worst year, 2013, it should be noted that the impact of each occurrence resulted in a downtime of 45 days, with a total of 180 days. Considering this scenario, management must calculate the costs associated with these absences.

Table 5. Enterprise accidents between 2009 and 2013

	2009	ST*	2010	ST*	2011	ST*	2012	ST*	2013	ST*
Filings in the eyes	-	-	2	20	-	-	-	-	3	45
Scobs	-	-	1	20	-	-	-	-	1	45
Scratches/crushes/cuts	-	-	-	-	-	-	2	25	5	45
Person slide	1	30	-	-	-	-	-	-	-	-
Others	1	4	-	-	-	-	-	-	-	-
Fracture/sprain/strain/pain	-	-	3	20	4	31	2	25	4	45
Total	2	34	6	60	4	31	4	50	13	180

* Stop time in days

Table 6, corresponding to the period 2014 and 2019, shows a general worsening in the number of accidents and their nature, with more projections, more entanglements/crushes/cuts, more accidents of other types, and more fractures/sprains/strain/pain. In a summary analysis, it appears that the situation worsened in this period. It should be noted that, in the worst year, 2018, the impact of such an occurrence resulted in a total of 302 days of downtime. And once again, management must calculate the costs associated with these absences. Having looked for a justification for the significant increase in the total number of accidents between 2017 and 2018, it was found that this situation is related to the increase of technical employees in the company.

Table 6. Enterprise accidents between 2014 and 2019

	2014	ST*	2015	ST*	2016	ST*	2017	ST*	2018	ST*	2019	ST*
Filings in the eyes	3	20	3	49	2	33	-	-	-	-	-	-
Scobs		-	2	-	1	-	7	-	2	-	2	-
Scratches/crushes/cuts	2	30	6	100	4	44	3	12	3	41	-	-
Person slide	-	-	-	-	-	-	-	-	-	-	-	-
Others (example: car accidents)	-	-	2	2	2	3	1	-	-	-	-	-
Fracture/sprain/strain/pain	2	17	1	13	3	104	3	31	7	261	3	45
Total	7	67	14	164	12	184	14	43	12	302	5	45

* Stop time in days

Accidents due to fractures/ sprains/ strain or pain are the most common, totaling 32 in these 11 years of activity with 592 days of technician stoppage, which corresponds to more than 30,95% of accidents; followed by accidents involving jamming of human limbs (common scratches/crushed/cuts), with 25 accidents and 297 days of stoppage, corresponding to 27,38% of accidents.

With less expression, there are accidents caused by swarf or products in the eyes, with 16 accidents and 65 days of stoppage, corresponding to around 19,05% of accidents; accidents associated with the projection of materials, with 13 accidents and 167 days of stoppage, which corresponds to just over 15,48% of accidents; and, finally, the "other" accidents and slips that are not considered significant, due to their low number.

Table 7. % of accidents *versus* cause

	Total (2009 to 2019)	Stop time in days	% of total accidents
Filings in the eyes	13	167	15,48
Scobs	16	65	19,05
Scratches/crushes/cuts	23	297	27,38
Person slide	1	30	1,19
Others (example: car accidents)	5	9	5,95
Fracture/sprain/strain/pain	26	592	30,95
Total	84	1160	

After the survey and analysis, the third phase of the study began with the presentation to the General Manager of the company. This aimed at understanding in greater depth the justification for the data obtained and the relationship with existing policies and strategies in the field of security regarding the operation of the company. As relevant points of the interview, it was possible to ascertain the following:

- the mandatory use of personal protective equipment (PPE); however, it was found in the observation carried out that this does not always happen.
- management's difficulty in controlling the use of PPE for the 70 technicians in their daily technical activities, given that many are displaced for work.
- the need to develop a new culture of responsibility that guarantees a change in the mentality of the technicians themselves, emphasizing the usefulness and obligatoriness of the daily use of PPE.
- the need to develop a new culture of responsibility that guarantees a change in the mentality of the technicians themselves, emphasizing the usefulness and obligation of the daily use of PPE.
- the acquisition of an overhead crane or small gantry requires an evaluation of the cost/benefit ratio. However, there is an awareness that it can improve safety conditions in the movement of machine components instead of handling components through straps on forklift forks.
- need to define and implement a training plan which guarantees greater awareness and knowledge of the procedures necessary to guarantee the safety of operators, both in terms of operation and in terms of manual handling of loads.

Given the information collected and the confrontation of the situations encountered with management practices, it is considered that it makes sense to draw up a plan to improve safety in the company, to be able to contribute to the improvement of this dimension in the company studied.

Thus, based on the previous elements resulting from the direct observation and analysis of accidents that occurred in the company in recent years, an improvement plan is proposed below to reduce accidents and improve working conditions. The proposals presented are as follows:

- Filings in the eyes – mandatory use of goggles or a mask when operating machinery or equipment where the material is projected.
- Maintenance and conservation of the original protection elements of the machines – respect for the protection elements originally existing in the equipment and that aim to minimize the occurrence of accidents (for example, protections to avoid the projection of filings).
- Personal protective material – use of personal protective material that is always mandatory according to the specific use of the device (e.g., use of steel-toed boots or gloves in all maintenance work).
- Machine handling training – training in cargo handling machines with recycling initially every six months and then annually, essentially refreshing the safety part, remembering technical details, such as, for example, that to get out of a movement of loads must be supported on 3 points of support and not exactly face the ground.
- Placing of posters with instructions or recommendations – creation and affixing of a highly visible poster to indicate the recommended procedure for exiting load-handling machines and the main safety rules associated with these machines.
- Risk training – risk training in the operation of load handling machines.
- Pavement marking – floor marking with pavement paint or steel or polyethylene barriers, delimiting the pedestrian and machinery zone, implementing the 5'S theory in the company.
- Delimitation of operation/equipment zones – delimitation of the press zone, in which only qualified operators can use the machine and placement of mirrors on the walls since, in some places, the visibility is significantly reduced.
- Investment in equipment – acquisition of an overhead crane, flag gantry or block, or similar for handling loads, instead of using a forklift with straps or steel cables.
- Training in manual handling of loads – training in manual handling of loads.
- Creation of areas for action in the event of an accident – implementation of eyewash stations in the workshop.

Conclusions

The prevention of safety violations at work must be provided by the definition of rules, procedures, and policies associated with the protection of people and equipment. However, such rules will only be effective if they are observed by employees and controlled by the organization's management. In this context, the cultural factor has significant relevance. Regardless of the number of safety rules that a company may have, it will be difficult to combat the lack of responsibility of workers about them when this is verified. It is in this context that it is important to highlight the organizational culture. Organizational culture is an excellent instrument for influencing collective behavior. And in this sense, it should be used by management to reinforce behaviors and values.

In the analyzed case study, management's inability to control and adjust existing rules and policies is evident. In the same sense, there is a negative evolution of accidents at work with the inability to reverse the trend over the years. The argument of the increase in the number of workers to justify the increase in accidents does not presuppose a lack of responsibility for the respective occurrence or the devaluation or even omission in need to adjust existing rules and policies.

The number of accidents recorded over the period analyzed confirms the existence of a problem at the management level and justifies a move towards greater involvement of organizational leaders and technicians in guaranteeing safety conditions and minimizing associated risks. A good company safeguards the physical and psychological integrity of its employees.

In this analyzed company, the accidents recorded in recent years corresponded to a downtime of almost 900 days and, consequently, express an extremely high cost that the company had to bear.

The proposal presented for improvements in terms of security must be supported by a plan assumed by the administration and correspond to a transformation or change project in this area. It is believed that these proposals will provide conditions for a significant reduction in accidents and, consequently, conditions for an increase in productivity and competitiveness.

Safety must be a very evident reality in the daily life of each employee, individually and of the company collectively (Neto, Areosa &Arezes,2017). Using security only at the level of principles and common sense is a cultural aspect that must disappear from the industry in Portugal. Increased security is beneficial for everyone!

The present study has some limitations. The first limitation is that it was limited to only one group of companies. Although they are relevant in the context of economic activity and the respective nature of the activity is conducive to the occurrence of accidents, given that it corresponds to the maintenance of equipment for cargo handling, it would be interesting to extend the same study to other sectors of economic activity as a form of power, including, establish a comparison between different economic sectors.

On the other hand, limiting the period until 2019, that is, until the beginning of the pandemic, it would be interesting to carry out the same study regarding the pandemic period. This new study would make it possible to verify whether the general health rules imposed by the Government in Portugal, such as the mandatory use of a mask or the mandatory social distance, had any positive effect on the culture of the company analyzed in the sense of greater awareness of the respective employees regarding the remaining rules and safety standards defined by the company.

It will certainly not be possible to establish a comparison between the number of accidents that occurred, as many companies were forced to close down due to the pandemic. In this sense, it is foreseeable that the number of accidents has decreased.

Future research work is expected to extend the study to other sectors and establish a comparative analysis between them to identify the sector with the lowest number of accidents at work and its relationship with the existence of internal policies and rules in this area.

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SOCIAL MARKETING AS A TOOL FOR A SUSTAINABLE MUNICIPAL WASTE MANAGEMENT

Armand Faganel[1], Anton Streicher[2]

[1]*University of Primorska, Koper, Slovenia, armand.faganel@gmail.com, ORCID:* https://orcid.org/0000-0002-3618-4986

[2]*Borza nepremicnin, Slovenia*

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Abstract

Research purpose. The purpose is to study the household attitudes toward waste separation and prevention and present an innovative model of efficient and sustainable waste management.

Design / Methodology / Approach. In the empirical part, an online survey was implemented to research residents' attitudes and intentions regarding handling household waste. It resulted in 228 valid responses, used for a quantitative analysis to answer the set hypotheses.

Findings. Regardless of the good results of waste separation in the municipality, the research showed that households do not know how to classify certain waste according to the type properly. It was confirmed that the use of penalty programs does not contribute to a higher level of waste separation. The already high awareness of the importance of separating waste could further be strengthened through the tools of social marketing as a factor for social change.

Originality / Value / Practical implications. It has been proven that residents' motivation is an important factor that indirectly influences households to separate, prevent and reduce the generation of new amounts of waste. Changing people's attitudes, mindsets, and behavior to be environmentally friendly is the best way to prevent further encroachment on the natural environment.

Keywords: social marketing; environmental awareness; motivation; waste reduction; households.

JEL codes: M31

Introduction

Criticism of the throwaway society influenced by consumerism (Gregson et al., 2007) and disposable culture (Adkins, 2018) is growing into an ever-stronger movement that tries to change how an average consumer thinks and acts. The consumption of non-recycled materials is growing, and the lifespan of products is shortened; if we add the accelerated development of industry, we come to the conclusion that these factors cause increased use of natural resources and growth of waste all over the world. If customers want to change their consumer habits, they need to know where and how to buy environmentally friendly products. As a link between buyers and producers, retailers have a great power to raise awareness and thus influence the choice when buying these products on their shelves (European Commission 2009, 13). Čebular Zajec (2015, 44) states that industry in Europe faces four main challenges: excessive waste and low material efficiency, rising raw material prices, the cost structure of production, where material costs of companies account for almost half of all costs, and high the EU's import dependence on raw materials and energy. The Sustainable Development Goals have been set up by the UN and represent a collection of 17 interlinked global goals for a "blueprint to achieve a better and more sustainable future for all", with goals 11 and 12 tackling waste and waste management and planned to be achieved by 2030 (United Nations, 2015). The critique of traditional waste systems and the direction of seeking new alternatives was pioneered by the community and environmental

movements. The solutions for these problems could be found, for example, in the transition to a circular economy, where waste from one industry becomes a raw material for the same or another industry (Morseletto, 2020). The reasons for promoting the circular economy are not just environmental. Namely, it is also about achieving economic and social goals in the form of new, quality employment. Another influential movement is building around the zero-waste idea in future cities (Hannon & Zaman, 2018). The world is facing a critical point where it is necessary to rethink how to improve sanitation by achieving sustainable development goals for the present and future generations (Orner & Mihelčič, 2018).

