



**PROCEEDINGS OF  
THE ANNUAL  
SCIENTIFIC BALTIC  
BUSINESS  
MANAGEMENT  
CONFERENCE 2022**

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*BUILDING STRATEGIC RESILIENCE IN TIMES OF UNCERTAINTY*  
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BA SCHOOL OF BUSINESS AND FINANCE  
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**BUILDING STRATEGIC  
RESILIENCE IN TIMES OF  
UNCERTAINTY**

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SCIENTIFIC BALTIC BUSINESS  
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2022**

**JUNE 1-3, 2022**

RIGA, 2022

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## THE SHADOW ECONOMY IN THE BALTIC COUNTRIES

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### Abstract.

- **Purpose:** The purpose of this paper is to present the recent findings of the Shadow Economy Index for the Baltic countries. The Index aims to measure the size of the shadow economies in Estonia, Latvia and Lithuania, as well as to explore the main factors that influence participation in the shadow economy. We use the term “shadow economy” to refer to all legal production of goods and services that is deliberately concealed from public authorities.
- **Design/ methodology/ approach:** The Index for the Baltic countries is determined annually based on a methodology developed by Putniņš and Sauka (2015) and using business surveys in the Baltic countries: Latvia, Lithuania and Estonia. The Index combines estimates of misreported business income, unregistered or hidden employees, as well as unreported “envelope” wages to obtain estimates of the shadow economies as a proportion of GDP.
- **Findings:** Our findings show that the size of the shadow economy in Latvia has increased in 2021, reaching 26.6% of GDP (+1.1% compared to 2020). This is the highest indicator of the size of the shadow economy in the country since 2011. The growth of the shadow economy in 2021 is also observed in Lithuania and Estonia. The most important component of the shadow economy in Latvia, Estonia and Lithuania in 2021 are envelope wages, and the amount of envelope wages is still significantly higher in Latvia, which largely explains the differences in the overall shadow economy between the Baltic states..
- **Research limitations:** Survey-based approaches face the risk of underestimating the total size of the shadow economy due to non-response and untruthful response given the sensitive nature of the topic. Our method minimizes this risk by employing a number of survey and data collection techniques shown in previous studies to be effective in eliciting more truthful responses.
- **Practical implications:** Our results suggest that policy makers should reconsider an approach to decrease the shadow economy both in Latvia, Lithuania and Estonia. This is especially important in the context of the current and potential economic development tendencies as affected by the Covid-19 pandemic and Russia war in Ukraine.
- **Originality/value:** This is the first method that draws on surveys of managers and estimates the size of the shadow economy as a percentage of GDP, as well as provides with in-depth insights on the key determinants of the shadow economy. The Index has also been applied in other countries, such as Russia, Ukraine, Moldova, Romania, Poland, Kyrgyzstan and Kosovo.

**Keywords:** shadow economy, Baltic countries, envelope wages

**JEL Classification:** H26, O17, H20, H61.

### Introduction

The aim of the SSE Riga Shadow Economy Index for the Baltic countries is to measure the size of the shadow economies in Estonia, Latvia and Lithuania, as well as to explore the main factors that influence participation in the shadow economy. We use the term “shadow economy” to refer to all legal production of goods and services that is deliberately concealed from public authorities. The Index has been published annually since 2010 to provide policy makers with information for making justified policy decisions, as well as to foster a deeper understanding of entrepreneurship processes in the Baltic countries.

The SSE Riga Shadow Economy Index for the Baltic countries is determined annually based on a methodology developed by Putniņš and Sauka (2015) and using business surveys in the Baltic countries: Latvia, Lithuania and Estonia. This is the first method that draws on surveys of managers and estimates the size of the shadow economy as a percentage of GDP, as well as provides within-depth insights on the key determinants of the shadow economy in the Baltic countries.

Several survey and data collection techniques are used in surveys, which have been shown to be effective in eliciting relatively truthful responses.

The Index combines estimates of misreported business income, unregistered or hidden employees, as well as unreported “envelope” wages to obtain estimates of the shadow economy as a proportion of GDP. This methodology has been also applied to estimate the size of the shadow economy in other countries such as Russia, Ukraine, Moldova, Romania, Poland, Kyrgyzstan and Kosovo.

In this study, the main focus is on estimates of the shadow economy in 2021 and trends covering the period 2009–2021. It also provides evidence about the main factors that influence entrepreneurial involvement in the shadow economy as well as some policy recommendations.

## 1. Method

The SSE Riga Shadow Economy Index is based on an annual survey of company owners/managers in Estonia, Latvia, and Lithuania, following the method of Putniņš and Sauka (2015). The surveys are conducted between February and April of each year and contain questions about shadow activity during the previous two years. For example, the survey conducted in January - February 2022 collects information about shadow activity during 2021 and 2020. The overlap of one year in consecutive survey rounds (e.g., collecting information about 2020 shadow activity in both the 2021 and 2022 survey rounds) is used to validate the consistency of responses.

We use random stratified sampling to construct samples that are representative of the population of firms in each country. Starting with all active firms in each of the three Baltic countries (obtained from the Orbis database maintained by Bureau Van Dijk), for each country we form size quintiles (using book value of assets) and take equal sized random samples from each size quintile. In total a minimum of 500 phone interviews are conducted in each of the three Baltic countries in each survey round. More specifically, in 2022. survey we interviewed 501 respondents in Lithuania and 529 respondents in Estonia. In Latvia, however, 841 respondents were interviewed: at least 100 company managers in construction, wholesale, retail, manufacturing and service industries. This was done in order to get more representative data for each of the aforementioned industries. 2022. survey was implemented in cooperation with Norstat Latvija.

The Index measures the size of the shadow economy as a percentage of GDP.

There are three common methods of measuring GDP: the output, expenditure, and income approaches. Our Index is based on the income approach, which calculates GDP as the sum of gross remuneration of employees (gross personal income) and gross operating income of firms (gross corporate income). Computation of the Index proceeds in three steps: (i) estimate the degree of underreporting of employee remuneration and underreporting of firms' operating income using the survey responses; (ii) estimate each firm's shadow production as a weighted average of its underreported employee remuneration and underreported operating income, with the weights reflecting the proportions of employee remuneration and firms' operating income in the composition of GDP; and (iii) calculate a production-weighted average of shadow production across firms.

## 2. Results and Conclusions

According to our calculations, the size of the shadow economy in Latvia from 2016 to 2018 had an increasing trend: 20.7% of GDP in 2016, 22.0% in 2017 and 24.2% of GDP in 2018. In 2019, there was a slight decrease in the shadow economy in Latvia (23.9% of GDP), while in 2020 the shadow economy grew again to 25.5% of GDP. The data of the latest study show that the size of the shadow economy in Latvia has also increased in 2021, reaching 26.6% of GDP (+1.1% compared to 2020). This is the highest indicator of the size of the shadow economy in the country since 2011, when the shadow economy in Latvia reached 30.2% of GDP.

Our data also show that the growth of the shadow economy in 2021 is also observed in Lithuania and Estonia. Compared to 2020, the shadow economy in Estonia has grown by 2.5%, reaching 19.0% of GDP. In Estonia this is the highest indicator of the size of the shadow economy in the country since 2012, when the size of the shadow economy reached 19.2% of GDP. While in Lithuania the size of the shadow economy increased by as much as 2.8% in 2021, reaching 23.1% of GDP. In Lithuania, this is the highest indicator of the size of the shadow economy since 2009, when we started measuring the shadow economy in Lithuania. Thus, most likely due to the Covid-19 pandemic, the shadow economy has increased in all three Baltic states in 2021. Although the difference between the size of the shadow economy in Latvia and Lithuania is relatively smaller than in previous years, it is still highest in Latvia.

According to our results, the most important component of the shadow economy in Latvia, Estonia and Lithuania in 2021 was “envelope” wages, which in Latvia comprise 46.2% of the total shadow economy (in 2020: 46.9%, in 2019: 44.1%), in Estonia: 42.7% (in 2020: 40.3%, in 2019: 43.0%), but in Lithuania 38.8% (in 2020: 37.7%, in 2019: 36.3%). In 2021, unreported revenues in Latvia comprise 30.0% (in 2020: 29.9%) of the total shadow economy, but the component of unreported employees: 23.8% (in 2020: 23.2%). Unreported employees, in Estonia and Lithuania, respectively, account for 30.0% and 23.5% of the total shadow economy in 2021, while unreported income: 27.2% and 37.7% of the total shadow economy.

Similar to the total size of the shadow economy, in 2021, compared to 2020, the share of the average wage (%) hidden by entrepreneurs from the state, or envelope wages, also increased in all three Baltic states. In Latvia, however, this increase is relatively small, only by 0.3%, with envelope wages increasing to 23.8% in 2021. In Estonia, the amount of envelope wages increased by 3.8%, reaching 17.0%, but in Lithuania by 0.9%, increasing to 16.2%. Thus, the amount of envelope wages is still significantly higher in Latvia, which largely explains the differences in the overall shadow economy between the Baltic states.

An increase in all Baltic countries is also observed in the area of unreported income (profit): In Latvia, the average share of income (%) that entrepreneurs hide from the state in 2021 increased by 0.6%, reaching 18.6%; in Estonia: by 0.5%, reaching 12.1%, but in Lithuania by 1.0%, reaching 16.8%. While in 2021, compared to 2020 the amount of non-disclosure of employees (average % of the total number of employees employed without a contract), slightly decreased in Latvia and Lithuania, respectively, by -0.2%, to 10.7% and by -0.4% to 8.9%. In Estonia, on the other hand, the non-disclosure rate has increased by 1.5% in 2021, reaching 10.5%, the highest level since we started measuring the shadow economy in Estonia.

According to our results, the general level of bribery (the percentage of income paid by companies in informal payments to “get things done”) in 2021, compared to 2020, has increased in all Baltic states. The largest increase is observed in Lithuania, where this indicator has increased by 3.9%, reaching 12.3%. In Estonia, general bribery has increased by 0.6%, reaching 7.0% in 2021, and in Latvia - by 0.9%, rising to 9.2%. The level of

general bribery in Latvia has not been this high since 2014, in Lithuania since 2015, but in Estonia this is the highest indicator since we have been measuring the size of the shadow economy in Estonia. The results of our study also show that in all of the Baltic states, in 2021, compared to 2020, the average % of the contract amount to ensure public procurement has increased. Namely, in Latvia there is an increase of 1.1%, reaching 8.0%, in Lithuania - 2.1%, reaching 7.7%, but in Estonia - 0.1%, with this component of the shadow economy increasing to 4%. The highest level of shadow economy in Latvia is observed in the Riga Region, Kurzeme and Zemgale. In terms of sectors, the highest share of the shadow economy in Latvia is still in the construction sector. If since 2015, the shadow economy in the construction sector in Latvia has decreased (40.0% in 2015, 38.5% in 2016, 35.2% in 2017, 34.1% in 2018, 30.7% in 2019 and 28.7% in 2020), then in 2021 the shadow economy has grown in the sector: to 31.2%. In 2021, the volume of the shadow economy in retail trade in Latvia reached 29.8%, in the service sector: 27.5%, in manufacturing: 25.0%, but in wholesale trade: 24.4%.