Literature review

The challenge is great, all parties involved will have to contribute a significant share to achieve the goal. On the one hand, the state, as a promoter of the idea of a circular economy and a policy of promoting recycling and waste prevention, and also municipalities through their public service providers to establish an effective way of waste separation, promotion, awareness, and appropriate infrastructure for their treatment, and finally households with the original task of proper waste separation and, above all, the orientation towards their prevention. This means changing consumer behavior in terms of quality-of-life orientation, reducing unnecessary purchases, choosing durable products with less harmful substances and, rejecting advertising materials, purchasing beverages, food and detergents in returnable packaging. Ottman (2011) emphasizes that the basic rule of green consumer consumption is control over a world that is becoming increasingly uncontrolled. He mentions sustainable consumers as people who care about their health and the health of relatives. They are taking control of the market, researching products, their packaging, and ingredients with a vengeful attitude, and in addition to directing their attention to the reputation of producers for eco (green) and social responsibility, the author adds (ibid.). Eagle, Dahl and Low (2020, 193) define social marketing as social change marketing. Like commercial marketing, social marketing seeks to change the behavior of target groups, with the difference that commercial marketing does so to increase market share, sales and consequently profits, while social marketing changes the behavior of individuals solely for the benefit of society as a whole.

Cornia et al. (2020) believe that separating waste alone is not enough to achieve environmental goals if we continue to promote separation. Attention must also be paid to preventing waste at the source, preparation for reuse, recycling, and energy conversion into fuels. Waste disposal is the last option in this cycle. Ekart & Vovk (2013) warn that non-implementation of comprehensive waste management will not bring Slovenia the title of "recycling society", especially because after 2020, waste disposal is not expected to be subject to waste management. Whether the turnaround in mentality will succeed, time will tell. In this paper, we want to present the issue of attitudes towards the separation and prevention of household waste in the municipality of Celje.

A common definition of waste across the Member States is presented by the Waste Framework Directive as "any substance or object in the categories set out in Annex I which the holder discards or intends or is required to discard" (EU, Regional Environmental Center, n.d.). Waste has been divided into different categories in the literature: municipal, industrial, hazardous and special. In terms of functionality and processing by material composition into biological waste, paper, glass, plastic, metals, composite materials, ..., according to the activity into waste from primary activity (agriculture, forestry, mining, …), waste from industry, energy, and construction waste. According to the method of its management and according to the possibility of reuse (Regional Environmental Center, n.d.).

Table 1. Overview of waste flow in Slovenia (Source: SORS, 2021)

Slovenia 2020	waste (t)
Non-hazardous and hazardous waste generated – total	7,669,111
Hazardous waste generated – total	138,296
Municipal waste generated	1.026.010

Hazardous municipal waste generated	7,376
Separately collected municipal waste	741,139
Waste recycling – total	3,193,220
... of which composting and treatment in biogas plants	301,332

The legislative basis in the field of waste management in the area of waste management is mostly based on the Environmental Protection Act. The framework or basic regulation governing waste is the Rules on the Management of Waste. These rules are supplemented by three subsidiary groups of regulations (ARSO, 2022):

- the first group comprises regulations governing individual types of waste (e.g. management of waste oils, packaging and packaging waste, batteries), and
- the second group comprises regulations governing facilities and equipment for waste management (disposal and incineration of waste).
- the third group consists of regulations on the transboundary shipment of waste.

Waste management (or waste disposal) deals with the processes and activities needed to manage waste from the starting point to its final disposal. Under the term of the circular economy, additional effort must be made to acquire the most updated information and pave a sustainable path for the management of municipal solid waste (Tsui & Wong, 2019). Esmaeilian et al. (2018) offer an insight into the potential of smart cities and connected communities in facilitating waste management efforts. Their framework highlights the value of product lifecycle data in reducing waste and enhancing waste recovery and the need for connecting waste management practices to the whole product lifecycle. In comparison, zero waste is understood as the design and management of products and processes, the reduction of the volume and toxicity of waste, and the preservation and recovery of all materials that are not incinerated or disposed of.

So, it is clear that pursuing waste prevention deploys different strategies and offers numerous benefits. Waste prevention might be accomplished through the reduction of the amount of materials that are being used in the products' production and through the increase of the products' efficiency. It can be pursued through the limitation of the excess consumption and by using products which would bring less waste. And finally, waste prevention is about consumers' attitudes and intentions to consider the possibility of reuse, repair or renovation before disposal (FoE Japan, 2013).

To achieve such a shift that would realize in the move from recycling to reduction while pursuing the way to sustainable consumption, some conditions must be established. If recycling depends only on the market, it might finish circulating due to the progressive economic development, as the income from the collection of recyclable resources lowers comparatively, and because the public sensitivity and awareness improves. This is why it is needed to control and reduce waste generation. With the implementation of waste reduction measures, it could be anticipated a reduced burden on waste management (FoE Japan, 2013).

There are diverse theories and models of behavior change, but in order to significantly influence and change residents' behavior in the field of waste reduction, the literature review brings considerable evidence that it is wise to use social marketing (Cole & Fieselman, 2013; Hodgkins et al., 2019; Kim et al., 2019; Kim et al., 2020; McKenzie-Mohr, 2011; Pearson & Perera, 2018). The goal of social marketing is to change harmful or useless behavior. Four types of social changes are being influenced through social marketing:

- Cognitive changes: raise awareness and educate individuals.
- Action changes or encouragement for action: attract as many individuals or target groups as possible to decide on a specific activity within a certain time frame.

- Behavior changes: require people to give up certain activities and adopt a different way of behaving that is in their best interest.
- Changes in values: the individual is required to change deep-rooted beliefs.

The City Municipality of Celje is one of twelve city municipalities in Slovenia. Its seat is the city of Celje, a regional center of southern Styria. It is the third-largest city in Slovenia. The Celje Regional Waste Management Center project (hereinafter RCERO Celje) is the first such integrated waste management project in Slovenia and represents the most significant environmental investment in the Municipality of Celje and the other 23 municipalities of the Savinjska region. The reason for the construction of RCERO Celje was the fact that the old landfills were no longer in accordance with the EU Directive on landfills because the limited space of landfills did not allow further disposal of waste. With the construction of the center alone, approximately 250,000 people from the region have gained the opportunity to be included in a comprehensive waste management system for the next five decades (Simbio, 2014).

Simbio, d. o. o., has 322 ecological islands in the area of the Municipality of Celje, where there are two or three containers of 1800 litres each, in which glass, plastic and metal packaging and paper and cardboard are collected. For the collection of hazardous waste, the company has a mobile collection point for hazardous waste, where it is placed in a certain place after the prior announcement; otherwise, the possibility of delivering waste to collection centers in the region (this only does not apply to mixed municipal waste). A similar system is for bulky waste, except the company pre-orders metal containers of 5 to 30 cubic meters or removes bulky waste on the basis of an order form, where each household can benefit from the disposal of up to 1 m^3 of such waste per year). There are 28,003 collection points in the Celje region, of which the most in Celje are 8,620 (Simbio, 2017).

Empirical analysis

The questionnaire was prepared about residents' attitudes toward waste separation and reduction, developed on the basis of the previous studies and literature review. It has been pretested in a pilot survey. Cronbach's coefficient α was used to check the reliability and validity of the questionnaire; it was measured at $\alpha = 0.794$, which is a good result. The data collected in the online survey were used for the purposes of their analysis using various statistical methods, using SPSS and LISREL programs. Methods used for testing hypotheses and modelling: exploratory factor analysis with Varimax rotation and Kaiser normalization; regression analysis; Spearman and Pearson correlation coefficients; and SEM analysis.

The survey questionnaire was sent to more than 1000 different e-mail addresses from the company's database; twice it was published on the social network Facebook and once on the social network LinkedIn. The effort resulted in 256 completed questionnaires, of which 205 respondents (80%) completed all questions, and the remaining 51 (20%) completed the questionnaire after the first question. There were 228 (89%) partially completed and, at the same time, relevant questionnaires.

Testing the hypotheses

Hypothesis 1: The more regulated the waste infrastructure, the more consistent the waste separation (at the declarative level). This hypothesis was tested with the help of regression analysis, where we checked the impact of waste infrastructure (independent variable) on the consistency of waste separation (dependent variable), which we obtained as a result of factor analysis. Based on the result of the regression analysis, we find that with the help of waste infrastructure, we can explain 3.9% of the variability of consistent waste separation, which indicates the fact that the dependent variable is significantly influenced by other factors. The data are shown in Table 2.

Table 2. Summary of the regression model of the variable "Waste infrastructure" (Source: authors)

Model Summary				
Model	R	R^2	Adjusted R^2	SD
1	0.206[a]	0.042	0.039	0.91268966

a. Predictors: (Constant), Waste infrastructure

The validity of the linear model was checked using variance analysis (ANOVA). The regression model is statistically significant (F = 11.313, p = 0.01 <0.05). The results are shown in Annex 4. From Table 3, we can see that the value of the standardized regression coefficient for waste infrastructure is 0.206 and is statistically significant (p = 0.001), which means that waste infrastructure has a positive and statistical effect on the consistency of separation. Although there is a weak dependence of the consistency of separation on waste infrastructure, we, nevertheless, confirm hypothesis H1.

Table 3. Coefficients of linear regression analysis - dependent variable "Consistency of waste separation", an independent variable "Waste infrastructure" (Source: authors)

Model	Non-standardized coefficients		Standardized coefficients	t	Sig.
	B	SD	Beta		
Constant	-2.217E16	0.057		0.000	1.000
Waste infrastructure	0.209	0.062	0.206	3.363	0.001

a. Dependent variable: Consistency of waste separation

Hypothesis 2: The level of knowledge of waste separation is positively related to consistent waste separation. To test the second hypothesis, we used Spearman's correlation coefficient (one of the variables is ordinal) because we wanted to determine whether there are relationships between the dimensions of waste separation consistency and the new calculated variables of knowledge of waste separation. Before calculating the correlation coefficients, it was first necessary to design a newly derived variable knowledge of correct separation. This variable was formed into three levels: 1 - low level, 2 - medium level and 3 - high level of knowledge of separation. We did this by considering the answers to the four questions asked (Q14 to Q17) from the questionnaire survey. For the correctness of the answers above 80%, they were classified as a high level of knowledge, for the correctness of the answers between 40 and 80%, they were classified as a medium level of knowledge, and below 40% of the correct answers as a low level of knowledge. Table 33 shows that all correlation coefficients are statistically insignificant. The p values of the dimensions of the consistency of waste separation are more than 0.05, so we cannot discuss the relationship between variables, resulting in the rejection of hypothesis H2.

Table 4. Spearman's correlation coefficient between the dimensions Separation Consistency and Knowledge of Waste Separation (Source: authors)

			Knowledge of Waste Separation
Spearmans' rho	Mixed municipal waste	Correlation coefficient	-0.096
		Sig. (2-tailed)	0.125
		N	257
	Biological waste	Correlation coefficient	0.009
		Sig. (2-tailed)	0.887

	N	257
Plastic and metal packaging	Correlation coefficient	-0.060
	Sig. (2-tailed)	0.340
	N	257
Paper and cardboard	Correlation coefficient	-0.073
	Sig. (2-tailed)	0.243
	N	257
Glass	Correlation coefficient	-0.043
	Sig. (2-tailed)	0.495
	N	257
Hazardous waste (batteries, medicines, paints, chemicals, etc.)	Correlation coefficient	-0.015
	Sig. (2-tailed)	0.807
	N	257
Bulky waste	Correlation coefficient	-0.017
	Sig. (2-tailed)	0.783
	N	257
Knowledge of separation	Correlation coefficient	1.000
	Sig. (2-tailed)	
	N	360

Hypothesis 3: Motivation in the form of reward and punishment has a positive effect on more consistent waste separation (at the declarative level).

It was tested with the help of regression analysis, where we tested a linear sample relationship between a dependent variable and two independent variables. For the purposes of hypothesis testing, the dependent variable in the regression analysis was the consistency of separation, while the variable consistency of separation due to monetary rewards and penalties was included as independent, and the consistency of separation due to collection charges was the second variable. All these variables were obtained based on the results of factor analysis. Based on the results of the regression analysis, we find that only 1.7% of the variability of consistent waste separation can be explained by the consistency of separation due to collection charges and the consistency of waste separation due to monetary rewards and penalties, which indicates that the dependent variable is significantly influenced by other factors. The data are shown in Table 5.

Table 5. Summary of the regression model of the variables "Consistency of separation due to removal charges" and "Consistency of separation due to monetary rewards and penalties" (Source: authors)

Model Summary				
Model	R	R^2	adjusted R^2	SD
1	0.160[a]	0.026	0.017	0.88928152

a. Predictors: (Constant), consistency of separation due to collection charges, consistency of separation due to monetary rewards and penalties

The validity of the linear model was checked using variance analysis (ANOVA). The regression model is statistically significant (F = 3.089, p = 0.047 <0.05). The assumption of the presence of multicollinearity in the regression model was checked using the VIF factor. The latter is not present if its value is less than 10.