In terms of attitudes, companies in the Baltic states are still relatively satisfied with the performance of the State Revenue Service (SRS). On a scale of 1-5, where 5 means very high satisfaction, in 2021, satisfaction with the SRS in Latvia will reach 3.60, but in Lithuania: 3.56. Thus, for the first time since measuring the factor influencing the shadow economy in the Baltic states (since 2010), the level of satisfaction with the SRS in Latvia is higher than in Lithuania. In 2021, satisfaction with the SRS is still the highest in Estonia (3.74), which is a decrease compared to 2019 (3.80) and 2020 (3.76). The results of the research show that in 2021, in Latvia, compared to 2020, the satisfaction of entrepreneurs with the state tax policy has increased: from 2.63 to 2.70. While in Lithuania and Estonia, satisfaction with tax policy decreased from 3.08 to 2.81 and from 3.14 to 3.02, respectively.

The satisfaction of entrepreneurs with the quality of business legislation has slightly increased in Latvia (from 2.96 in 2020 to 2.98 in 2021), but has decreased in Lithuania and Estonia, from 3.03 to 2.89 and from 3.35 to 3.25, respectively. Satisfaction with government support for entrepreneurs in Latvia in 2021 has increased to 2.89 (2.42 in 2019, 2.59 in 2020), while it has decreased in the other two Baltic states: to 2.91 in Lithuania (2.64 in 2019, 2.99 in 2020) and up to 2.51 in Estonia (2.85 in 2019, 2.78 in 2020).

We use regression analysis to identify the statistically significant determinants of firms' involvement in the shadow economy. For the regressions, we use pooled data from the past 11 survey rounds (years), which gives a panel that spans the years 2010-2021 and has a cross-section of approximately 1,500 firms per year. The dependent variable in all regressions is the level of the firm's involvement in the shadow economy. The independent variables are various firm-level characteristics, attitudes, sector dummy variables, region and year fixed effects.

The country dummy variables suggest that during the sample period, the size of the shadow economy is smaller in Estonia and Lithuania relative to Latvia after controlling for a range of explanatory factors, and the differences are statistically significant. Tolerance towards tax evasion is positively associated with the firm's stated level of income/wage underreporting, i.e., entrepreneurs that view tax evasion as a tolerated behaviour tend to engage in more informal activity. The measures of tolerance also serve the important role of controlling for possible understating of the extent of shadow activity (untruthful responses) due to the sensitivity of the topic.

The regression coefficients indicate that the effect of perceived detection probabilities and penalties on the tendency for firms to engage in deliberate misreporting is consistent with the predictions of rational choice models, i.e., the higher the perceived probability of detection and the larger the penalties, the lower the amount of tax evasion and misreporting. The effect of detection probability in particular stands out as being a particularly strong deterrent of shadow activity. This evidence suggests a possible policy tool for reducing the size of the shadow economies, namely increasing the probability of detection of misreporting. This could be done via an increased number of tax audits, whistle-blower schemes that provide incentives to report information to authorities about non-compliant companies, and investment in tax evasion detection technology.

The regression results also indicate that a firm's satisfaction with the tax system and the government is negatively associated with the firm's involvement in the shadow economy, i.e., dissatisfied firms engage in more shadow activity, satisfied firms engage in less. This result is consistent with previous research on tax evasion and offers an explanation of why the size of the shadow economy is larger in Latvia than in Estonia and

Lithuania; namely that Latvian firms engage in more shadow activity because they are more dissatisfied with the tax system and the government. Analysing each of the four measures of satisfaction separately we find that shadow activity is most strongly related to dissatisfaction with business legislation and the State Revenue Service, followed by the government's tax policy and support for entrepreneurs.

Another strong (and statistically significant) determinant of involvement in the shadow economy is firm size, with smaller firms (e.g., those with fewer employees) engaging in more shadow activity than larger firms, although the descriptive statistics suggest the relation may be non-monotonic. The statistically significant coefficient on firm age suggests that younger firms engage in more shadow activity than older firms. A possible explanation for these two relations is that small, young firms use tax evasion as a means of being competitive against larger and more established competitors. The sector dummy variables suggest that firms in the construction sector tend to engage in more shadow activity than firms in other sectors such as retail.

Our results suggest that policy makers should reconsider an approach to decrease the shadow economy both in Latvia, Lithuania and Estonia. This is especially important in the context of the current and potential economic development tendencies as affected by the Covid-19 pandemic and Russia war in Ukraine.

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# USING MACHINE LEARNING TOOLS TO DETECT TAX EVASION IN LATVIA

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**Abstract.** Labor tax evasion is a major policy issue that is salient in many transition and post-transition countries. In particular, in many Eastern European countries the practice of the so called “envelope wages”, i.e., an unreported part of salary that is paid on top of the official wage, is very widespread. In this paper, we use Latvian State Revenue Service’s data on tax audits and firm financial indicators to study labor tax evasion. First, we explore data on audited firms to identify NACE sectors that are most prone to labor tax evasion. Second, we apply machine learning techniques to study whether data-driven approach can be useful to enhance the audit targeting strategy. We train algorithms on the sample of audited firms and show that the best performing algorithms (Random Forest and Gradient Boosting) correctly predict the true type of firm (i.e., tax compliant or tax evading) in 70-71% of cases. The main contribution of our paper is to sketch an approach to detecting tax evading firms, which can be used by the Latvian State Revenue Service to increase tax audit success rate.

**Keywords:** tax evasion, envelope wages, administrative data, tax audits, machine learning

**JEL Classification:** H26, H83

## Introduction

Tax evasion is a salient problem in many transition and post-transition countries. A particularly widespread form of tax evasion are the so-called “envelope wages”, when employees are formally registered and receive part of their remuneration officially (often the minimum wage), but on top of that receive cash payments “under the table” (e.g., see results of Paulus, 2015 and Kukk and Staehr, 2014 on Estonia, and Eleket al., 2012 on Hungary). There is solid evidence suggesting that the practice of envelope wages is also widespread in Latvia (see Putniņš and Sauka, 2015, Putniņš and Sauka, 2022, European Commission, 2014).

In this paper, we use Latvian State Revenue Service’s data on tax audits and firm financial indicators to study labor tax evasion. Our analysis proceeds in two steps. First, we provide a descriptive analysis of the data on tax audits to identify NACE sectors that are more prone to tax evasion. Second, we use machine learning techniques and train algorithms to classify firms between tax-compliant and tax-evading. We implement three different machine learning algorithms and show that the two best performing

algorithms are able to correctly predict the firm type (i.e., tax compliant or tax evading) in about 70% of cases. This suggests that machine learning tools can be effectively used to detect firms with a high risk of tax evasion and can be used by the Latvian State Revenue Service to increase tax audit success rate.

## 1. Data and methodology

### 1.1. Data

In this paper, we use administrative data provided by the Latvian State Revenue Service (hereinafter – VID, *Valsts Ieņēmumu Dienests*). The database covers all firms that were audited by VID during the period from 2013 to July 2020. It contains information on all personal income tax (PIT), social security contributions (SSC), and VAT audits, indicating whether the firm had to pay fines or additional taxes after the audit. In addition, the database provides firm-level information on employment, average wage and a range of financial indicators, such as turnover, profit, assets, etc. The database is *anonymized*, implying that it does not contain any information that would allow us to identify firms.

The database contains information on 8246 audits. This includes 1791 PIT audits, 1790 SSC audits and

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4665 VAT audits. In most cases (59% of all audits) VID performed audits of all three taxes at the same time. 37% of audits cover episodes when only VAT was examined, and 4% of audits cover only PIT and SSC audits. The number of audited firms in the database is 4175, of which 523 firms (12.5%) were audited more than once.

## 1.2. Methodology

Our analysis proceeds in two steps. First, we provide a descriptive analysis of the database on the audited firms and the share of audits that resulted in a penalty. The aim of this analysis is to provide indicative evidence on the NACE sectors that are likely to be most prone to labor tax evasion. Almost 70% of all VID's performed audits resulted in fines, charges or assessed extra payable taxes (for simplicity, hereinafter we call audits that resulted in a penalty "successful" audits). The share of successful VAT audits is twice as high as that for PIT and SSC audits (almost 90% vs. about 40%, respectively). The fact that the share of successful VAT audits is so high suggests that VID is specifically targeting firms with a high risk of VAT evasion. Audits of PIT and SSC are rarely done alone, and the relatively low share of imposed penalties allows us to interpret the share of successful PIT and SSC audits as an indicator of the possible prevalence of tax evasion across NACE sectors. This approach has two important limitations. First, various types of tax evasion are likely to be interrelated, hence firms with a high risk of VAT evasion tend to evade labor taxes at a higher rate than other firms in the economy. Second, any possible changes in VID approach to selecting firms for audits will result in changes in the shares of successful audits that are not related to changes in the prevalence of tax evasion *per se*.

Next, we proceed to the second step of our analysis: we apply machine learning techniques and train algorithms that are able to identify (labor) tax evading firms based on firms' reported financial indicators. We use the database on the audited firms as the training sample, assuming (like in the first step) that audited-but-non-sanctioned firms are tax compliant. We implement three different algorithms that differ in the way they learn from the data: (1) Random Forest, (2) Gradient Boosting, and (3) Logit (for a review of machine learning methods, see Athey and Imbens, 2019). These three techniques have previously been used in the literature on corporate

fraud detection (see Ravisankar et al. 2011, Cecchini, 2010, Hsu, 2015). Each of these algorithms has specific strengths and weaknesses, hence we implement and compare several approaches.

## 2. Results

Figure 1 plots the share of successful audits, i.e. audits which resulted in fines or additional charges across different NACE sectors.

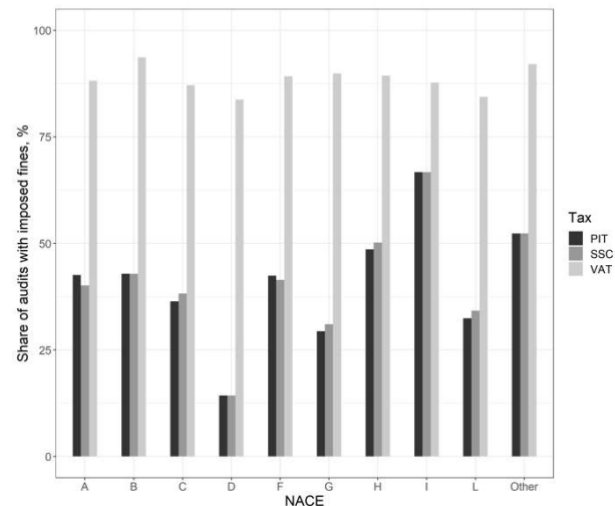


Figure 1: Shares of audits with imposed fines, charges or assessed extra payable taxes by NACE sectors, %<sup>1</sup>; Source: authors' calculations using VID data

The sectors where the share of successful PIT and SSC audits are the highest are accommodation and catering (I), transportation and storage (H), and construction (F). The respective share in manufacturing (C) is lower. This result is consistent with findings from the survey data for the sectors that are directly comparable (Putniņš and Sauka, 2022): both survey and administrative audit data suggest that the prevalence of tax evasion in construction tends to be higher than in manufacturing.

Next we look at the changes in the shares of successful audits. We focus on sectors that are characterized by a relatively high share of successful audits and/or make up a large share in the structure of Latvian GDP. The share of successful audits was persistently the highest in accommodation and catering (sector I; see Figure 2), construction (F) and transportation (H). Another important takeaway from Figure 2 is that the share

<sup>1</sup> NACE sectors: A - Agriculture, forestry and fishing, B - mining, C - Manufacturing, D - Energy, F - Construction, G - Wholesale and retail trade, repair of motor vehicles and motorcycles, H - Transportation and storage, I - Accommodation and food service activities, L - Real estate activities.

of successful audits was steadily growing in all sectors in 2013-2019. Given the magnitude of the increase (more than two times in some sectors), it most likely reflects changes in VID’s approach to choosing firms for audits.

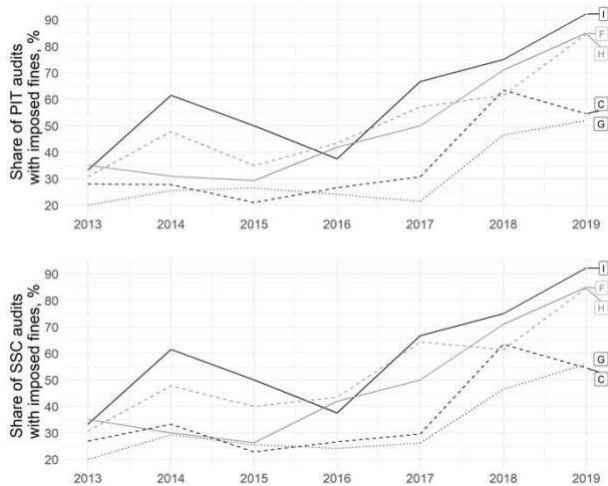


Figure 2: Share of successful PIT and SSC audits by year and NACE sector, % (Source: authors’ calculations using VID data)

Next we turn to our results on firm classification using machine learning techniques. The algorithms are trained on a randomly selected subset of audited firms and then tested on the remaining subset of audited firms. Table 1 reports the out-of-sample performance of the three different algorithms. We report two statistics that are commonly used to assess performance of classification tasks. Accuracy is the percentage of firms correctly classified by the algorithms as tax compliant or tax evading (i.e., the model prediction is consistent with the observed audit’s outcome). ROC-AUC (Area Under the Curve – Receiver Operating Characteristics) provides a measure of how well the algorithms are able to distinguish between firms of different types. ROC-AUC can take the values between 0 and 1, the closer to 1 the better the performance.

Table 1. Algorithm performance (Source: authors’ calculations)

	Random Forest	Gradient Boosting	Logit
Accuracy	71.0%	70.1%	64.3%
ROC-AUC	0.783	0.735	0.695

Random Forest is the algorithm providing the best out-of-sample performance, according to both accuracy and ROC-AUC measures. The accuracy

statistic for Random Forest is 71%, implying that 71% of firms are correctly classified as tax compliant or tax-evading. Random Forest slightly outperforms Gradient Boosting, which provides precise predictions in 70% of cases.

**Conclusions and discussion**

We show that administrative data and machine learning techniques can be effectively used to identify firms that are likely to be involved in (labor) tax evasion. In addition to the usual processes already utilized by VID, machine learning techniques can be applied to improve the selection of firms to audit in order to maximize the probability of detecting tax-evading firms. Once adopted, these tools can improve audit effectiveness at virtually no additional cost.

**Acknowledgements**

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# THE IMPACT OF STUDENT MINI COMPANIES ON THE MOTIVATION OF YOUNG PEOPLE TO DEVELOP THEIR ENTREPRENEURIAL INTENTION

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## Abstract.

How to master entrepreneurial skills still is a highly desired and discussed topic due to the trend – to find out what are the motivating factors in developing entrepreneurial intentions at the age of high school students in recent years.

In order to conduct a study on the impact of Student Mini Companies on the motivation of high school students to start a business, a survey was conducted with the respondents from the program and graduates from different regions of Latvia (Liepāja, Valmiera, Madona, Jelgava and Riga).

The aim is to investigate the Student Mini Company program in development of entrepreneurial intention of high school students. Descriptive statistics, Likert scale from 1 to 5 and analysis was used. In combination with theoretical framework study – research led to important conclusions – such as that Student Mini Company is a well-established program aimed at giving young people the opportunity to gain initial business experience as well as an appropriate set of skills and competences. The program motivates young people to dare, builds confidence in their activities and improves their knowledge of entrepreneurship.

The research limitation includes high school aged students participating in the Student Mini Company program, alumni of the Student Mini Company program, Junior Achievement Latvia Alumni Club.

The research should be continued taking into account the effects of the pandemic – digitalization of entrepreneurial education. The impact in long term motivation to establish a company for Student Mini Company and similar program alumni are not enough researched.

**Keywords:** Motivation, Student Mini Company, Entrepreneurship, Entrepreneurial education, Entrepreneurial Intention.

**JEL Classification:** I250, M13.

## Introduction

In the last following years, the tendency to raise awareness to improve and master the entrepreneurial skills has rocketed. Multiple organizations see it also as an opportunity to earn more money, education institutions are expanding the possibilities and tries to reflect the needs the job market requires. Education system reforms are stressing that the students need to be prepared for professions that do not exist yet. Need to say that this trend is implementing in all age groups within multiple projects. In 2022, when the consequences are being felt and even intensified because of Covid-19 pandemic the society also understands that major changes are approaching. Still, there are quite many uncertainties which professions will be eliminated and in what time because of the speed of modernization and process efficiency, though if we put it in a framework of a skill set – what skills and

competencies are demanded and which skills are facing an overproduction, we can prepare ourselves as personas to minimize the impact of the uncertainties, also to strategize and plan the future of our organizations – set correct and far-sighted goals and understand what kind of skill sets are needed in our employees to execute these plans successfully and with minimum of expenses. Some would say that previously mentioned aspects are covered in topics of entrepreneurial education. In short – the saying: “Live life and learn” has reached a significant role of our everyday lives, learning through-out our whole lives will become a reality to obtain the needed skills to stay in the job market longer. To address this problem the authors have researched the informal education program “Student Mini Company” by Junior Achievement and analyzed the correlation of high school students’ intentions to develop their own entrepreneurship after graduation the program

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## 1. Theoretical Background

In the context of secondary school, entrepreneurship education aims to help young students develop skills and knowledge that are crucial for the development of a more general entrepreneurial mindset. In fact, serious and simulation games have had a significant effect on classroom education as well as on training programs, increasing the learner's motivation, and enabling him to embark on engaging and challenging learning paths (La Guardia, D., Gentile, M., Dal Grande, V., Ottaviano, S., 2014). Entrepreneurial education plays multiple roles in acquiring knowledge and skills for entrepreneurial activities by being a method of learning as well as a subject of learning (Konan Kan Elvis Kouakou, Cai Li, Isaac Gumah Akolgo, Alida Magakam Tchamekwen, 2019). Traditional pedagogical tools, such as lectures, literature reviews, and examinations, do not provide motivation for entrepreneurship (Sogunro, 2004) (Thanasi-Boçe, 2020). The greatest outcomes can be attained when students are exposed to experiential learning activities that are action-oriented and encourage problem-solving and creativity. (Colin Jones, Jack English, 2004); (Peltier, J.W. and Scovotti, C., 2010); (Kolb, 2014); (Thanasi-Boçe, 2020). But there is still a considerable gap in entrepreneurship education studies, including aspects of entrepreneurial aspirations, gender differences, motivation, skills, and efficiency of teaching methods" (Carvalho et al., 2015). Despite the intuitive appropriateness of experiential entrepreneurship pedagogy and the encouragement among leading scholars to use it (see, for example, Béchar and Toulouse 1991; Neck and Greene 2011), evidence supporting the assumption that experiential pedagogy makes greater impact on students' learning than traditional, lecture-based, pedagogy is still lacking. (Kozlinska et al, 2020).

## 2. Methodology

To conduct a study on the impact of Student Mini Companies on the motivation of Latvian high school students to start a business, a survey was conducted with the respondents of program participants and graduates from different parts of Latvia - Liepaja, Valmiera, Madona, Jelgava and Riga districts. Later descriptive statistics and Likert scale from 1 to 5 was used. Pointing out the research

limitations: high school aged students taking part in the Student Mini Company program. Graduates of the Student Mini Company program, Junior Achievement Latvia Alumni Club.

## 3. Results

In general, the questionnaire was distributed in Latvia - Liepaja, Valmiera, Madona, Jelgava, Limbazi and Riga districts. The JA Latvia databases available to the author of the work were also used and the JA Latvia Alumni Club was surveyed.

The total number of respondents is 102, which is approximately 3,4% of all Student Mini Company program participants in Latvia. Of this, 71.6% are women and 28.4% are men. Respondents range in age from 16 to 36, from incomplete secondary education to completed higher education.

The main research questions of this paper were: Does the Student Learning Company program allow its participants to gain a positive business experience and does the Student Learning Company program motivate young people to become entrepreneurs?

To begin the research the authors found out the main motivator that raised the high school students' interest in entrepreneurship (see Figure 1).

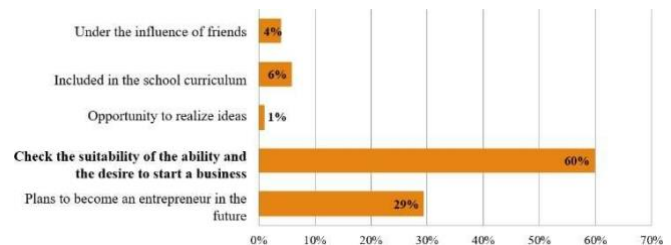


Figure 1. Initial motivator that raised the interest of entrepreneurship among high school students

As the results show that among answers like "Under the influence of friends" or "Included in the school official curriculum" which would come to mind as top answers in general, 60% of the students wanted to "Check the suitability of the ability and the desire to start the business" and after that 29% of the respondents answered, "Plans to become an entrepreneur in the future", that proves that high school students are willing to experiment and understand themselves by creating their own experience, not by someone else's impressions. In authors opinion it's a sign that the respondents have developed the entrepreneurial mindset qualities and skills from Student Mini Company experience.