Table 6 shows that the value of the VIF factor is 1,001 for both variables. This confirms the absence of multicollinearity. From Table 6, we can see that the value of the standardized regression coefficient for consistency of separation due to rewards and penalties is -0.136 and is statistically significant (p = 0.036), while the value of the standardized regression coefficient for consistency of separation due to removal charges is -0.082 and not statistically significant (p = 0.206). This means that the consistency of waste separation is not affected by the consistency of separation due to charging. The consistency of separation due to rewards and penalties negatively and statistically affects the consistency of waste separation, which means that hypothesis H3 cannot be confirmed.

Table 6. Coefficients of linear regression analysis - dependent variable "Consistency of waste separation", independent variables "Consistency of separation due to monetary rewards and penalties", and "Consistency of separation due to collection charges" (Source: authors)

Model	Non-standardized coefficients		Standardized coefficients	t	Sig.	Colinearity	
	B	SD	Beta			Tolerance	VIF
Constant	0.032	0.058		0.558	0.578		
Consistency of separation due to monetary rewards and penalties	-0.128	0.061	-0.136	-2.109	0.036	0.999	1.001
Consistency of separation due to collection charges	-0.075	0.059	-0.082	-1.267	0.206	0.999	1.001

a. Dependent variable: Consistency of waste separation

Hypothesis 4: The level of knowledge of the waste separation and prevention system has a positive effect on consumers' shopping habits. The mentioned hypothesis was tested with the help of regression analysis, where we tested a linear sample relationship between the dependent variable and three independent variables. For the purposes of hypothesis testing, the regression analysis was a dependent variable of the purchasing habit variable; the independent variable was the pay-as-you-go variable, the permanent variable was waste reduction and the third variable of waste management. All these variables were obtained based on the results of factor analysis. Based on the result of the regression analysis, we find that with the help of the system "pay as you put off", permanent waste reduction and waste management, we can explain 20.9% of the variability in shopping habits, which indicates that the dependent variable is significantly influenced by other factors. The data are shown in Table 7.

Table 7. Summary of the regression model of the variables "Pay as you litter", "Sustainable waste reduction", and "Waste management" (Source: authors)

Model Summary				
Model	R	R^2	Adjusted R^2	SD
1	0.469[a]	0.220	0.209	0.85771245

a. Predictors: (Constant), Pay as you litter system, Permanent waste reduction, Waste management

The validity of the linear model was checked using variance analysis (ANOVA). The regression model is statistically significant (F = 21.047, p = 0.00 <0.05). The assumption of the presence of

multicollinearity in the regression model was checked using the VIF factor. The latter is not present if its value is less than 10. Table 37 shows that the values of the VIF factor are less than 10 for all variables. This confirms the absence of multicollinearity. From Table 8, we can see that the value of the standardized regression coefficient for waste management is 0.430 and is statistically significant (p = 0.00). The standardized coefficient for permanent waste reduction is 0.170 and is also statistically significant (p = 0.004), while the value of the standardized regression coefficient for the pay-as-you-go system is 0.016 and not statistically significant (p = 0.799). This means that shopping habits are not affected by the pay-as-you-go system. Waste management and permanent waste reduction have a positive and statistically significant effect on shopping habits, which means that hypothesis H4 is partially confirmed.

Table 8. Coefficients of linear regression analysis - dependent variable "Purchasing habits", independent variables "Waste management", "Permanent waste reduction" and "Pay as you go" system (Source: authors)

Model	Non-standardized coefficients		Standardized coefficients	t	Sig.	Collinearity	
	B	SD	Beta			Tolerance	VIF
Constant	0.017	0.057		0.307	0.759		
Waste management	0.487	0.069	0.430	7.024	0.000	0.928	1.078
Permanent waste reduction	0.193	0.067	0.170	2.872	0.004	0.998	1.002
Pay as you litter system	0.020	0.078	0.016	0.255	0.799	0.927	1.079

a. Odvisna spremenljivka: Nakupne navade

Presentation and verification of the structural model

The SEM analysis represents the analysis of the structural model. It analyses relationships or relations between model constructs or sets of variables. In the process of testing the structural model, it is a matter of testing hypotheses about the connections between individual constructs or concepts by checking the whole model. The starting point for testing hypotheses is the comparison of hypothetical (theory-based) relationships with those measured on the basis of empirical data. In our case, based on theoretical starting points and personal assumptions, we presented the relationships or relations between individual sets of variables and performed a simpler SEM model, as we had already performed an extensive analysis in the previous phase. In order to observe the relationships between individual sets of variables, we designed the structural model so that we can observe the direct impact of four sets of variables (perception of waste separation, motivation in the form of rewards and penalties, waste infrastructure, level of knowledge of waste prevention) on the consistency of waste separation. Sets of variables (level of knowledge of waste separation, perception of waste separation) on purchasing habits and the indirect influence of the level of knowledge of waste separation through the perception of waste separation on the consistency of waste separation. In the model, individual sets of variables are calculated based on the sum of all statements of each set of questions, using two sets of questions, namely Q10 and Q11, to perceive waste separation. The model shows individual connections and represents relationships or relations (in the form of an arrow) between independent and dependent sets of variables. The direction of the arrow indicates a direct relationship between sets of variables (independent to dependent). These are partial regression coefficients that show the strength and direction of the connections between the mentioned variables.

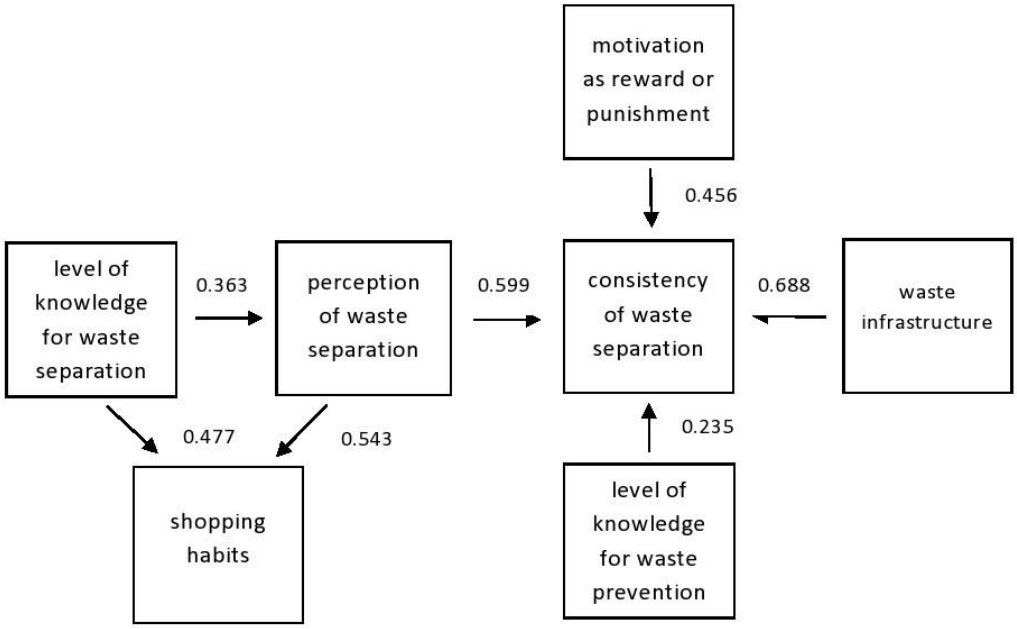

Fig. 1. Structural model of sets of variables (Source: authors)

Figure 1 shows that "waste infrastructure" (0.688) and "waste separation perception" (0.599) have the greatest impact on the consistency of waste separation, less "reward motivation" (0.456) and "waste prevention knowledge level" (0.235).). Based on the obtained results, we can say that they are expected because waste separation requires good infrastructure to enable the consistent separation, and it is also important how households perceive or are susceptible to waste separation. The susceptibility of separation, of course, requires motivation, which can take the form of a reward or a fine. "Perception of waste separation" has a slightly greater impact on purchasing habits (0.543) than the "level of knowledge of waste" (0.477). The reason for this result is our assumption that households that are more susceptible to segregation are consequently also more environmentally aware and thus buy products that are environmentally friendly and cause less waste.

Discussion and Conclusions

Findings regarding the waste separation show that households are aware of the importance of separating waste, which means reusing raw materials, conserving natural resources and thus the environment for future generations. All households generally separate waste; on average (M = 4.23), households accurately (61-80%) separate all types of waste, mainly the waste collected on ecological islands, namely paper, plastic and metal packaging and glass. They are not so precise in separating hazardous waste. The reason for this lies in the fact that households do not have special containers for the mentioned waste but have to take the waste to the collection center.

Findings regarding the motivation for waste separation demonstrate that motivation in the form of a reward or a sanction with a fine are not factors that would further encourage households to separate waste, as they are undecided about this type of incentive. Even the method of charging for collection, "you pay as much as you litter," is not a good enough monetary incentive. This means that separation is influenced by other motivational factors not covered by the research. The motivational factor in the form of a one-month write-off of the amount for the waste collection came closest to the average of approvals (M = 3.33).

Findings regarding waste reduction and prevention prove that most households occasionally pay attention to the fact that their purchases do not cause additional unnecessary packaging, which increases the generation of new waste. More and more households are realizing the importance of buying environmentally friendly products. Half of all respondents buy the same share of conventional and green

(eco) products. From the results of the analysis, we found that, on average, respondents pay the most attention to products that are fresh and unpackaged (M = 3.81) and made from natural ingredients (M = 3.55). On average, households agree that the conservation of natural resources is a necessity and not a choice (M = 4.57).

The awareness of the importance of separating waste (environmentally friendly behavior) for the preservation of the environment and thus natural resources is also felt by households in the municipality of Celje. The survey found that, on average, households strongly agree with the claims that dictate the importance of segregation for environmental conservation for future generations and the possibility of recycling and reusing raw materials from waste to conserve natural resources. Not only are they aware of the importance of waste separation, households in the municipality actually separate waste in a very efficient way. Motivation is an essential factor that indirectly influences households to separate, prevent and reduce the generation of new amounts of waste.

This is possible if we use social marketing as a tool that influences the target audience in order to positively change behavior concerning the environment. A social marketing plan must be developed based on proper analysis, selecting target groups, setting behavioral goals and tasks, identifying barriers and benefits for target groups, develop appropriate positioning and marketing mix elements.

Despite the fact that the "Zero waste" strategy is not implemented in the municipality where the survey was conducted, we concluded that households are in favour of some claims related to the strategy. On average, households agree that the conservation of natural resources is a necessity and not a choice. As households separate waste well, it was to be expected that, on average, they still agree with the statement that it is necessary to separate all types of waste. On average, they least agree with the statement that the municipality does not need a landfill and incinerator. One of the reasons is that the municipality has built an incinerator that supplies the city with heat produced from waste incineration. The survey also showed that households are aware that in order to preserve natural resources, it is necessary not only to separate but also to prevent the generation of new waste. In prevention, they are especially active in the consumption of paper that is printed, photocopied and written on both sides, and in shopping, where they use the already used bag they bring from home.

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WAS IT DOOMSDAY? FIRST WAVE OF THE COVID-19 PANDEMIC IMPACT ON THE POLISH CULTURAL INDUSTRY

Marcin Komańda

Opole University of Technology, Opole, Poland, m.komanda@po.edu.pl, ORCID: https://orcid.org/0000-0003-1695-2949

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Abstract

Research purpose. The COVID-19 pandemic has become a theme of the research on the functioning of the economy and particular industries. The same concerns were raised regarding the issue of the cultural industry. Therefore, the content of this paper was dictated by the recognition of the impact of the first wave of the Covid-19 pandemic on the activities of the cultural industry in Poland. The formulated research question reads: "How did the beginning of the Covid-19 pandemic impact the economic standing of the Polish cultural industry?"

Design / Methodology / Approach. The conducted literature review, whose purpose was to recognise the threads of the scientific discourse on the pandemic and cultural industry together with the cultural issues of business activity in a broad sense, was based on the use of the VOSviewer software, based on the data obtained from the Web of Science Core Collection. This concerned publications from January 1, 2020, to April 4, 2022. The part of the paper that leads to answering the research question uses the inductive method. It is based on the analysis of the quantitative data and information obtained from Statistics Poland (GłównyUrządStatystyczny), research reports as well as media releases.

Findings. It was determined that in the first year of the pandemic, the number of cultural events, as well as the number of their participants, drastically decreased. There was also a change in the structure and value of expenditures of the citizens of Poland. This caused a drastic fall in revenues from the activity conducted by cultural institutions at the beginning of 2020. The situation improved after the disbursement of the government aid. However, even one year after the first lockdown, the increased debt of the art industry can be pointed out.

Originality / Value / Practical implications. Determining in a broad way the impact of the first wave of the pandemic on the cultural industry in Poland concerning the economic standing is a novel approach. The previous studies focused on the situation of particular types of cultural institutions and possibly on the people associated with them. Due to its specificity, the conducted research also makes it possible to identify potential research problems relating to this industry. On the one hand, these potential studies are in line with the research threads represented in world literature. On the other hand, they concerned the specificity of the Polish cultural industry.

Keywords: Covid-19; cultural industry; economic standing

JEL codes: A10; M20

Introduction

The Covid-19 pandemic affected the lives of people all over the world, and thus also many aspects of their life, including social activity. One of the areas particularly affected by the adverse effects of the pandemic was the economy and businesses representing various industries. The main concerns were directed toward the issue of maintaining the supply chain continuity in economic systems (Aday&Aday, 2020; Chowdhury et al., 2021), and among the industries particularly affected by the pandemic, such as the hotel and tourism industry (D'Orazio et al., 2021; Davahli et al., 2020), the food service industry (Harms et al., 2021; Norris et al., 2021), or the fitness industry (Komańda, 2020; Park & Kwon, 2022) were indicated. However, all the industries that were related to the movement of people and/or their meetings among people can be pointed out as those that encountered exceptional difficulties, especially during lockdowns. One of such industries is also the cultural industry.

The research purpose of this paper is to recognise the impact of the first wave of the Covid-19 pandemic on the activities of the cultural industry in Poland. The structure of the article includes the theoretical part (a review of the literature based on the analysis of data collected from the WoS Core Collection database, enabling the identification and discussion of the main threads of the scientific discourse related to the business and the Covid-19 pandemic) and the empirical part related to the presentation of the methodological assumptions of the conducted research and their results (methodology and results). Finally, the conclusions of the conducted analyses were presented.

The research question formulated is as follows: "How did the beginning of the Covid-19 pandemic impact the economic standing of the Polish cultural industry?" In order to answer this question, the analysis of the data presented by Statistics Poland (Główny Urząd Statystyczny) was primarily used, as well as the information found in reports and publications on the condition of the Polish cultural industry at that time. The conducted analysis revealed that, indeed, the first lockdown caused the collapse of the economic standing of cultural institutions in Poland. Furthermore, there was also a change in the structure of expenditures of Polish citizens, which means that the very easing of sanitary restrictions over time did not quickly translate into a noticeable improvement in the economic standing of these entities. These were government funds given to cultural institutions and artists that significantly improved the situation during the first year of the pandemic.

Literature review

The review of the resources of the Web of Science Core Collection database indicated that 257,718 publications containing a reference to the Covid-19 pandemic in the title or abstract were indexed between the beginning of 2020 and April 4 2022. The publications naturally represented all sciences, but their very number points to the fact that this subject, in the recent two years, has become one of the key research problems for the world of science. After conducting a search for publications on the subject of the pandemic in this database and combining it with the additional condition of the presence of the term 'cultural' in the title or abstract, a list of 3,539 publications indexed in the discussed period can be seen. Upon narrowing the search criteria to publications in the form of articles and conference papers and the subject areas of business and management, 164 indexed publications were identified. There were 29 publications in 2020, 115 publications in 2021, and 20 publications in 2022 at the time of data review.

The data of these publications were downloaded for the purposes of the analysis of their titles and abstracts with the VOSviewer software. It was determined that using the criterion of counting the actual number of appearances of the expressions in the texts (the so-called full counting), 5,039 appearing phrases were distinguished. It was assumed that the expressions that would be used for further analysis should occur at least 25 times. There were 26 such expressions identified. In accordance with the programme settings, 60% of the most significant expressions (i.e., 16 of them) were taken into consideration for the final analysis.

The most commonly appearing expressions are 'covid' (335 times), 'study' (226 times), 'pandemic' (188 times) and 'research' (119 times). VOSviewer identifies expressions in terms of incidence and relevance score. The higher the latter measure, the greater the relationship between the expression and the specific subject (which is credited with the creation of the expression list in VOSviewer). The most significant expressions identified by the programme in terms of both measurements distinguished from the titles and abstracts of the analysed texts are presented in Table 1.

Table 1. The most significant expressions appearing in the titles and abstracts of the analysed text (Source: own work)

Term	Occurrences	Relevance score
article	37	0.5824
challenge	55	0.6312
consumer	33	0.5218

context	62	0.7949
covid	335	3.2576
crisis	76	0.5299
culture	76	1.026
effect	97	1.4238
need	33	0.4325
pandemic	188	1.1675
person	40	0.6386
research	119	1.0276
study	226	1.8003
technology	47	1.3508
time	65	0.4897
work	51	0.3255

All 16 expressions are grouped into three groups (the information provided by the VOSviewer software). Group 1 contains the following expressions: 'article,' 'challenge,' 'crisis,' 'need,' 'pandemic,' 'technology,' 'time,' 'work.' In group 2, the following ones were distinguished: 'covid,' 'culture,' 'effect,' 'person.' In turn, group 3 contains the following expressions: 'consumer,' 'context,' 'research,' 'study.' The first group of expressions may suggest that the content of a large part of publications may be related to issues of performance of professional duties or functioning of institutions/organisations during the pandemic. The second group may, in turn, posit the relationship with the issue of the impact of the pandemic on cultural issues in a broad sense, including those related to social behaviour, also in the perspective of individuals. Group 3, in turn, seems to emphasise the issue of the research on consumption during the pandemic.

The reports related to the research results on the operations of business entities during the pandemic show that this was a time when revenues were decreasing regardless of the industry, while smaller entities were more strongly affected by this trend (Kryeziu et al., 2022). Companies were primarily focused on current adaptation to the crisis and simultaneously sought to prospectively build a stronger position for the post-pandemic times (Kraus et al., 2020). Therefore, within corporate management, tendencies appeared to implement new technological solutions, use new managerial practices or to manifest strategic behaviour also entangled in the social context (Kryeziu et al., 2022). The latter aspect was visible, among other things, in the greater involvement of companies in corporate social responsibility practices (Dwivedi & Kumar, 2021). The manifestation of changes in social attitudes was also visible within the companies themselves. The existence of stronger solidarity and integration, as well as a higher level of digitisation activities, was confirmed in this context (Kraus et al., 2020). This indicates that the pandemic has become a period of evolution of business models towards the adoption of virtual work solutions while creating a number of challenges for business entities (Mangla, 2021).

Similar trends were observed in the functioning of cultural institutions during the pandemic. They frequently remained closed for long periods of time, which made it possible to surmise that with the onset of the pandemic, the economic performance of the cultural industry would deteriorate considerably (Radermecker, 2021). It also required them to reconsider the feasibility of their missions and practical way of acting. Modifications to the activity were related, to a large extent, to an attempt to use IT tools and reach out to virtual communities (Suciu, 2021). Notably, these activities also consisted of measuring the level of involvement in the interactions between social media participants within virtual activities/events generated by cultural institutions. This also helped to determine the so-called good practices (Ryder et al., 2021). Simultaneously, the main barrier to developing activities using computerised solutions was the lack of sufficient financial resources that cultural institutions could spend on this purpose (Raimo et al., 2021). Changing ways of functioning for entities in the cultural

industry was also considered in terms of prospective creativity within the framework of professional activities (Richards & Pacella, 2022).

The issues related to social behaviour also became the research subject during the pandemic. Concerning the work context, the threads of the impact of cross-cultural difference and cross-cultural communication on the comprehension of the meaning of crisis management activities were mainly raised (Bajaj et al., 2021). The research was conducted on the issue of the cultural proximity of workgroup members and its relationship with creativity and virtual work (Qin et al., 2021). The issue of a work-life balance was also referred to (Mello & Tomei, 2021). The relationship between the type of national culture and the level of incidence and recovery from Covid-19 was identified. These relationships took into consideration, among other things, the level of aversion to uncertainty expressed by the members of society (Eigenstuhler et al., 2021). Other studies, in turn, emphasised the issue of personal efficacy beliefs, which were not only linked to subjective norms but also to spending intentions during the pandemic (Fagundes et al., 2020).

Therefore, the trend of the research on consumption during the pandemic also took into consideration the cultural context. From the perspective of panic buying, which occurred at the beginning of the pandemic, the impact of cultural values and state reaction policy to the pandemic were considered (Ahmadi et al., 2021). It was indicated that both individualism and avoidance of uncertainty as an indication of national culture have a positive influence on panic buying (Messner & Payson, 2022). The research results determined that during the pandemic social support could be regarded as a source of coping as well as a source of increasing negative emotions (Im et al., 2022). It was also shown that emotional excitement generating a positive attitude towards campaigns relating to Covid-19 also translated into buying intentions (Chetioui&Lebdaoui, 2021). Furthermore, the time of the pandemic also affected the development of e-commerce, as well as changes in the purchasing behaviour of particular social groups (Braholli, 2022). It was indicated that during the pandemic, the gravity of consumer awareness and experience in online shopping increased (Gu et al., 2021).

It is worth noting that within the framework of researchers' interest in the functioning of the cultural industry during the pandemic, attention was also paid to the government support programmes for cultural institutions and their employees. This also indicated certain variations in aid instruments concerning the general model of cultural funding in particular countries (Betzler et al., 2021). Considerations on culture during the pandemic also contributed to the reference to the future, to post-pandemic times. In this respect, it was postulated, above all, to reconsider the essence of cultural activities in the dynamic and complex socio-economic reality (Dümcke, 2021). These postulates seem to be also justified since not only was this socio-economic environment of the cultural industry completely disrupted during the pandemic but also the cultural institutions themselves transformed their business model. The implementation of online solutions in combination with strengthening relationships with local communities (Kantor &Kubiczek, 2021) appear to be the activities of cultural institutions that were also the answer to the change in preferences within the consumption of members of society or the nature of social behaviour during the pandemic.

Methodology

The objective of the undertaken research task is to determine the answer to the following question: "How did the beginning of the Covid-19 pandemic impact the economic standing of the Polish cultural industry?" In order to accomplish this, a decision was made to analyse information and data from various sources. The list of these sources is presented in Table 2.

Table 2. List of information sources (Source: own work)

Source type	Source symbol	Source data
Report	[a]	Miniszewski, M. (2021), Consumption during the pandemic (Konsumpcja w pandemii), Polish Economic Institute, Warsaw, pp. 40.

		https://pie.net.pl/wp-content/uploads/2021/05/PIE-Konsumpcja-w-pandemii.pdf
Existing data	[b]	Local Data Bank (Bank Danych Lokalnych)https://bdl.stat.gov.pl/bdl/start
	[c]	Statistics Poland (Główny Urząd Statystyczny) https://stat.gov.pl/obszary-tematyczne/kultura-turystyka-sport/kultura/kultura-w-2020-roku,2,18.html
Media releases and articles	[d]	Artists in pandemic. Research report presentation. Webinar. (Artyści w pandemii. Prezentacja raportu z badań. Webinar), https://www.instytut-teatralny.pl/2021/03/20/artysci-w-pandemii-prezentacja-raportu-z-badan-webinar/
	[e]	Artists still in financial distress. Many professional groups have lost more than half of their salaries (Artyściwciąż w trudnejsytuacjifinansowej. Wiele grup zawodowych w teatrach straciło ponad połowę swoich zarobków), https://biznes.newseria.pl/news/artysci-wciaz-w-trudnej,p26229456
	[f]	Muses in the shadow of Covid-19. How the pandemic is changing our culture (Muzy w cieniu Covid-19. O tym, jak pandemia zmienia naszą kulturę), https://magazynterazpolska.pl/pl/a/muzy-w-cieniu-covid-19-o-tym-jak-pandemia-zmienia-nasza-kulture
	[g]	The New York Times: Poland among countries that most generously supported artists during the pandemic (Polska wśródkrajów, którenajhojniejwsparłyartystów w czasiepandemii), https://www.gov.pl/web/kultura/new-york-times-polska-wsrod-krajow-ktore-najhojniej-wsparly-artystow-w-czasie-pandemii
	[h]	The financial result of cultural institutions may surprise you. Here are the latest data (Wynik finansowy instytucji kultury może zaskoczyć. Oto najnowsze dane), https://ksiazka.net.pl/wynik-finansowy-instytucji-kultury-moze-zaskoczyc-oto-najnowsze-dane
	[i]	The pandemic has hit these professions hard. The numbersdon'tlie (W te zawody pandemia uderzyła potężnie. Liczby nie kłamią), https://businessinsider.com.pl/wiadomosci/straty-artystow-i-branzy-eventowej-w-pandemii/ry5k8h5

The information on the state of the Polish cultural industry from the report and media releases, and articles published during the pandemic in the years 2020-2021. Their nature can be regarded as secondary (they concern with citing information about disseminated research results or data first published elsewhere) or primary (the announcement of the Ministry of Culture and National Heritage; the cited scientific report). The existing data published by Statistics Poland are also used. They concern both pre-pandemic and post-pandemic data.