Regarding the benefits of taking part in the Student Mini Company program, students evaluated each benefit from 1 (I did not get anything) and 5 (I got it completely) of the Student Mini Company (see Figure 2).

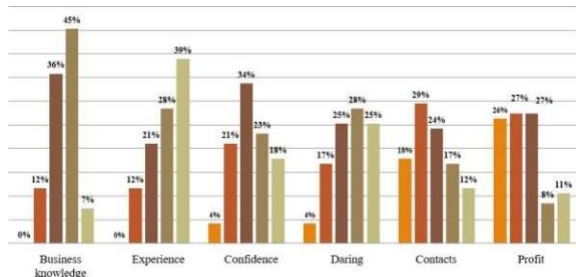


Figure 2. Benefits of taking part in Student Mini Company program

The highest results (5-4 points) were given to “Experience”, “Business knowledge” and “Daring” to start the enterprise that covers the main aims of the Student Mini Company program in general. Secondly (3 points), the students evaluated that “Confidence” can be gained within the program, and thirdly (2-1 points) were given to aspects like “Contacts” and “Profit”.

In a similar way the authors asked the students to evaluate the competency development after the Student Mini Company program. The marks were 1 (Could not be developed/improved) and 5 (improved/developed completely). In total 17 interdisciplinary competencies were evaluated, in order to find out to what extent the Student Mini Company program enables young people to prepare for their entrepreneurial practice (see Table 1).

Competence development	Average score
Sense of responsibility	3.92
Presentation skills	3.89
Decision-making	3.86
Take the initiative	3.80
Deadlines for inclusion	3.76
Ability to coordinate activities	3.66
Punctuality	3.58
Creativity	3.57
Leadership	3.54

Competence development	Average score
Teamwork	3.46
Perseverance	3.44
Self-efficacy	3.43
Negotiation skills	3.41
Ability to motivate others	3.40
Project management	3.39
Risk management	3.16
Networking	3.08

Table 1. Competence development by creating a Student Mini Company

The results show that the programs show good results of developing multiple competencies such as “Sense of responsibility”, “Presentation skills”, “Decision making”, “Taking the initiative” and many more, that are the basic competencies that are required from a modern entrepreneur in nowadays. Addressing the matter of future interest in entrepreneurship the authors analyzed the results dividing the student and alumni answers separately. As it seems the alumni evaluate the experience better than students (see Figure 3).

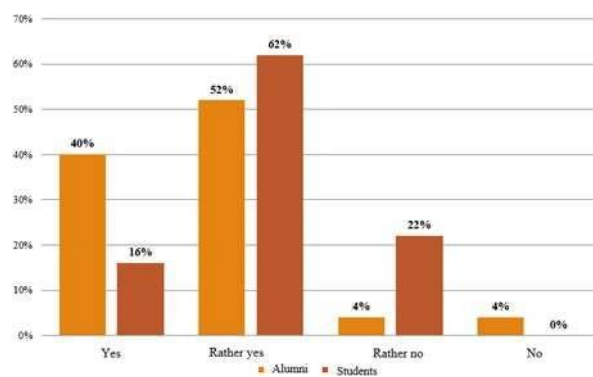


Figure 3. Future interest in entrepreneurship of the students and alumni of the Student Mini Company

Only 16% of the students admitted that the Student Mini Company program develops future interest in entrepreneurship, 52% admit “Rather yes”. The authors explain the results that the student cannot determine precisely what competencies of graduating the Student Mini company will come in handy in future studies or job market – they just do not know yet.

But still the results show a good and positive tendency. Regarding the 4% “Rather no” and 4% “No” – the authors explain that it correlates with the initiative motivation to take part in the program – to check the suitability of the ability and the desire to start the business. If the student at this moment understands what he likes and dislikes that helps to choose more suitable direction for each individual already making the decision based on personal experience, which can lead to a truly likable path that can motivate to a “Live life and never stop learning” mindset and minimize the risk job loss in the future, thus also becoming a more valuable specialist for future employers.

Quite the opposite situation is with alumni – 40% admits “Yes” and 52% “Rather yes”. Again, the authors explain, that the job market demands more advanced entrepreneurship knowledge based on digital solutions, the Student Mini Company provides basic level.

## Conclusions and Discussion

Student Mini Company is a well-established program aimed at giving young people the opportunity to gain initial business experience as well as an appropriate set of skills and competences. The program motivates young people to dare, builds confidence in their activities and improves their knowledge of entrepreneurship. In other study, respondents representing Generation Z highly value the application and effectiveness of modern teaching methods in entrepreneurship studies, however, the evaluation of different methods differs significantly depending on the type of learning preferred (Lesinskis et al, 2021).

The research should be continued taking into the account the effects of the pandemic – digitalization of entrepreneurial education. The Student Mini Company method has been proved effective especially in alumni group (40% admitting “Yes” – that the program developed entrepreneurial intention and 52% answering “Rather yes”). But times have changed, so the program should be updated as well, keeping the good practice alive. (Proposition – to update the program in order of EU Digital Education Action Plan (2021-2027). Lack of Student Mini Company alumni are researched – the impact in long term motivation to establish a company.

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# COVID-19 GLOBAL PANDEMIC IMPACT ON CYBER SECURITY IN THE FINANCIAL INSTITUTIONS

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## **Abstract.**

**Purpose.** This paper aims to evaluate the impact of the Covid-19 Global Pandemic on the cyber security environment of financial institutions.

**Design/ methodology/ approach.** This paper is based on two major parts of cyber security issues. Firstly, evaluate the impact of working from the home situation and its impact on cyber security. Secondly, establishing the implications for creating a safe and protected environment for financial services, customer-related activity, and data protection. While preparing this research, these methods were used: qualitative and quantitative analyses of scientific literature and data, data comparison, and evaluation.

**Findings.** This paper outlines that cyber security issues in financial institutions became significantly problematic during the pandemic period. Because of the uncertainty, financial institutions face new challenges regarding cyber threats identification and management. Three significant areas that require additional input and development are establishing a safe and protected environment while working from home, improving the network security of all customer journey touchpoints, and following the adaptation processes of cybercriminals.

**Research limitations/implications.** The adopted methods of managing cyber threats could be analyzed and proposed for further research. Considering that cyber-attackers are adjusting to new protection tools extremely fast, new cyber risk management tools could be proposed.

**Originality/value.** This paper evaluates new significant cyber threats to financial institutions caused by the global Pandemic. Also, it suggests the most relevant business areas where financial institutions should focus their efforts to improve safe cyber space and business environment.

**Keywords:** Cyber security, cyber-attacks, Covid-19 Pandemic, financial institutions

**JEL Classification:** G32

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**Introduction**

In recent years global Covid-19 pandemic situation brought up new challenges to the business environment. Mainly financial institutions are situated at a leading edge to respond to new cyber threats. Regarding the pandemic situation, the method financial services are provided changed drastically. A high number of financial services are only offered online. Many employees have to adapt to working from home (WFH) practices. Moreover, these new circumstances are closely related to personal data, human privacy, and security issues that are becoming one of the most attractive targets to cyber attackers (Harjinger, 2021). Together with the extraordinary effect on society’s everyday living, the Pandemic created circumstances for new cyber-crime.

**1. Cyber security issues during the Pandemic period**

In the context of the Covid-19 situation, The Crown Prosecution Service (CPS) in England suggested a new cybercrime description. They recommend considering cybercrime as an umbrella term involving two types of illegal activity: cyber-dependent and cyber-enabled crimes.

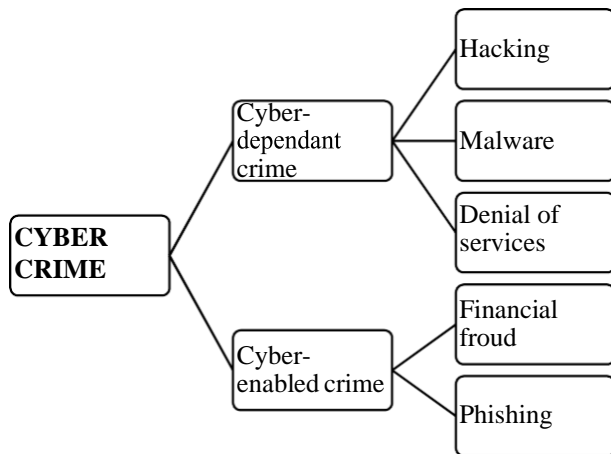


Fig. 1. Cyber-dependent and cyber-enabled crimes. (Source: compiled by the author, based on CPS, 2020).

Cyber-dependent crimes are described as crimes that only can be undertaken while using I.T. technologies and devices. Furthermore, those devices are used as a tool for committing the crime and as a target of the same crime. Examples:

creating and spreading malware to achieve financial gain; creating hacking instruments to steal financial resources. Cyber-enabled crimes - are traditional cybercrimes such as personal data theft and cyber-enabled fraud. This type of cyber-crimes is not dependent on networks or computers, but they have been created or designed using internet technologies. For example: based on financial target – intellectual property crime or fraud; offensive communication; bullying (CPS, 2020).

Identifying new types or methods of cyber-crimes is essential and establishing possible consequences of cyber-attacks in the context of the global Pandemic. Cyber security issues in the Pandemic could be categorized into direct and indirect effects (Ferreira et al., 2021).

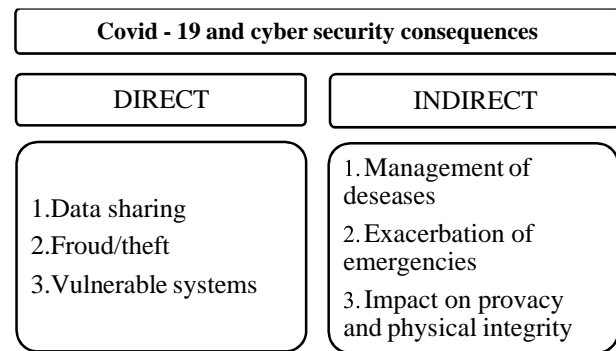


Fig. 2. Direct and indirect consequences of Covid-19 to cyber security. (Source: Ferreira et al., 2021)

Regarding the direct consequences of Covid-19 on cyber security, the data-sharing issue is one of the most sensitive because protecting personal data and private information is crucial but difficult to achieve (Toch et al., 2018). Various applications involve data sharing and collecting personal information, but the users are not provided with proper risk assessment and management tools. Also, a lack of cyber security literacy of the users may lead to cyber-crimes because individuals install and use data tracking apps. In contrast, those apps may involve technical security vulnerabilities (United Nations Office on Drugs and Crime, 2021). Also, the number of false information regarding pandemics increased drastically. The target of those attacks is mostly financial fraud or data theft. Together with private usage of online technologies, there are a lot of public systems that have become a target for cybercriminals. Some public institutions and private businesses were not ready for such

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circumstances and did not implement proper security measures or protocols; therefore, the risk of cyber-attacks while using those systems increased highly during this period.

Analyzing the indirect costs of Covid-19 towards cyber security, one of the new opportunities for cyber criminals is the platforms used for online healthcare services and other services that require the input of personal data. The cyber security management systems are not prepared to ensure adequate control and protection of personal data and additional sensitive information. Because many people are isolated at home, another severe consequence of the covid-19 arises – insecure communication online. A considerable part of infrastructures is not adequately secured and does not take the required precautions and security integrity to ensure that personal data and other information in a virtual space is secure.

## 2. Major factors affecting cyber security in financial institutions in the Pandemic period

The COVID-19 Pandemic has presented financial institutions with three immediate priorities regarding cyberspace security.

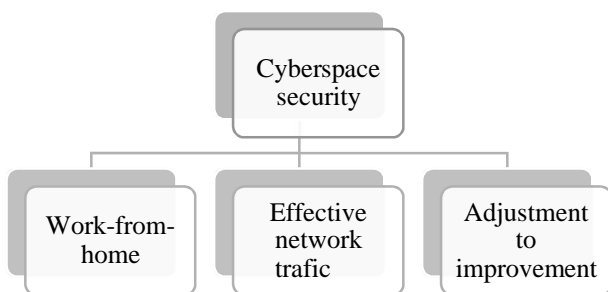


Fig. 3. Significant areas of cyber security affected by the Covid-19 Pandemic

(Source: compiled by the author, based on Boehm, 2022)

One is securing work-from-home arrangements. The other is maintaining the confidentiality, integrity, and availability of consumer-facing network traffic. The third one is adopting the company's risk management protocols and processes according to how cybercriminals adapt to changing environments and opportunities (Boehm, 2022).

### 2.1. Work-from-home effect on cyber security

After the Pandemic started, one of the financial institutions' most significant challenges was adjusting to working from home requirements. Providing secure work-from-home agreements requires adjustments in these significant areas: technology, people, and processes.

**Technology.** Considering the working from home situation and specific financial institution operation principles, it is essential to implement technological solutions that enable employees to work from home securely and maintain business continuity (Alsaroso, 2020). Important actions to ensure cybersecurity could be:

1. *Ensure prompt support for critical systems.* Support regarding systems, such as virtual private networks (VPNs), end-point protection, and cloud interfaces that are crucial for safety and confidentiality would help financial institutions to prevent additional cyber risks.
2. *Engage multifactor authentication requirements.* Employees working from home should be obligated to use multifactor authentication (MFA) to access internal networks and critical databases.

**People.** It is essential to help employees recognize and understand the risks. Even with technological solid control tools, employees working from home should still be aware of potential risks and risk management protocols and have critical thinking. Also, sometimes in an environment that is not monitored by supervisors' employees tend to engage in activities that open them to cyber threats. In these situations, managers of financial institutions should consider that educating staff is very important, together with creating a safe space to ask questions, communicate, and indicate the gaps in knowledge. Moreover, increasing awareness of possible social engineering attacks related to the Covid-19 Pandemic should be one of the priorities.

**Processes.** Regarding the activity of the financial institution promoting resilience is an important part. It could be recommended to pay attention to staff training, updating the actions regarding cyber security protocol, and supporting employees in the I.T. field more actively and efficiently. Also, to reach for a fully protected process, the institution should consider expanding the monitoring agreements between staff members. Finally, not to be missed out, the connections with third parties regarding the company's processes and relationships should be revised and any necessary safety tools installed to protect the security of processes, databases, and any other sensitive information.

## 2.2. Supporting fluent network traffic process

Confidentiality, integrity, and availability (also called CIA) are among the essential criteria to ensure network activity and online services. To protect employees and customers from cyber-attacks during the Covid-19 Pandemic period, the financial institution should focus on supporting safe connectivity and transactions and securing all the touchpoints related to the CIA. Also, investing in network and online services capabilities and flow rate should be considered because the load on the servers and customer services functions is highly increased during the pandemic period. So, to ensure the continuous and fluent reach of service, the network traffic capacity should be revised.

## 2.3. Adopting cyber risk management processes regarding the advancement of cybercriminals

The advancement of cyber criminals is an ongoing process that is difficult to keep up with. Especially during the pandemic period, the hackers and other cyber attackers are carefully tracking any possible changes in the process of target institutions, trying to overcome possible cyber security gaps, and using the pandemic situation to even strengthen their positions and possibilities to organize successful breaches in the organization. The possible direction to adapt the cyber-attack path could be a typological adaptation, target adaptation, and cyberplace adaptation.

Table 1. How do cybercriminals adapt during the pandemic period?

(Source: compiled by the author, based on Linares, F., 2022)

Typological Adaptation	If any specific type of cyber-criminal activity is identified and blocked, cyber criminals respond by organizing utterly different types of cyber-attack.
Target Adaptation	Cybercriminals identify which of their targets are protected the most and focus on those not at the best protection level.
Technical Adaptation	Cybercriminals use advanced technologies and significantly improve their tools to improve their attacks.
Cyberplace Adaptation	Cybercriminals adapt the place they organize the attack or the website name from which they initiate cyber-attacks.

The Pandemic period mostly facilitated the adaptations like target adaptation and cyberplace adaptation. This is because the Pandemic drastically changed the view from the organization's perspective of what should be protected the most. Also, the Pandemic restrictions changed online service users' habits.

## Conclusions and Discussion

1. The significance and relevance of cyber security issues strongly increased during the Pandemic.
2. Financial Institutions are one of the top targets for cyber attackers and are leading by the number of cyber events occurrences.
3. In the global pandemic situation, cybercrime is described as an umbrella term involving two types of illegal activity: cyber-dependent crimes and cyber-enabled crimes.
4. Cyber-enabled attacks were the most frequently occurring attack during the COVID-19 Pandemic. Phishing attempts were the most popular method.
5. It is significant to indicate how cyber attackers adapt to the changing environment (adopting to cyberplace, technical issues, target)
6. Remote work safety is one of the critical challenges for financial institutions during the Pandemic.
7. Securing confidentiality, integrity, and availability (CIA) is essential to ensure the continuity of operations during this disruptive time.

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### **Biography of the author**

I am Julija Gavenaite-Sirvydiene. My bachelor's field was in financial economics; I obtained my master's degree in business management. I am a third-year candidate for Ph.D. at Vilnius Gediminas Technical University (Lithuania). I am building my dissertation in the cyber security field and analyzing the effect of cyber-attack on the level of effectiveness of the financial institution.

# RECOVERY OF DEBTS IN LATVIAN ENTREPRENEURSHIP AS RESILIENCEFACTOR

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## Abstract.

- Business management in Latvia is under resilience mobilisation. Post-COVID revival got more complicated due to a jump in the geopolitical risks, the avalanche of unprecedented sanctions and counter-sanctions on the verge of running out of control. Business management faces inter alia the threat of inability to secure asset recovery. On the one hand, management at all levels is under mounting debts. The prospect of increase in the basic interest rates in the USA, the Eurozone and other financial centres aggravates the prospects of debt servicing. On the other hand, however, new opportunities for curing the debt disease emerge. Enterprise management is to take own part of action to facilitate economic development.
- Purpose is to investigate the problem of recovery of debts in Latvia in order to find solutions that might be practiced regionally and globally under resilience vector by business management.
- Methods of research are qualitative and quantitative. Among qualitative methods, review of literature, personal observations, interviews and cases are employed. The last three produce primary data. Secondary data comes from entrepreneurship statistics with focus on recovery of debts. Linear regression models applied for such processes as change in the share of enterprises with negative equity, number of insolvency cases and the liquidated to registered enterprises rate in Latvia.
- Findings include estimation of the problem, expression of the recovery of debts in numbers. Novelty consists of raising the debt recovery problem and ways of solving it under unique business environment in the light of academic discussion. The disclosed mechanism of combating the mounting debts in business management can spread internationally.
- Originality of the paper is being the pioneering research in the recovery of debts in Latvia. System approach implementation can help both practicing managers in business and regulators in Latvia and abroad to combat mounting debts and increase resilience.
- Key words: asset, debt, outstanding liabilities, Latvia, delayed payments, business management

**Keywords:** asset recovery, debt recovery, outstanding liabilities, unpaid invoice, delayed payments, cession, factoring

**JEL Classification:** M210.

## Introduction

The problem of recovery of delayed payments, known also as outstanding liabilities or debt, is topical in business management research. Resilience that is put forward as the mainstream is the capacity to recover quickly from difficulties. The delayed payments exist always. However, the severity of the problem differs under business environment changes.

Entrepreneurs who have ever faced delayed payments from customers know how complicated, time-consuming and costly the process of debt recovery can be.

A balance sheet with frozen assets can become toxic. It deprives the enterprise from funds to invest in development. Usual debt recovery ratio of all debts faced by enterprises in Latvia is anticipated below 50%. No wonder, many enterprises arrive to negative own capital. The causes of it are many, failing to recover the debts by the customers being one of them.

Aim of this research is to investigate the problem of recovery of debts in Latvia in order to find solutions that might be practiced regionally and

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globally under resilience vector by business management.

Tasks: review of literature on recovery of debts, own research design, organisation and results of research, discussion, conclusions

Methods of research: qualitative and quantitative. Among qualitative methods, review of literature, personal observations, interviews and cases take the head. The last three produce primary data.

As concerns quantitative data, it is secondary data coming from entrepreneurship statistics with focus on recovery of debts. Annual reports of professional debt recovery companies and their association (in Latvian Ārpusstiesas parādu atgūšanas nozares pārskats) are basic sources of data needed to investigate the position in Latvia. Unfortunately, 2018 Report of the Latvian Extrajudicial Debt Collector Association (LĀPPA) is the most recent one at the disposal of researchers. Lursoft is to be specially mentioned as source of statistics for business management. In our research, Lursoft data was treated as most reliable and providing basis for interviews. Linear regression model is applied for such processes as change in the share of enterprises with negative equity, number of insolvency cases and the liquidated to registered enterprises rate in Latvia. New information technologies pave the way to tight monitoring of the outstanding liabilities reported by enterprises that are aware of potential losses in the case of non-payment or even a delay in payment by partners. Getting paid on time is a challenge for business management.

The paper after Introduction is divided into three major parts. First comes the part devoted to research material and methodology stemming from reviewing and discussing the literature on debt recovery, second comes the part with the research results that paves the way to the discussion as part three, thereof, in which debt recovery size, structure and efficiency, as well as instruments for debt recovery analysis are presented. Discussion brings the data disclosed in the context of digesting the topic by business management. The article ends with conclusions drawn from the research conducted.

The research on recovery of debts has limitations. First, Latvia is chosen as the focus. On the one hand, it can be criticised on the grounds of Latvia being very small. On the other hand, Latvia has passed the transition to the market economy and got membership in the EU, Eurozone and OECD. Second, the time span is recent years. Third, the number of interviews and cases is limited.

However, the limitations can be overcome in further research.