The compilation of data from the indicated sources of information is expected to contribute to the construction of a general picture of the issue contained in the research question. The research procedure built this description in the process of making it more precise in the course of research. It was achieved under the influence of collected and analysed empirical material. The research procedure was therefore interactive - it depended on the already collected and obtained data and the shape of the described phenomenon emerging from it. In this particular procedure, the analysis started with quantitative data on the number of cultural events organised in Poland in the analysed period and the structure of Poles' expenditure. In the next step, data were searched to outline a broader context of the economic situation of the cultural industry in Poland, also in terms of the subsequent months of the pandemic. The applied procedure represents the inductive method which makes it possible to build an image of the described issue to answer the formulated research question. However, using the selected set of information sources causes the created image to be grounded in the context of the data and information used and thus does not constitute a complete view of the studied issue.

Results

In order to demonstrate the scale of the impact of the first wave of the Covid-19 pandemic on the Polish cultural industry with regard to the number of organised mass events of arts and entertainment nature and the number of their participants, the information resources of the Local Data Bank (Bank DanychLokalnych) were used. It is an Internet portal maintained by Statistics Poland, which is the largest database on the economy, society, and environment in Poland [b]. The values of the discussed variables for the years 2016-2020 were obtained. They are presented in Figures 1 and 2.

The average yearly number of participants of artistic and cultural events in the years 2016-2019 amounted to 11,561,267 people, whereas the average number of organised events of this kind was 3,383.75. When the values for these variables are compared with the data for 2020, which is the year when the first lockdown due to the pandemic was announced, it can be said that the number of organised events, as well as the number of their participants, declined spectacularly. To be precise, the number of organised arts and entertainment events in 2020 was 88.8% less than the average number in 2016-2019 and 89.47% less than in 2019. In the case of the number of people participating in these events in 2020, it can be stated that it was 89.60% less than the average number of them in the years 2016-2019 and 90.27% less than their number in 2019.

The value of average monthly expenditures on culture and recreation per capita in Poland in 2016-2020 in PLN can also be traced. The data are shown in Figure 3.

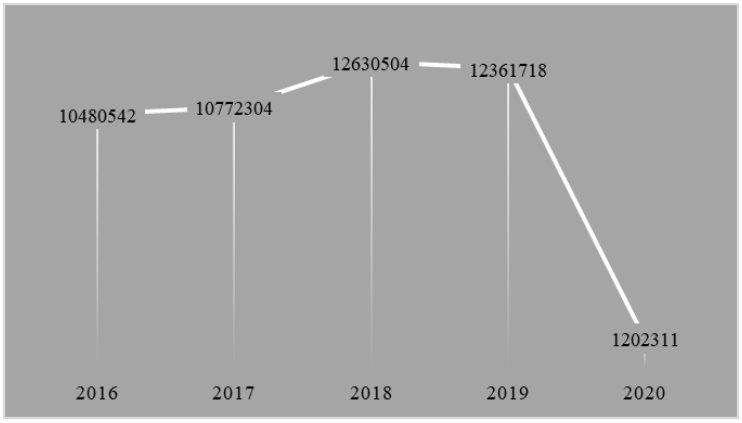

Fig. 1. Number of participants of arts and entertainment events in the years 2016-2020 in Poland (Source: Local Data Bank, https://bdl.stat.gov.pl/bdl/start)

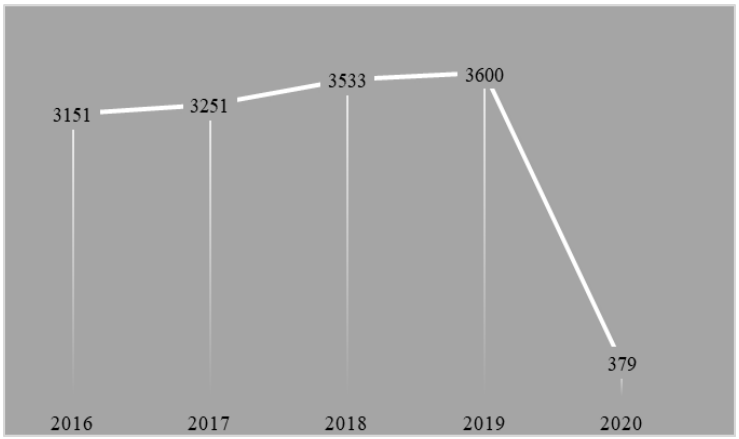

Fig. 2. Number of organised arts and entertainment events in the years 2016-2020 in Poland (Source: Local Data Bank, https://bdl.stat.gov.pl/bdl/start)

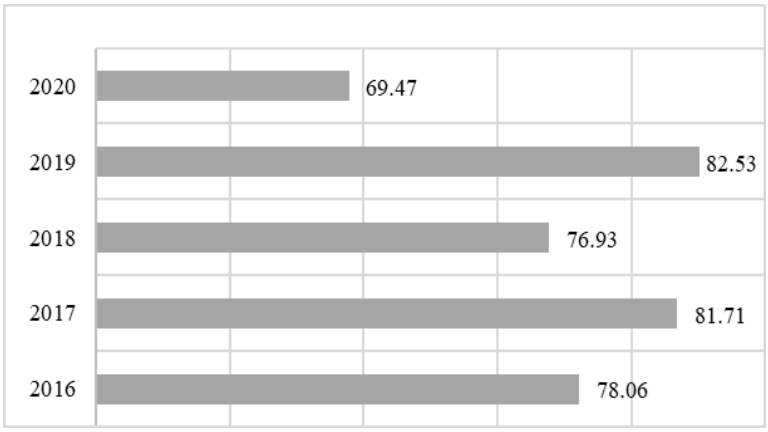

Fig. 3. Value of average monthly expenditures on culture and recreation per capita in Poland in the years 2016-2020 in PLN (Source: Local Data Bank, https://bdl.stat.gov.pl/bdl/start)

The average monthly expenditures on culture and recreation per capita in Poland amounted to PLN 79.81 a year in 2016-2019. Thus, their value in 2020 was 12.96% lower than the reported average value for the four years. Compared with the value of these expenditures in 2019, the year immediately preceding the year of the first wave of the pandemic (i.e., 2020), it was 15.82% less. These results indicate a real decrease in the expenditures for this group of consumer goods. The scale of this decline is not exceptionally large. However, in the interpretation, the cited data cannot be solely referred to as expenditures on culture since they also include expenditures relating to recreation. Using data aggregated in this regard, it is not possible to deduce how much the share of monthly expenditures in 2020 on cultural products and services alone actually declined nor how this share looked in previous years. However, it can be pointed out that due to the lockdown in early 2020, household expenditures decreased by 30.9% year on year, and the research conducted in the summer of that year showed that 80% of consumers participated in cultural events less frequently [a].

Other data sets of Statistics Poland [c] make it possible to state that when it comes to the average yearly amount of expenses per capita in a household on cultural use items, they were down from PLN 364.68 in 2019 to PLN 306.84 in 2020 (decrease by 15.86%). This confirms the magnitude of the phenomenon identified on the basis of total average spending on culture and recreation. However, a greater scale of the collapse in the participation of Poles in the cultural offer is presented by the data on such expenditures incurred on entry fees to theatres, music institutions and cinemas, that is, relating to participation in organised forms of cultural events. In this case, the average annual expenditure per capita in the household in 2019 amounted to PLN 36.6, and only PLN 14.88 in 2020. This means a decrease in these expenditures by as much as 59.34%. The share of these expenditures in the portfolio of household expenses on culture amounted to 9.97% in 2019 and only 4.85% in 2020.

It is worth emphasising that by the end of the first quarter of 2020, more than half of local and government cultural institutions had already faced tremendously negative effects of the pandemic. One in four (25%) estimated that business revenue had decreased by 50-59%, and one in twelve (more than 8%) estimated the decrease to be more than 90% [h]. Interestingly, the first lockdown in Poland was introduced on March 16 (the sanitary regime was gradually eased over the following months), and the first confirmed case of the disease occurred in early March (March 4, 2020, to be exact). This may mean that the demand for cultural services decreased already at the beginning of the year in the face of the information about the pandemic spreading worldwide. When looking at the course of the year, it can also be stated that the outstanding arrears of the art industry increased by PLN 2.2 million to the level of PLN 8.5 million between March 2020 and March 2021 [i]. The situation was, of course, not without its influence on the material standing of the people of culture. The results of the research conducted at the end of 2020, whose subject were theatre artists, showed that 32% of them admitted that in order to support themselves, they needed to avail themselves of financial support provided by their relatives, whereas 70% of them regards their professional situation as bad or very bad [d]. However, other sources

of information stated that music scene actors declared that due to pandemic restrictions, their earnings decreased by 77% in the first year of restrictions compared to the pre-pandemic level - from the average of around PLN 6,836 gross to around PLN 1,553 gross.

The professional situation of artists in connection with the Covid-19 pandemic once again opened a discussion in the environment of employees of cultural institutions on the failure of the system of supporting culture, including artists themselves (e.g., within lack of clarification of benefits for the art community and lack of social security) [f]. However, it should be noted that already in March 2020, the Ministry of Culture and National Heritage began to develop solutions that could provide the world of culture with compensation for the suspended or limited artistic activity related to lockdown or other restrictions during the national epidemic emergency. The value of this aid channelled to the cultural sector through a multitude of parallel programmes in 2020 was estimated at as much as PLN 6 billion [g]. However, the aid could be used mainly only at the end of that year.

Conclusions

The analysed data on the number of organised cultural events and their participants in Poland in 2020 clearly indicate that with the introduction of the epidemic state, the economic standing of cultural institutions and artists/people working in the cultural industry themselves must have deteriorated significantly. This is also illustrated by the data on the estimates of the decline in cultural institutions' revenues from their activities. Changes in the structure of consumer expenditures of Polish citizens as well as their values related to cultural products/services indicate, in turn, that the situation could not improve quickly after the first easing of the sanitary regime in mid-2020. Even one year later (mid-2021), the debt of the art industry remains at an elevated level. Taking into account these findings, as well as broader views expressed by representatives of the cultural industry, it can be concluded that the first months after the introduction of the lockdown in 2020 were economically disastrous for them. At the same time, the financial situation of cultural institutions subject to the central or local authorities improved significantly after the aid funds had been disbursed by the government.

The obtained image of the impact of the first wave of the Covid-19 pandemic on the economic standing of the Polish cultural industry is saddled with imperfection resulting from the used inductive method based on the analysis of data and information from selected sources. The subject of further research may be the issue of a detailed identification of the reasons why Polish cultural institutions already in the first quarter of 2020 spoke of a significant decrease in revenues from their activities. Indeed, it was not until March 2020 that an epidemic in Poland was announced, and this raises the question of whether the discussed decline in revenue was caused by the specifics of the industry activities in Poland or by the already changing consumer decisions of Polish citizens in the face of the information about the pandemic in the world.

In the light of the obtained research results, arising both from the analysis of quantitative data and the conducted literature analysis, it is also possible to outline issues that may become the subject of separate research tasks. Firstly, in the perspective of the Polish cultural industry, it is possible to recognise the directions and scope of modification of modes of action during the pandemic, especially within the so-called realisation of the mission of cultural institutions. What is more, the problem may be connected, as it appears, with the issue of social responsibility and relationship with the local community. These issues also often appear in the deliberations of international researchers. They are also related to the model of relations between the cultural industry and the public sector in given countries. Secondly, it is possible to refer to the role of the cultural industry in the social and economic life in Poland and thus also determine the position of the people of culture and the economic problems they have to contend with. This issue is significant in the context of the Polish cultural industry since artists/employees of the cultural sector in Poland have been informed about specific problems related to remuneration or social insurance for many years. In the pre-pandemic period, the Polish creative community also agitated for the implementation of the so-called reprographic fee that could solve some of these issues. This issue, in turn, presents the Polish political, legal and economic context of the functioning of the cultural industry. Bearing this in mind, potential considerations should take into account the relationship of the

Polish cultural industry with the public finance sector, as well as socio-political mechanisms regarding legislation.