### **1. Review of literature and research methodology**

Review of literature aims at highlighting the stand of research in the recovery of debts and coining own research methodology. According to the Law on Extrajudicial Recovery of Debt (2019) debt recovery is an aggregate of extrajudicial activities used by a creditor or provider of debt recovery services inviting a debtor to voluntarily fulfil the delayed payment obligations. Debt is payment obligations which have not been fulfilled within the deadline specified in a lawful transaction or legal act. Debtor is a person that has debt. The basic definitions above have Latvian and international run.

Corporate debt to GDP according to Santos-Alborna (2019) is at its highest level in all of recorded history. 50% of that debt is BBB, or one level above junk. Too much debt lowers credit quality. Growing debt/equity ratio can become less manageable. In the structure of corporate debt, the part representing debt to supplier cannot be ignored. Wisniewski (2022) focused on the relationship between financial liquidity and debt collection efficiency. An econometric model was used to build forecasts for both of these characteristics in a small business. An iterative method of forecasting from structural-form equations was used. Improvement of debt recovery efficiency results in a company's better financial liquidity. In business practice, debt recovery is often confused with debt collection, implemented by debt collection companies/agencies. Meanwhile, according to the Oxford English Dictionary, "collect (v.)—ask for money", seems to narrow. According to Cambridge dictionary, "Debt collection—the job of collecting payments from people who have failed to pay the money they owe for goods, services, etc. that they have already received".

The importance of interpreting and forecasting a company's financial position has received considerable attention from Bodie and Merton (2000, ch. 3)

Furlong (2021) investigated "debt trap" in the water supplying companies and concluded that management requires a new philosophy of infrastructure financing, one that democratizes decision-making, focuses on smaller projects of social and environmental value, and considers "use value" rather than simple exchange-value in

assessments of what it means for an investment to be productive.

Saksonova et al (2021) underlined the financial status and financial performance of a company as its value indicator. Debt recovery is one of the factors producing premium or discount in the value.

Among qualitative methods used by author, review of literature, personal observations, interviews and cases take the head. The last three produce primary data. A dozen of interviews provided author with valuable data that shed light on the debt recovery problem.

Secondary data comes from entrepreneurship statistics with focus on recovery of debts. Annual reports of professional debt recovery companies and their association (in Latvian Ārpustiesas parādu atgūšanas nozares pārskats) are basic sources of data needed to investigate the position in Latvia. Unfortunately, 2018 Report of the Latvian Extrajudicial Debt Collector Association (LĀPPA) is the most recent one at the disposal of researchers. Lursoft is to be specially mentioned as source of statistics for business management. In our research, Lursoft data on receivables portfolio was anticipated most reliable and providing basis for interviews. Linear regression model is applied for such processes as change in the share of enterprises with negative equity, number of insolvency cases and the liquidated to registered enterprises rate in Latvia. The equation is called a linear equation in slope-intercept form.

$$y=ax+b \quad (1)$$

where:  $y$  – result;  $a$  – growth rate (or decline rate if negative);  $b$  – the point (0,b) on the y-axis.

R-Squared ( $R^2$  or the coefficient of determination) is a statistical measure in a regression model that determines the proportion of variance in the dependent variable that can be explained by the independent variable. If above 0,8, the indicator is worth being discussed. Author used EXCEL function of linear trend for automatic calculation of both  $y$  and  $R^2$ .

The development of the IT has paved the way to tight monitoring of the outstanding liabilities reported by enterprises that are aware of potential losses in the case of non-payment or even a delay in payment by partners. Getting paid on time is a challenge for business management.

## 2. Research results and discussion

Collection and structuring of data on debt recovery cases by Lursoft provided for disclosing the major parameters of the debt recovery in Latvia.

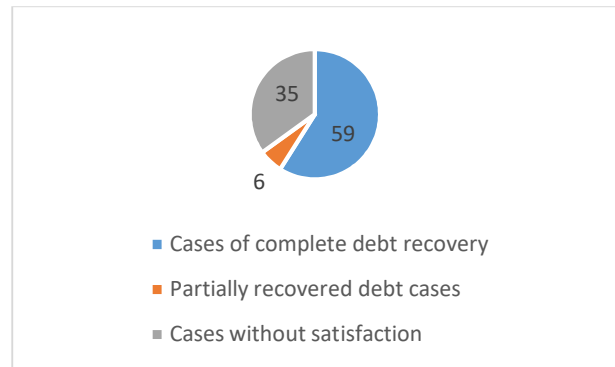


Figure 1 Structure of debt recovery cases in Latvia (Lursoft)

One can see that complete debt recovery cannot be achieved even with advanced clients that apply to the provider of debt recovery service.

Growth of the market is skyrocketing. Only the total turnover of the members of LACPA has overcome 22 million EUR in 2018 and this proved almost 35% more than in 2017.

The interviewees feel that debtors unevenly originate from different industries.

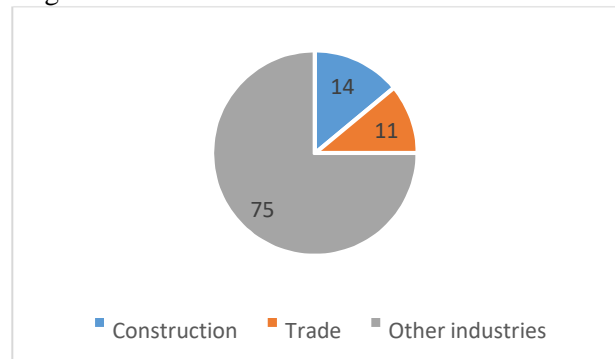


Figure 2 Major industries of origin of debtors in the receivables portfolio (Lursoft)

One can see in the pie-type chart that construction companies use to champion in the receivables portfolio. From the point of view of the industrial structure, 14% of all debts in the receivables portfolio are registered with companies working in the construction sector. The amount of their debts varies considerably, from a couple of euro to just under 150 thousand euro.

The second largest group of debtors, whose number of debts in the receivables portfolio exceeds the 10% limit, is retail.

Other industries are represented in the receivables portfolio. However, the share of cases in each proves below 10%.

Interviewees anticipated that the negative equity might be the first noticeable consequence of the debt problem. Negative equity as phenomena can be disclosed by analysis of annual reports. Statistics for five years is presented in the figure 3.

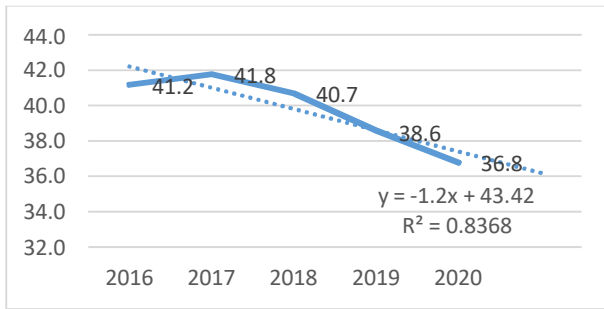


Figure 3 Share of enterprises with negative equity (Lursoft)

One can see that the share of enterprises in trouble is above 36% all the time. Geopolitical risks and weak ability of a number of enterprises for resilience can lead to the growth of number of such enterprises in Latvia. R-squared is a goodness-of-fit measure for linear regression models. This statistic indicates the percentage of the variance in the dependent variable that the independent variables explain collectively. Without employing new methods of debt recovery, such enterprises can go into liquidation. In order to make it simpler and to reduce the costs by entrepreneurs in the process of debt recovery, Lursoft as one of the leading big databases in Latvia has developed a service called portfolio of debtors, or “the receivables portfolio”. Research discovered this innovation as very promising. However, nobody of the interviewees was ready to become clients.

Liquidation is concerned by majority of interviewees as the logical worst outcome for victims of unrecovered debts. Liquidated enterprises in Latvia overcrowd the newly registered ones since 2016 (see figure 4).

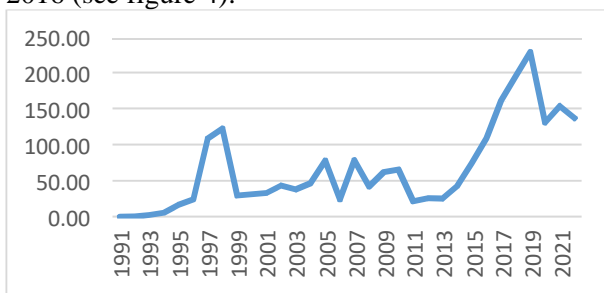


Figure 4. Liquidated to registered enterprises rate in Latvia, % (Lursoft)

Our calculation of the rate provides for the pessimistic linear chart. However, the initiated insolvency proceedings involving legal entities tend to decline (see figure 5).

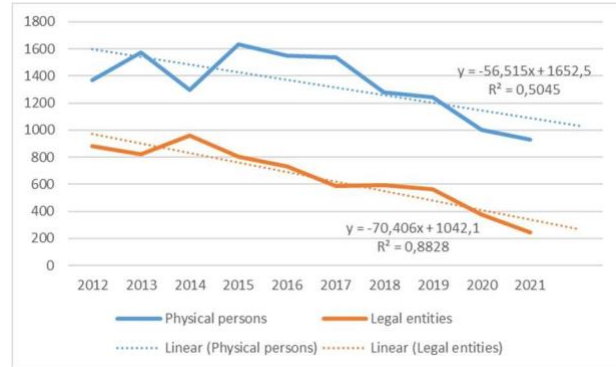


Figure 5 Initiated insolvency proceedings of legal entities in Latvia 2012-2021 (Register of insolvency)

The trend to decline can be interpreted as a ray of hope in the area of debt recovery. However, much effort is needed to take the situation under control.

### Conclusions and Discussion

1. Recovery of debts in entrepreneurship proves a resilience factor. It has both strategic and technological dimensions. Competencies in solving the recovery of debts problems can be resource for creating strategic resilience.
2. European Green Deal has already entered the business development perspectives. Funding by the EU can alleviate the debt problem in Latvian entrepreneurship.
3. The receivables portfolio service becomes a part of risk management. It demands support from the Intelligent Data Analytics, which in turn, can be provided by a big database championing in working the Register of enterprises inputs on daily basis. It belongs to New Industries in the Digital Technology Era.
4. In Latvia, recovery of 59% of all late payments registered in the receivables portfolio by Lursoft is a benchmark for the present condition. Major industries of origin of debtors in the receivables portfolio are construction and trade. The efficiency of debt recovery is different in different industries, starting with 43% in ICT and getting to 80,85% in mining and quarrying.
5. Weak debt recovery is a factor of big, above 36% share of enterprises with negative equity in Latvia. New system is necessary to counteract the trend, starting from 2016, that the number of liquidations is higher than the number of registrations.
6. Of all invoices, the payment of which has been delayed by building companies, in 62% of cases, after registration of the debt in the accounts

receivable portfolio, payment has been made in full.

7. Financial Management Processes in business in the Digital Age get new dimensions with factoring, cession and clever service of the receivables portfolio.

8. Directions of further research: questionnaire among business managers in Latvia and the Baltics, embracing Latvian and foreign stakeholders, would disclose the mechanism of preventing the debt creation under digital economy. Thus factors of strengthening the resilience among business community can be proposed more precisely for business practice and regulators.

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# HOW MUCH TAX REVENUE IS LOST THROUGH EVASION? A NEW FRAMEWORK AND ESTIMATES FOR LATVIA

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## Abstract.

- **Purpose:** The purpose of this paper is to estimate the total amount of lost taxes due to undeclared and shadow activity in Latvia during the year 2020.
- **Design/ methodology/ approach:** The approach is to decompose total government tax revenue into its components (tax on labour, tax on businesses, value added tax, excise tax, etc.), then use the most appropriate estimates of evasion rates or tax gaps for each component, then sum the lost tax revenues across categories.
- **Findings:** The estimated aggregate lost tax revenue is EUR 2.702 billion in 2020, which is equivalent to around 9.2% of GDP and about 22.4% of total potential tax revenue. The estimated lower and upper bounds are EUR 1.989 to 3.538 billion. Taxes on labour are the largest contributor to the aggregate tax gap, accounting for around 78% of total lost revenue. The next largest contributor is value added tax (VAT), accounting for a further 9%, followed by excise tax, accounting for around 8% of total lost tax revenue. Smaller contributors include taxes on corporate income, property, vehicles, gambling, and imports.
- **Research limitations:** Estimates of tax evasion (including in this paper) have estimation error, which is why we provide upper and lower bounds, and are based on several assumptions.
- **Practical implications:** The findings suggest there is potential to substantially increase tax revenue by undertaking policy actions that reduce labour tax evasion, given the largest share of lost tax revenue (e.g., target envelope wages and tax avoidance schemes by high income earners). Further increases in tax revenue can be realised by combatting the VAT gap (e.g., information technology systems that better track VAT liabilities, real-time reporting, and e-invoicing).
- **Originality/value:** While a lot of research has been devoted to measuring the size of the shadow economy, less work has gone into quantifying lost tax revenue, which is the focus of this paper. Other studies of tax evasion typically focus on estimating the tax gap for one specific type of tax, whereas this paper provides a framework to estimate the aggregate tax gap.

**Keywords:** tax evasion, tax gap, shadow economy, Latvia, envelope wages, state revenue service.

**JEL Classification:** H26, O17, H20, H61.

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## Introduction

Tax evasion is a multi-trillion-dollar challenge for governments around the world. It can lead to increased inequality as taxes are one of the key redistributive mechanisms. It can undermine the provision of public goods and services, limiting the ability for governments to address market failures. Tax evasion can weaken the viability of social security systems. It can also hinder the ability for policymakers to correct socially, environmentally, or individually harmful practices through taxes as a corrective mechanism. Finally, increased tax evasion can lead to imbalances in government budgets, potentially forcing governments to take on debt, and the associated financial implications.

Tax evasion is one of the main reasons why companies and individuals operate in the shadow economy (the informal or undeclared segment of GDP) and misreport production, sales, profits, or income to authorities. While a lot of research has been devoted to measuring the shadow economy (e.g., Tiszberger, 2022; Medina and Schneider, 2021), less work has gone into quantifying one of the main consequences of shadow economic activity: lost tax revenue, which is the focus of this paper.

The purpose of this paper is to provide a simple framework that can be used to quantify a country's lost tax revenue due to tax evasion. To illustrate how this framework can be used, we apply it to estimate the aggregate tax gap (potential tax revenue that is not realised due to tax evasion) in Latvia during 2020. Therefore, this paper is, in part, a case study of a particular country that has for many years grappled with the challenge of a relatively high rate of tax evasion and has implemented many measures to reduce the size of the shadow economy. But this case study has a more general purpose and that is as an example of how the aggregate tax gap can be estimated in other countries to provide policymakers with a critical input for decision-making.

## 1. Method

The framework consists of three main steps. The first step is to decompose total realised tax revenue into its main components (e.g., different taxes). The reason is that different taxes are evaded

to different extents. The decomposition used in this paper is (i) personal income tax, (ii) compulsory social security contributions, (iii) corporate income tax, (iv) taxes on property, (v) value added taxes (VAT), (vi) excise taxes (alcohol / tobacco / oil / petroleum), and (vii) other taxes (e.g., vehicles, gambling, imports). For each of these taxes, I obtain the realised tax revenues from the OECD statistics database.

The second step is to estimate the lost revenue for each tax component using an appropriate method. There are different leading approaches to estimating the "tax gap" for different components, which is a further reason for breaking down taxes into the different tax components, and the appropriate methods may vary by country depending on available data and resources that can be devoted to producing estimates. For example, in the application to Latvia, we draw on a range of methods including survey-based micro-data estimation of the evasion of labour taxes, corporate taxes, and VAT (method of Putnins and Sauka (2015) drawing on Gerxhani (2007) and Kazemier and van Eck (1992)), the EU's 2021 VAT gap report (CASE, 2021), studies of specific excise tax components by academic researchers, organisations such as the World Health Organisation (WHO, 2018), Jurušs, Šmite-Rože, and Gasūne (2018), and the state revenue service.

The third step involves summing the estimated lost revenue from each component, resulting in a total revenue loss or aggregate tax gap. By summing all the lower bound estimates and all the upper bound estimates, one obtains a "conservative" (wide) range for the true level of lost tax revenue. This aggregate tax gap is not the same as the size of the shadow economy because the shadow economy is a measure of unreported economic activity not lost tax revenue.

## 2. Results

The decomposition of tax revenue shows that about one-half of the total tax revenue in Latvia is derived from taxes on labour (51%). The other major components of realised tax revenue are VAT (29%) and excise taxes (11%). It is therefore reasonable to expect that the majority of lost tax revenue, measured in euro or dollar terms, will be from labour taxes, and that component is particularly important to estimate as accurately as possible.

The results illustrate that evasion rates vary considerably across the different tax components. The highest estimated evasion rates are for labour

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taxes, with estimates ranging from 30.72% to 42.98%. These taxes are relatively easy to evade through mechanisms such as “envelope wages” (paying part of an employee’s salary in cash and not declaring that part) and informal, unregistered employees. The lowest estimated evasion rates are for VAT, with estimates ranging from 7.25% to 9.30%.

Turning to the estimates of the aggregate tax gap, the results in Table 1 show that total lost tax revenue is estimated to be EUR 2.702 billion in 2020, with a confidence interval of EUR 1.989 to 3.538 billion. These bounds arise from modelling different scenarios and using different assumptions, given that tax evasion, contraband, and misreporting are not directly observable but have to be estimated. This estimated total lost tax revenue is equivalent to 9.2% of GDP and 22.4% of total potential tax revenue, suggesting an economically meaningful magnitude.

Decomposing the tax gap into its components, Table 1 shows that by far the largest contributor to the total lost revenue is taxes on labour (personal income tax and social security contributions), collectively accounting for around 78% of the total lost revenue. This high contribution from labour taxes is the result of two factors: labour taxes are a major component of the total tax budget and the percentage evasion rates for labour taxes are among the highest of all the tax types. The next largest contributor to the tax gap is value added tax (VAT), which accounts for a further 9% of total lost tax revenue. For VAT, there is a relatively low evasion rate (being around 8.3%, which is lower than evasion rates in most other tax categories) but VAT is nevertheless a large contributor to the tax gap because VAT makes up a large proportion of total tax revenue (29%).

The last of the major contributors to the tax gap is excise tax, accounting for around 8% of total lost tax revenue. Within excise tax, petroleum

products, particularly diesel and petrol used in motor vehicles, and tobacco, driven largely by contraband cigarettes, are the largest contributors of lost tax revenue. Although petroleum and gas have a relatively low evasion rate, their contribution to lost tax revenue is substantial because they account for a large share of total excise tax revenue (just over a half). Tobacco, on the other hand, accounts for a smaller share of total excise tax revenue but has a higher evasion rate, which has been trending downwards through time, making it a substantial contributor to the overall excise tax gap. Third among lost excise tax revenue is alcohol.

Smaller contributors to the tax gap include taxes on corporate income (tax gap of EUR 62 million), taxes on property (tax gap of EUR 18 million), and other taxes including vehicles, gambling, and imports (tax gap of EUR 51 million).

## Conclusions and Discussion

This paper proposes a framework for estimating the total amount of lost tax revenue and illustrates the application of the framework to Latvia.

The results show that lost tax revenue in aggregate is approximately 9.2% of GDP or around EUR 2.702 billion in 2020. By far the largest contributor to the total lost revenue is taxes on labour, consisting of personal income tax and social security contributions, collectively accounting for around 78% of the total lost revenue. The next largest contributor to the tax gap is value added tax (VAT), which accounts for a further 9% of total lost tax revenue. The last of the major contributors to the tax gap is excise tax, accounting for around 8% of total lost tax revenue. Within excise tax, petroleum products, particularly diesel and petrol used in motor vehicles, and tobacco, driven largely by contraband cigarettes, are the largest contributors of lost tax revenue.

Table 1: Estimated aggregate annual tax gap in Latvia, with a breakdown by tax category (2020)

	Baseline estimated tax gap (EUR million)	Lower bound tax gap (EUR million)	Upper bound tax gap (EUR million)	Contribution to total tax gap
Personal income tax	€ 1,055	€ 794	€ 1,350	39%
Social security contributions	€ 1,056	€ 791	€ 1,380	39%
Corporate income tax	€ 62	€ 56	€ 68	2%
Taxes on property	€ 18	€ 6	€ 31	1%
VAT	€ 243	€ 211	€ 277	9%
Excises (alcohol/ tobacco/ oil)	€ 217	€ 113	€ 343	8%
Other (vehicles, gambling, imports)	€ 51	€ 19	€ 90	2%
<b>TOTAL</b>	<b>€ 2,702</b>	<b>€ 1,989</b>	<b>€ 3,538</b>	<b>100%</b>

The findings have policy implications. For a government seeking to maximise tax revenue or minimise the lost tax amount, these results provide a sense of where to focus tax collection efforts and policy measures. Given the large contribution of labour taxes to the total tax gap, there is substantial potential for increasing tax revenues by undertaking policy actions that reduce labour tax evasion. Further increases in tax revenue can be realised by combatting the VAT gap. Evidence from EU countries suggests that effective policies to combat the VAT gap include information technology systems to better track VAT liabilities, real-time reporting, and e-invoicing.

The main contribution of this paper is that, to the best of our knowledge, this is the first study that seeks to quantify the total lost tax revenue due to concealment of economic activity / tax evasion. Prior studies have either (i) estimated the size of the shadow economy (see Tiszberger (2022) and Medina and Schneider (2021) for recent and comprehensive reviews), or (ii) estimated individual components of lost tax revenue (e.g., Beverelli and Ticku (2022) estimate the evasion of tariffs and Bargain, Etienne, and Melly (2021) estimate informal pay gaps).