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OPPORTUNITIES FOR THE DEVELOPMENT OF INTERNATIONAL COOPERATION FOR PROFESSIONAL ORCHESTRAS

Jelena Budanceva[1], Sabine Soida[2], Lasma Sondore[3]

[1]EKA University of Applied Sciences, Riga, Latvia, jelena.budanceva@gmail.com

[2]Orchestra RĪGA, Riga, Latvia, sabine.soida@riga.lv

[3]Orchestra RĪGA, Riga, Latvia, lasma.sondore @riga.lv

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Abstract

Research purpose. Due to the COVID pandemic, the culture and leisure industries were affected by many restrictions and canceled projects and events. Possibly cultural sector is one of the most affected by COVID-19 and one of the latest to recover from the pandemic restrictions (Radermecker, 2020). This situation changed not only the consumption habits of the cultural events attendees' but also stopped many projects, both national and international forcing cultural institutions, including the sector of professional music, to find new solutions for concert activities locally and new possibilities for development. The orchestra RĪGA used this time to review the area of international cooperation and to find out how to look effectively for partners abroad. The purpose of the study is to determine how the professional orchestras can identify potential partner countries and which aspects should be taken into account in order to ensure sustainable and successful international cooperation in the field of classical music.

Design / Methodology / Approach. The study used empirical research methods: questionnaires and in-depth interviews, as well as modeling on international cooperation on the basis of Hofstede's cultural dimensions. In total 149 musicians of three Latvian professional orchestras took part in the survey. Five in-depth interviews with the musicians with international experience and orchestra managers were conducted.

Findings. Intercultural differences must be considered to promote international cooperation, so the authors conclude that with the help of Gert Hofstede's cultural dimensions theory, it is possible to assess the potential cooperation opportunities and threats of countries by comparing them. After in-depth interviews with experts and the analysis of the survey, it can be concluded that all respondents emphasize the need to develop a strategy for the promotion of international cooperation for Latvian professional orchestras. The results of the questionnaire show that the musicians of all 3 Orchestras consider that specific countries of international cooperation were named - Lithuania, Estonia, Denmark, Sweden, Norway and Germany, which is in line with expert advice and the results of Hofstede's 6-dimensional analysis.

Originality / Value / Practical implications. Based on the research, both empirical and theoretical, a model for international cooperation for professional orchestra was developed. The model consists of 3 aspects – existing cooperation on the city-level (partner-cities), countries which are closer to Latvia in according to Hofstede's 6-dimension model and personal contacts of musicians and music managers.

Keywords: culture management; international cooperation; culture diversities; professional orchestras

JEL codes: Z10

Introduction

Due to COVID pandemic, the culture and leisure industries were affected by many restrictions and cancelling projects and events. Possible cultural sector is one of the most affected during COVID-19 and one of the latest to recover from the pandemic restrictions (Radermecker, 2020). This situation changed not only consumption habits of the culture events attendees, but also stopped many projects, both national and international forcing cultural institutions, including the sector of professional music, to find new solutions for concert activities locally and new possibilities for development.

The rapid development of technology and communication tools has significantly strengthened the international environmental research and management capabilities. Much can be said about the formation of international cooperation as a phenomenon of the 21st century, but the promotion of international cooperation in the field of professional music as the main object of research has certainly not been among the research conducted in Latvia.

Latvian professional orchestras need to establish international cooperation, but this is complicated by limited financial resources and different forms of governance and administrational complicates. International cooperation is necessary for the development of professional orchestral culture and for the promotion of the prestige of Latvian culture in the world.

The development and promotion of international cooperation would open a new perspective for Latvian professional orchestras on the development of a modern orchestra, the improvement of professional and artistic quality, as well as the expansion of the scope of activity beyond the borders of Latvia.

The main research question is: Which aspects should be taken in account by establishing the international cooperation in professional music field?

The objective of this research is to explore the potential countries for international cooperation for professional orchestras and to develop a model for determining such choices of partner-countries.

The tasks are:

1. to investigate the situation with Latvian professional orchestras and their international cooperation;
2. to analyze the literature by choosing a theoretical framework for identifying potential partner countries;
3. to conduct a survey of professional musicians on the need and possibilities of international cooperation;
4. to conduct interviews with industry on potential aspects of international cooperation and recommended countries;
5. based on the case of the orchestra Riga, to determine the role of normative documents in selecting partner countries;
6. to identify potential cooperation for the state orchestra in Riga;
7. to establish a general model for the selection of partner countries for professional orchestras.

In order to succeed in international cooperation by restricted financial sources and luck of public support, it is necessary to develop a model that will help to choose most corresponding countries for possible cooperation.

The current situation suggests that it would be necessary to study the possibilities of international cooperation and develop a model how to find international partners for orchestra RIGA. The orchestra RĪGA used this time to review the area of international cooperation and to find out how to look effectively for partners abroad.

Peter Bendixen writes that orchestras essentially represent the performing arts industry. Classical performing arts works with artistic ensembles and collaborators (guest directors, guest conductors, soloists, artists, etc.) whose work (rehearsals) and performances (public appearances) require a significant number of coordinating and supporting support services (technical staff, administration, service, workshops, etc.) and thus the corresponding costs (Bendixen, 2008).

There are in total six professional concert orchestras in Latvia:

- 2 symphony chamber orchestras (State Chamber Orchestra Sinfonietta Riga and Baltic Chamber Orchestra Kremerata Baltica);
- 3 symphony orchestras (Latvian National Symphony Orchestra, Liepaja Symphony Orchestra, Latvian National Opera and Ballet Orchestra);
- 1 brass symphony band (Orchestra "RĪGA").

There are also two professional military wind orchestras, which perform only the functions of state

military orchestras and are not included in the professional concert orchestras - the National Orchestra of the Republic of Latvia and the Latvian National Armed Forces Headquarters Orchestra.

The orchestra "Riga" is the only professional wind orchestra (symphonic band) not only in Latvia, but in the whole Baltics.

An overview of the forms of funding, scale and international cooperation of these orchestras can be found in Table 1.

Table 1. Professional orchestras in Latvia – an overview (Source: author's collection, 2021)

Name	Founded	Profile	Financing	Musicians	International cooperation
Orchestra "RĪGA"	1972	Symphonic Brass orchestra	Rīga municipality	48	Irregular; no strategy. 2019-2021 – just 1 guest artist
Liepaja Symphony Orchestra	1881	Symphonic orchestra	Ministry of culture, Liepaja municipality	≈100	Irregular; no strategy Stopped due COVID
Latvian National Symphony Orchestra	1926	Symphonic orchestra	Ministry of culture	≈90	Regular; no strategy, 2019-2021 – quest in Tallinn
Latvian National Opera and Ballet Orchestra	1918	Symphonic orchestra	Ministry of culture	>100	Regular; strategy. Stopped due COVID
State Chamber Orchestra Sinfonietta Riga	2006	Symphonic chamber orchestra	Foundation „Sinfonietta Rīga"; Ministry of culture	33	Regular; no strategy. Stopped due COVID
Baltic Chamber Orchestra Kremerata Baltica	1997	Symphonic chamber orchestra	Ministries of culture of Latvia, Estonia, Lithuania	20	Regular; no strategy 2019-2021 – concerts in 5 countries

Latvia also has a tradition that allows the contribution of professional composers, poets, and conductors to be combined with the direct, natural, immediate desire to sing and elemental music of a large mass of singers, which resonates in thousands of listeners - a phenomenon that has survived only in the Baltic States. Performances based on such traditions could also be interesting for foreign viewers.

There are enough players in the field of Latvian professional music who are able to keep the Latvian professional music culture at a high level by cooperating with both Latvian and foreign artists. The activity of Latvian professional music also closely interacts with the activity of Latvian amateur art in the field of music, which is of really high-quality and at a competitive level. In order to bring these musicians to the international stage, organizational initiatives are needed to arrange and justify the goals and opportunities, and partner countries of international cooperation that have so far not deserved attention.

Literature Review

The international cooperation means creating added value and more opportunities to the locally developed activities at an international level through international cooperation and interaction channels such as agreements, strategies, and cooperation systems. International cooperation is able to:

1. promote innovation-related human capital for the acquisition of new skills and knowledge;
2. facilitate the search for the necessary resources to support innovation at a national level;
3. benefit from international networks and market knowledge;
4. find wider markets for new innovative products or services (Giannopoulos & Munro, 2019).

As Kathrin Koster mentioned, unlike standard projects, international projects usually involve foreign stakeholders, which means also that international projects tend to be riskier and more uncertain than local projects (Koster, 2009).

The work of cultural managers in cultural organizations increasingly involves international aspects of cooperation, which is a direct result of both increasing migration and diverse funding programs aimed specifically at fostering networks between European cultural organizations (Henze, 2018).

For orchestras that are already in a difficult financial situation, it is especially important to find the "right" international partners right away and not to waste time and limited resources on errors and trials.

As Lientz and Rea pointed out, there are many factors, differing international cooperation from standard activities:

1. cultural and social differences in companies;
2. cultural and social differences between and within countries;
3. diversity of languages and dialects;
4. religion;
5. legal, regulatory, and statutory requirements;
6. differences in the level of technological development in different areas;
7. diversity of infrastructure;
8. time zone differences (Lientz & Rea, 2015).

Complicity of international projects and international cooperation determines the need for strategic planning in this area. As Taylor notes, a well-designed strategy provides access to higher productivity, culture, empowerment, and overall efficiency (Taylor, 2016). For this purpose, culture and music sectors should also start with different forms of environment analyses (as Pest, Pestel, Swot, Porter model and so on) and proceed with setting action plans and priorities. Pre-defining of potential international partners saves time, eliminates ineligible offers, and allows to achieve goals more specifically.

For international projects and cooperation not only additional knowledge and skills are required, but also the ability to adapt to different factors, including cultural differences. Understanding cultural differences is also the key to a successful international project. A very important factor is the project manager's ability to communicate with the project team a relevant foreign language, which is a particularly important specialized skill for international project managers (Koster, 2009). Everything from culture to technical standards is diverse in international activities, which is what makes this area so challenging (Grisham, 2010). Choosing international markets - usually markets in close geographic proximity are chosen for cooperation - turns the question of where to expand into a question of whether to expand into a neighboring market or not (Hollensen, 2017).

With international cooperation and the growth of projects around the world, cultural organizations are playing an increasingly important role in this area. Jürgen Rothlauf pointed out, that organizations need to discuss the necessary changes in global business and to realize that international business, as well as other environmental factors such as geographical distance, legal regulations, etc., are also directly related to culture (Rothlauf, 2014). It is not really possible to develop a general approach to different cultures, which would be applicable to all different cultures, so it is important to evaluate national variables in addition to the cultural background each time in advance (Lientz & Rea, 2016).

Different approaches can be used to define significant cultural differences, mentioning just some of them:

- Seven basic elements of culture: language and communication, education, religion, aesthetics, social institutions, behavior, values, and forms of entrepreneurship. All of these elements have an equal impact on the management of cultural diversity, but this depends to a large extent on each culture individually (Siedenbiedel, 1997);
- Human universals of Donald Brown and cultural universals of Joseph Murdock, describing elements, patterns, traditions, or institutions that are common for human cultures and social life worldwide (Murdock, 1957; Brown, 1991);

- Theory of six cultural dimensions (Hofstede et al., 2010);
- Culture mapping via communicating, evaluating, leading, deciding, trusting, disagreeing, scheduling, persuading dimensions (Meier, 2014).

Taking one of these theories into account when planning the cooperation on international level and understanding the role of intercultural entrepreneurship is essential for successful project managers working with international projects. To succeed in this task tools and working methods are needed that can enable people to develop sufficient competences in an intercultural context (Koster, 2009).

Analyzing the importance of cultural differences in promoting international cooperation, the authors chose to make a comparison of countries using Gert Hofstede's theory of cultural dimensions. This theory was chosen because Hofstede`s theory is also providing a digital tool - country comparison graphs, which allows the correlation of all six dimensions with each country of the world, as well as to pick any set of countries, and display any set of dimensions of culture in 2D, plus color shades for a third dimension (Hofstede, 2022). By using country mapping tool of American professor Erin Meyer, only 67 countries can be measured, and Latvia is not one of them (Meyer, 2022).

Geert Hofstede, a Dutch cultural anthropologist, was the first to talk about the differences in the psychological culture of each nation and raised six key issues (originally in 1980 – 4), that the public must accept in order to organize it. These are called cultural dimensions. Each is expressed on a scale from 0 to 100:

1) power distance - the extent to which there is inequality in human relations; here, status is important, both for its bearer and for those involved;
2) individualism - collectivism on the opposite side;
3) uncertainty avoidance - to what extent it is important for an individual to avoid the unpredictable and the unknown;
4) masculinity - the opposite is feminism; the extent to which the former's or the latter's views in public life and interpersonal relationships are superior;
5) long term orientation (long-term values and relationships) - on the opposite side of the scale there is a short-term orientation; the extent to which behavior and planning depend on one feature or another;
6) indulgence – means the attitude to inner freedom; feeling that it is good to do things you what, importance of friends, free time, enjoying life (Hofstede et al., 2010).

With regard to international cooperation specific to the field of culture, it should be noted that managers in the economy are seekers and doers; managers in culture and art, on the other hand, are seekers for performers (Bendixen, 2008). The approaches to expanding culture organizations and business companies to foreign markets also are different; in the business environment it is typical to begin with a market research, but in culture sector it is common to start with an inventory of personal contacts.

As Henze points out, a distinction should be made between international cultural cooperation and global art management, such as Hollywood films, which would mean similar approaches around the world. Basically, in most situations in the international context, it would be most useful to develop knowledge about specific regions or countries (Henze, 2018).

Methodology

The purpose of the study is to determine how the professional orchestras can identify potential partner-countries and which aspects should be taken into account in order to ensure sustainable and successful international cooperation in the field of classical music.

The following tasks have been set to achieve as the research goals:

1) to study and analyze the theoretical literature on the importance of cultural differences in planning international cooperation;
2) to analyze the organizational forms, activities and the current international cooperation of the

Riga Orchestra and other Latvian professional orchestras;

3) to analyze the national or local documents that determine the activities and goals of the orchestra RĪGA;
4) to conduct a survey of the orchestra musicians and representatives to determine the need for international cooperation and desired countries;
5) to develop recommendations and guidelines for the development of a strategy for the promotion of general and international cooperation of Latvian professional orchestras;
6) to develop a model for the foundation of international cooperation both theoretical for the symphony orchestras and practical with a list of suggested partners for the orchestra RĪGA.

For data gathering and the theoretical basis of the article, a review of relevant literature was completed, as well as an analysis of different internal (annual reports of 4 professional orchestras - Orchestra „Riga", Latvian National Symphony Orchestra, chamber orchestra „Kremerata Baltica" and Liepāja Symphony Orchestra) and external documents (Cultural strategies of Riga City Municipality for 2017-2030). Many theoretical concepts to determine the success or problems of potential cooperation between different countries have been explored, taking into account culture dimension of the study object - professional orchestras. In choosing the methodology for this study, one of the criteria was the choice of a method that would also allow the compatibility of different countries to be demonstrated in a transparent and accurate way with the help of an appropriate digital tool. As Latvia is not included in the Culture map of Prof. Erin Meyer, the authors chose Hofstede's theory and the appropriate tool for modelling international cooperation for professional orchestras.

The study used empirical research methods: questionnaires and in-depth interviews.

In-depth interviews with industry experts were conducted to analyze previous experiences of international cooperation of orchestras and recognize current opportunities of international cooperation of professional orchestras in Latvia. 5 professionals, who represented three different Latvian professional orchestras, were interviewed individually, via emails correspondence.

A survey of three professional orchestra musicians (n=149) – Orchestra „Rīga", Latvian National Symphony Orchestra and Liepāja Symphony Orchestra – was carried out in order to find out the opinions regarding the necessity of international cooperation and its development on the professional music scene of Latvia. Period of data collecting for questionnaire and interviews was from 25.10.2021 to 1.12.2021. The data analysis and interpretation took place in January 2022.

Results

Document analysis:

After analyzing the activity reports of professional orchestras for the last three years, the authors concluded that the Latvian National Symphony Orchestra has the most bride activity report, where the number of concerts of the orchestra, the established cooperation, international cooperation, and possible operational difficulties, for example, in connection with the Covid-19 pandemic, are listed. The activity reports of orchestra Riga are available only in the closed system of Riga city municipality and show the financial data, concert data as well as international cooperation. The activity reports of the Liepāja Symphony Orchestra show the data of the financial and accounting report, but the concert activity is not analyzed. The activity reports of the Kremerata Baltica Chamber Orchestra analyze the thematic programs, the list of concerts, the most significant compositions performed by the composers, the financial reports, and the international cooperation.

Upon an in-depth analysis of the orchestra "Riga", main factors can be pointed out in why that it is the only professional brass orchestra in Latvia, founded in 1972 and financed only by Riga city council (except some projects submitted to other fundings). In the orchestra there are 49 musicians, one conductor, five administrative employers. The orchestra is the founder and the implementer of the music festival WINDSTREAM. The orchestra does not have neither international strategy, nor ordinary development strategy, but does practice international cooperation - mostly by inviting international

musicians to the concerts and festival (four people) and giving guest concerts abroad (one person) during the last five years.

The only document that includes the goals and operational processes of the Riga Orchestra (core activities, support, and system management) is the "Management system of the Professional Wind Orchestra "Riga" of the Riga City Council Culture Department" developed in 2007 and is currently outdated.

The vision of the orchestra is *the orchestra "Riga" currently presents itself as a concert orchestra, which performs on Riga City Festivals and nationally important days, gives concerts in Riga and Latvian concert halls and Riga Dome, invites young listeners to conversations about music in the Splendid Palace cinema, plays compositions of various styles, always looks for the new and undiscovered in music* (Riga Orchestra, 2021).

It has to be highlighted that one of the most important problems for orchestra RĪGA is the attraction to Riga city in the sense that the orchestra is perceived as a municipal orchestra, which must first "serve" the people of Riga.

Therefore, the analysis of Cultural strategies of Riga City Municipality for 2017-2030 was made. Main conclusion is that the strategy of Riga municipality does not include a separate strategic plan for professional music, but mentions the availability of professional art, including the need to establish an acoustic concert hall in the city of Riga.

In this document, the international cooperation is mentioned in the Point 3.9, with reference to the preferred cooperation with 29 Riga twin cities (for now the cooperation with twin cities in Russia and Belorus is stopped).

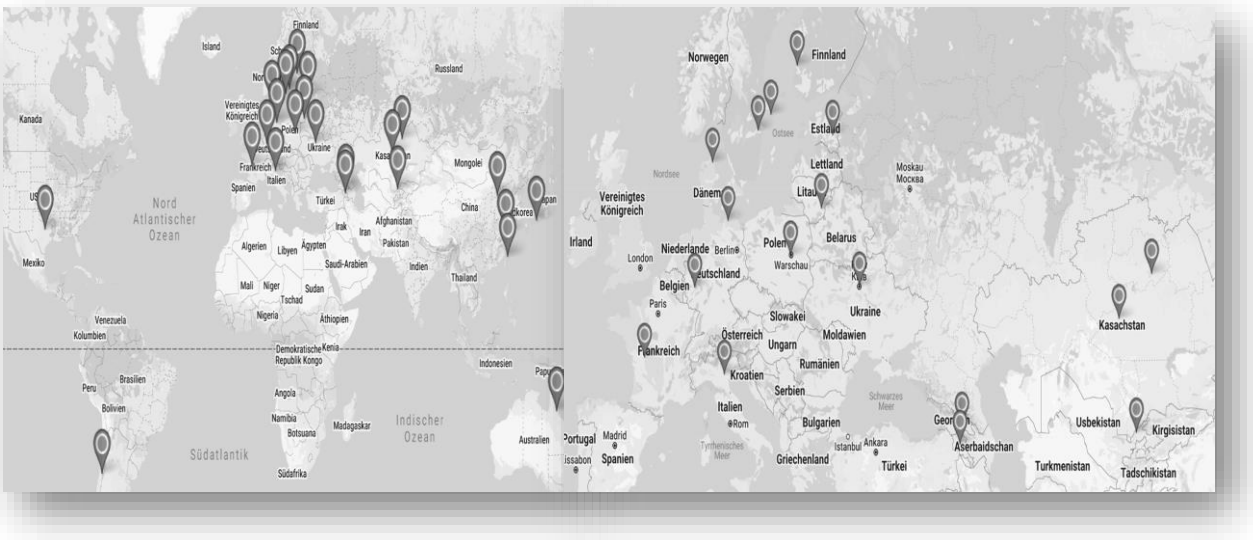

Fig. 1. The world and Europe map with twin cities of Riga (Source: the autors collected, 2021)

As the image shows, 14 of 29 twin cities are located in the European countries, two are in Sweden, in Kazakhstan and in China.

Modelling of cooperation based of G. Hofstede's cultural dimensions:

The authors of the paper created a comparison between Latvia and countries representing these 14 twin cities for the international cooperation of the Riga Orchestra according to G. Hofstede's, in order to find out which of these countries would be easier for Latvia to cooperate with and where the biggest problems and complications could arise.

For the modelling 14 countries from Riga twin cities list were chosen: Taiwan, Estonia, the United States, Poland, Georgia, Lithuania, Kazakhstan, Armenia, Australia, France, Germany, Russia, Ukraine,

and Japan. The criteria for this choice wereas follows: the country has a professional orchestra; the country has a concert place for a brass orchestra; from financial and political point of view it is possible to invite a guest artist from the country. Considering the fact that the Riga Orchestra has its own specifics - a professional wind orchestra - the authors of the work chose for potential collaboration countries that have either a professional wind orchestra or another type of professional orchestra, as well as world-renowned solo artists or conductors. These 14 countries were examined by all six dimensions with a digital tool https://geerthofstede.com/country-comparison-graphs/ (Hofstede, 2021)

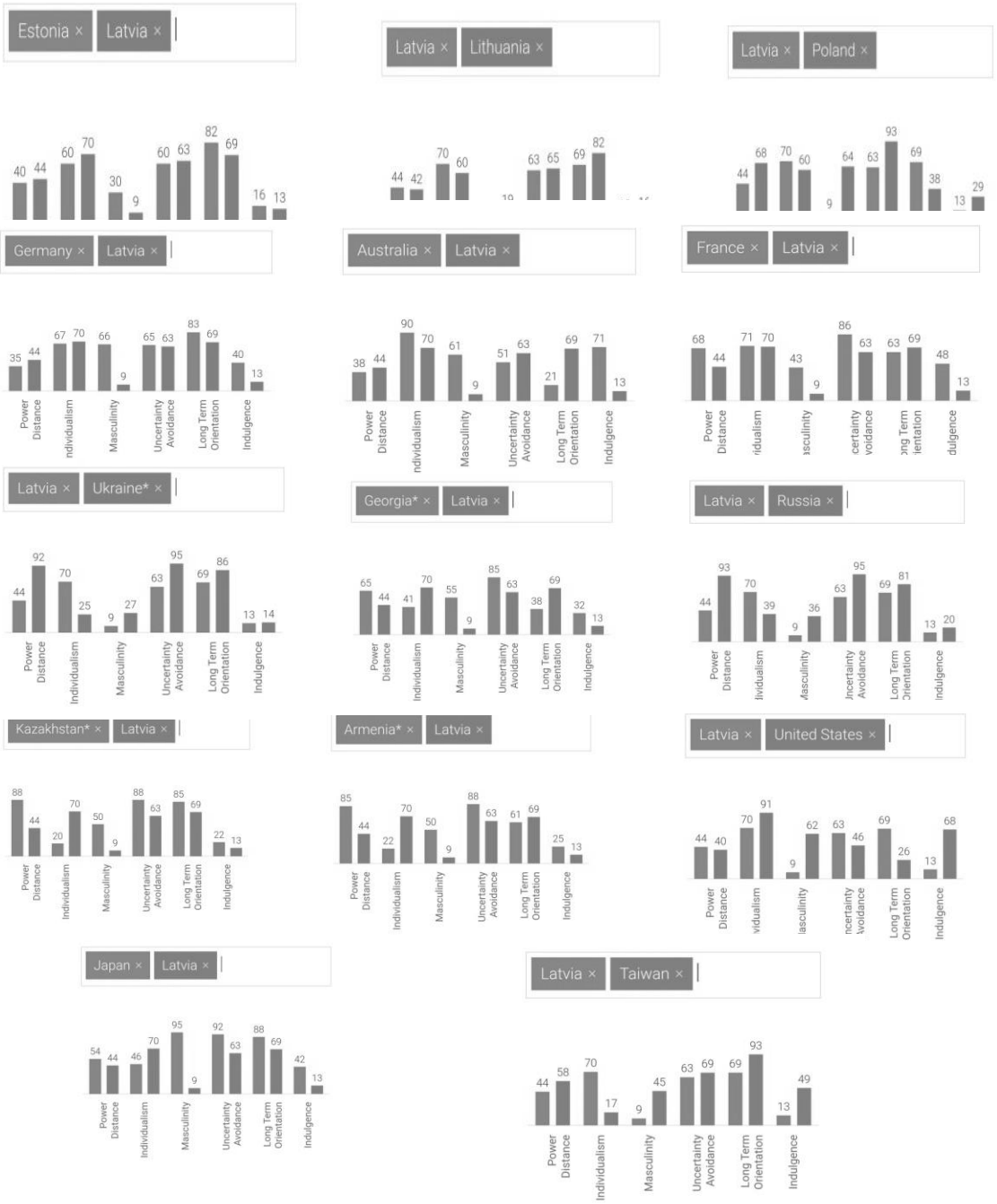

Fig. 2. The comparison of Latvia and other 14 countires by 6 dimensions of G.Hofstede (Source: autors collected, 2021)

After comparing G. Hofstede's cultural dimensions, the authors can conclude that the easiest cooperation partners for Latvia could be with Lithuania, Poland, Estonia, and Germany, because with these countries

Latvia has an equal level of cultural dimension of distance, individualism, and orientation towards long-term values. These factors indicate that countries would be able to understand each other well, find common ground and build professional and long-term cooperation. Problems in cooperation with Latvia could arise with Armenia, Kazakhstan, Ukraine, and Russia, as there are mostly different levels in all dimensions, but these three levels are especially different, which were equal to the four countries mentioned above. Problems could arise in mutual communication, intercultural understanding and interaction, and long-term cooperation.

In-dept interviews:

In-depth, partly structured interviews were conducted in person with professional orchestra musicians with international experience, producers and project managers, n=5.

Answering the question about necessity of international cooperation and planned partner countries all five respondents answered that it is very important to plan international cooperation and choose partner countries not accidentally but on the basis of various criteria and in advance. They noted that it could be region, where such professional symphony orchestras are less active and where there would be opportunities to express themselves with some new offer, or otherwise - where there are many such orchestras, and there is some kind of paved path.

Answering the question about country or region, with which international cooperation should be established, representatives mentioned firstly the Baltic countries and other countries like Finland, Russia, Poland, other Scandinavian countries, and Germany, Netherlands, as well as Far East countries as Japan.

Questionnaire:

During five weeks from 25.10.2021 to 1.12.2021 149 musicians from three Latvian professional orchestras were surveyed: 46 of the orchestra RĪGA, 62 of the Latvia National Symphonic orchestra, 41 of the Liepājas Symphonic orchestra.

The questionnaire consisted of 4 closed and three open-ended questions.

Initially, the authors wanted to find out how many of professional musicians have an international experience. The results show that 83% had had an experience of international cooperation which means that respondents can be considered competent in the matters of international cooperation.

In the next question, the authors wanted to find out the opinion of professional orchestra musicians about whether the orchestras need international cooperation at all. The majority or 95% of respondents considered such cooperation necessary, only 5% of respondents said that international cooperation among professional orchestras was not relevant.

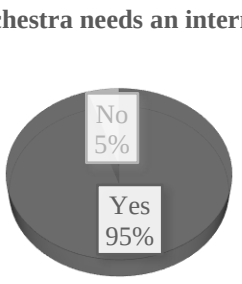

Fig. 3. The need for international cooperation for professional orchestras (Source: the autors collected, 2022)

When asked about the need to develop a strategy for promoting international cooperation with orchestras, 87% of respondents believe that such a strategy for international cooperation needs to be developed (see Figure 6). The authors agree with this opinion because after analyzing the documents,

they concluded that these orchestras have never had such a strategy, so it is difficult to plan opportunities for international cooperation in terms of financial, artistic and time resources.

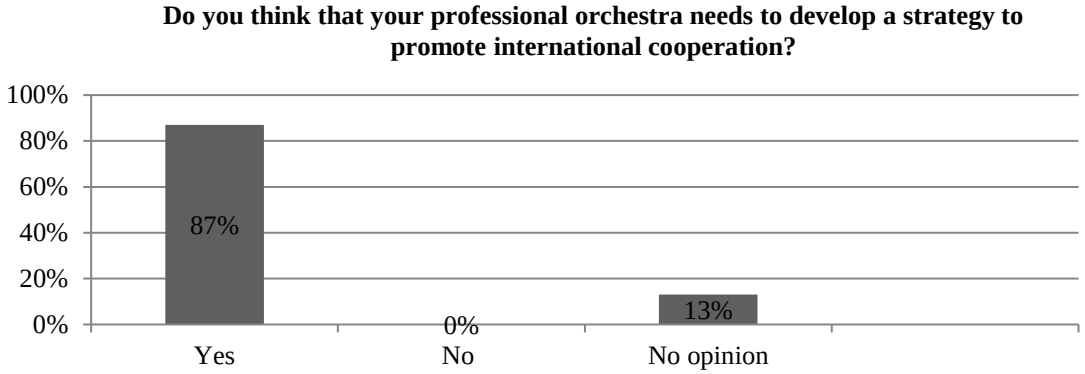

Fig. 4. The need for strategy of international cooperation for professional orchestras (Source: the autors collected, 2022)

In the next question of the questionnaire, "Do you think that the current international cooperation of the orchestra is sufficient?", 33% of respondents marked that the current international cooperation was sufficient, but 55% of respondents said that international cooperation was insufficient for the orchestra. The authors of the work can fully agree with this opinion, because after the literature study and the analysis of the documents they learned that all these professional orchestras have had international cooperation during the last seven years, but it has been relatively small and without developing an up-to-date cooperation strategy.

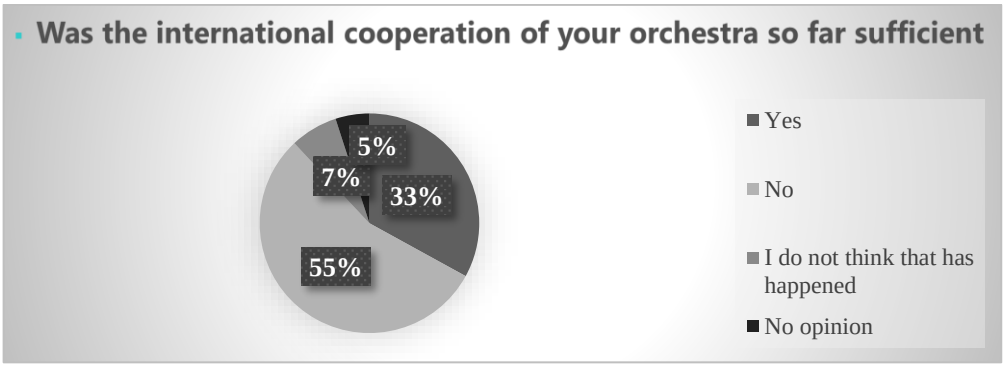

Fig. 5. The success of international cooperation of professional orchestras (Source: the authors collected, 2022)

7% of respondents believe that their professional orchestra has not had international cooperation at all; the authors cannot agree because after a document analysis it was found that orchestras have had at least rare and minor international cooperation, such as guest conductors in Latvia or cooperation trips to the Baltic States. 5% of respondents do not have an opinion on this issue.

In the question "What do you think is the international cooperation of a professional orchestra?" respondents provided specific answers: visits of guest conductors or foreign guest soloists both in Latvia and abroad, participation in foreign competitions, participation in foreign festivals, cooperation with foreign ensembles both in Latvia and abroad, orchestra performances and concert tours abroad.

In the answers to the question "Do you think there is any other professional orchestra in Latvia or in the world, that seems to be a good example in building international cooperation?" respondents mentioned such examples of best foreign orchestras, the Dutch wind orchestras, the Vienna and London Philharmonic Orchestras, The Tokyo Kosei Wind Orchestra, the Royal Symphonic Band of the Belgian Guides, The Case Western Reserve University Symphonic Winds, the Denis Wick Canadian Wind

Orchestra, the British Orchestra. Following open question “With which countries have you had positive cooperation experience?” confirmed the trends expressed in the interviews with industry representatives - most mentioned were Baltic countries, Germany, Scandinavia, Japan and other Far East countries, as well as theUSA.

Modelling of potential cooperation countries

Based on four research methods: document analysis, modeling of partners with Hofstede’s cultural dimensions, in-depth interviews and interviews of professional musicians, a list of countries with which brass orchestra Rīga could have successful cooperation was created.

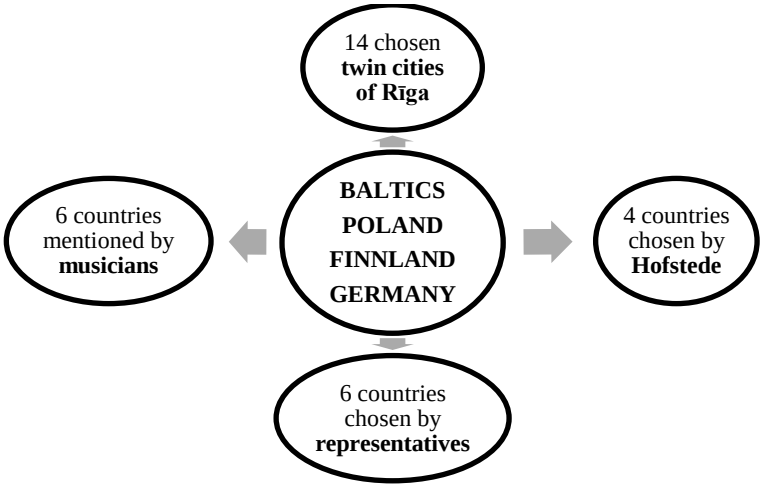

Fig. 6. The model for choosing international partner countries for the orchestra RIGA (Source: the authors collected, 2022)

When compiling the list of potential partner countries for the Riga orchestra, the authors singled out three components from this particular offer, that are relevant to most culture industries and could become a support for culture organizations in choosing partner countries for international cooperation.

The three pillars needed to establish a scientifically and empirically sound basis for international cooperation are the documents governing the activities of the organization at the national and local levels; existing experience and contacts of the organization's artists, team and industry representatives and modeling of national compatibility according to one of the models, recommending G. Hofstede's six cultural dimension model or Country culture map by Erin Meyer, if the selected countries are included.

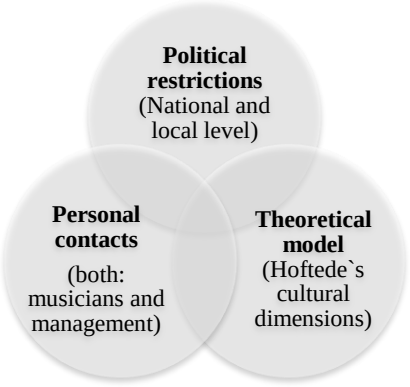

Fig. 7. The model for choosing international partner countries for professional orchestras (Source: the authors collected, 2022)

The model is created taking into account specifics of culture field, especially the role of personal contacts and culture diversities. To create this model the document analysis, surveys and data modeling are necessary.

Conclusions

1. Intercultural differences must be considered in order to promote international cooperation in any field. One of the most popular and also "user friendly" models to understand countries' similarities and differences, as well as to calculate the cooperation between different countries, is Gert Hofstede's cultural dimensions theory.

2. Unlike the business management approach, where market research is conducted to start working in emerging markets, in the field of music it is important to be aware of the experience of your organization's employees in international cooperation, as well as existing contacts. Instead of market research, professional orchestras should study the distribution of certain music in the country, the existence of concert halls and their suitability for the genre, as well as the distance to the country in the context of financial constraints. Acting as a public orchestra, even for international cooperation, it is important to take into account public strategies and documents.

3. After in-depth interviews with experts and analysis of the survey, it can be concluded that all respondents emphasize the need to develop a strategy for the promotion of international cooperation for Latvian professional orchestras.

4. The results show that the musicians of all three Orchestras as well the experts consider certain countries for international cooperation – primarily neighbors (Lithuania, Estonia) as well as Scandinavian countries, like Finland, and Germany.

5. Based on the research, both empirical and theoretical, a model for international cooperation for the professional orchestra RIGA was developed. The model consists of three aspects – existing Riga cooperation on the twin city-level; countries which are closer to Latvia in accordance with Hofstede's 6-dimension model and personal contacts of musicians and music managers.

6. For the successful international cooperation at least three aspects have to be regarded – political issues; theoretical models showing the differences and similarities of cooperating countries; personal opinion, experience and contacts of artists and managers.

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