While the shadow economy and tax evasion are intimately related because tax evasion results in shadow activity (unreported production, income, and profits) and shadow activity is often done to avoid taxes, they are not the same when it comes to estimates. Therefore, the paper's contribution to the shadow economy literature is to provide estimates of the ultimate consequence of shadow economic activity, that being tax evasion. The paper's contribution to the literature on tax gaps is to provide a framework for estimating the *aggregate* tax gap and illustrate the application of the suggested approach.

### Acknowledgements

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# CALCULATING THE FINANCIAL WELL-BEING OF YOUNG ADULTS

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**Abstract.** The strategic resilience of every company is based on its capacity to turn dangers into chances and the ability to take benefit of the opportunities determined promptly. One of the central elements in this process is an employee. Therefore, the well-being of the employee should be determined and discussed to keep and attract new talents. Financial well-being is a widely discussed issue in the scientific literature but is less studied in Latvia, therefore the authors are willing to contribute to the current research by setting the following goal: to discover the level of the financial well-being of young adults and to determine the factors influencing it to create a prototype of financial well-being index. To achieve the objective, the following methods are used: a) the level of financial well-being and factors influencing it are determined based on the online questionnaire of 326 young adults (period of the survey: Spring-Summer 2021); b) the prototype of financial well-being index is build based on three-step optimization approach as proposed by Becker et.al. (2017). The current paper determines the level of the financial well-being of young adults in Latvia and proposes a methodology to study the phenomena continuously, therefore the findings could be valuable both for HR specialists and policymakers.

**Keywords:** financial well-being; young adults; Latvia; financial well-being index.

**JEL Classification:** I39, M59.

## Introduction

The concept of well-being is widely discussed in the scientific literature. The best known is Maslow's hierarchy of needs. The theory is based on the needs of people who form a hierarchy and each step of the hierarchy can be updated successively one by one (Maslow, 1943): starting with physiological needs, followed by security, social needs, and social recognition, while the final step is self-implementation. Because Maslow's hierarchy of needs is one of the most mentioned concepts, a huge number of researchers are contributing to the topic of well-being and developing the above-mentioned concept further on. Some of the papers should be mentioned here as the authors discussed the concept of well-being and proposed the ways to measure it: Tay & Diener (2011); Adler & Seligman (2016); Stockenberg & Sultan (2018); Abeltina et al. (2021); etc. On the one hand, the concept of well-being is well developed and extensively elaborated, on the other hand, the concept of financial well-being, in particular, is less advanced. It is worth considering that the definitions of financial well-being are not unified, therefore many authors have defined their own. An important aspect is that even with no homogeneous definition, there are significant parallels between the ideas of each author of the

definition. The authors of the current paper have studied the works published by Brügger et al. (2017); Tenney & Kalenkoski (2019); Barrafremit et al. (2020) and would like to propose their definition of financial well-being that will be used in the coming research steps: financial well-being is an individuals' sense of comfort about their financial situation and ability to avoid and overcome economic and financial risks (bankruptcy, poverty, etc.). This definition includes a person's current financial situation ("ability to avoid and overcome economic and financial risks") and comfort ("comfort about their financial situation") which covers the most important aspects of financial well-being as concluded from analyzed literature and captures subjective financial well-being. Last, but not least based on the literature analysis the authors determined the number of factors to evaluate the level of financial well-being, including well-being at the workplace; level of overall optimism; social-anthropology factors; financial behavior; level of self-control, and level of financial literacy. All the mentioned factors are going to be studied to determine the level of financial well-being.

## 1. Methodology of the research

as it is stated above, but is less studied in Latvia, therefore the authors are willing to contribute to the

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current research. The purpose of the study is to determine the level of financial well-being and to discover the factors that influence the financial well-being of young adults. The study is limited to the young adults in Latvia, aged from 15 to 25 years. Moreover, only full-time or part-time students were considered for the current research.

The methodology of the research is developed as empirical research conducted using questionnaires to obtain the answer from respondents to specific statements by completing an online questionnaire. The data were analyzed by applying several statistical tests and regression analysis. The online questionnaire of 326 young adults was conducted (the period of the survey includes Spring-Summer 2021).

In the second part of the research the authors intend to create a prototype of financial well-being index and the first results will be shared below. The prototype of the financial well-being index is built based on a three-step optimization approach as proposed by Becker et al. (2017).

**2. Results of the research**

In the first step of the research, the authors have determined the level of the financial well-being of the young adults (based on the self-evaluation). The results are presented below in Figure 1. The lowest level of financial well-being is 1.1 and the highest level is 4.9.

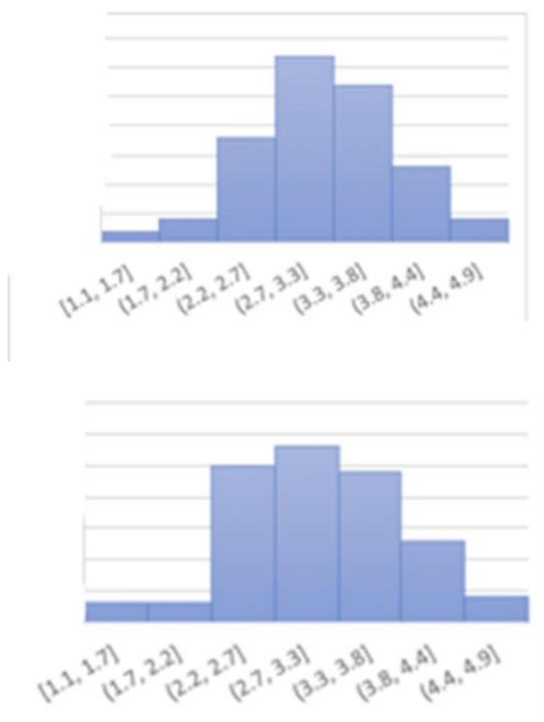


Figure 1. State of financial well-being as experienced by young adults before COVID-19 (1<sup>st</sup> figure) and current state of financial well-being as experienced by young adults (2<sup>nd</sup> figure) (source: created by authors)

Moreover, the authors have tested if the level of financial well-being was seriously impacted by COVID-19 pandemics in the short run and no significant impact was determined based on the student *t*-test (see Table 1).

Table 1. Student *t*-test (source: created by authors)

			<i>t</i>	<i>df</i>	<i>p</i>
Current State	vs.	State before COVID-19	-1,252	99	0,213

In the second step, the authors tested the factors influencing the level of the financial well-being of Latvian young adults (the factors are chosen based on the literature analysis and are mentioned above). The most important factors are presented in Table 2 and one can notice that only 3 factors out of 6 are important to understand and determine the level of financial well-being. Moreover, we were able to determine that the level of monthly net income plays a rather significant role and should be considered as well.

Table 2. Factors` significance (source: created by authors)

Relative Factors	Partial Regression Coefficient	Standard Error	Standardized Partial Regression Coefficients	<i>T</i>	<i>p</i>
...					
<b>Monthly income</b>	0,189	0,089	0,202	2,116	0,037
...					
<b>Self-control</b>	0,342	0,096	0,355	3,574	0,001
<b>Optimism</b>	0,163	0,074	0,205	2,213	0,03
<b>Financial literacy</b>	0,125	0,051	0,22	2,433	0,017
...					
Note: $R^2 = 0,706$ ( $F = 6,275$ ; $p < 0,001$ )					

In the third step, it was necessary to create a so-called financial well-being index (a prototype) that could help to monitor the level of financial well-being promptly. The factors to be considered in the

index are determined above. To solve the weight determination problem, the authors would like to apply conclusions drawn by Becker et al. (2017), who studied composite indexes and developed some approaches permitting the expansion of factors to distinguish the influence of weights. Applying the methods above the following weights were determined:  $X_1 = 26\%$  (where  $X_1$  – net monthly income);  $X_2 = 41\%$  (where  $X_2$  – level of self-control);  $X_3 = 20\%$  (where  $X_3$  – level of overall optimism) and  $X_4 = 13\%$  (where  $X_4$  – level of financial literacy). All the weights of the composite well-being index are rounded up to the full number. It is worth mentioning that index weights are skewed towards the level of self-control that could be improved via self-studying and personal development and therefore is valued as being positive.

To create the composite well-being index in the fourth step the following procedure is required: every factor's median observation determined previously should be divided by the strength of the factor and multiplied by the weight of the factor determined based on the model mentioned above. The weights of the factors and strength factors are determined by the scoring scale. The scoring scale runs from 1 (minimum level) up to 5 (indicating the maximum level). The results are demonstrated in Table 3.

Table 3. Scoring and weighting parameters for the index (source: created by authors)

Factor/Scoring scale	1	3	5	Weight of each factor
net monthly income	< 500 EUR	< 1 000 EUR	Starting from 1000 EUR	26%
level of self-control	1,71	3,09	4,55	41%
level of overall optimism	1,81	3,58	4,90	20%
level of financial literacy	Below 60%	Between 60% - 80%	Above 80%	13%

The composite financial well-being index is determined as 3.48 showing the above-average level of the financial well-being of Latvian young adults, which should be considered a positive sign, while there is still a place for improvement. It is worth considering that the result gained is preliminary as the scoring parameters are proposed by authors based on overall knowledge and previous experience

in the research field, while further justifications or proofs would be necessary to claim the usability of the proposed tool for further research and implementation in practice.

## Conclusions and Discussion

The authors are claiming that financial well-being is not just about the level of security, but also, about the level of comfort. The influencing factors found in this study that affect the financial well-being of young adults are self-control, financial behavior, optimism, and financial literacy. Based on the research the authors can determine that the level of self-control has a positive effect on the financial well-being of Latvian youth; the level of financial knowledge has a positive effect on the financial well-being of Latvian youth, and the level of overall optimism has a positive effect on the financial well-being of Latvian youth. The research findings could be interesting both for business representatives willing to attract new talented employees, as well as for politicians and decision-makers understanding the necessity to diminish the emigration of young adults from Latvia.

Moreover, the authors presented a prototype of financial well-being index, even though it is still a work in progress (preliminary theoretical concept) and further testing is necessary to finalize it, it is going to contribute to further understanding of the issue and propose a tool to be used in measurement and management processes. The final results will be presented and discussed in the coming papers.

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# THE SHADOW ECONOMY IN LATVIA: CHARACTERISTICS OF THE DEMAND SIDE

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**Abstract.** This study focuses on the demand side of the shadow economy: the willingness to purchase products or services for a lower price in exchange for not reporting the activity to the tax administration institutions. A survey carried out in Latvia is used to examine the relationship between tax-compliant behaviour, fear of punishment, material deprivation and government efficiency. The survey results show that the demand side of the shadow economy is widespread, as the acquisition of goods and services is carried out by many Latvians, including those who do not receive undeclared income. Economic constraints drive the demand, but the engagement with the shadow economy has a strong relationship also with the perceived risk of being caught, as well as the quality of government efficiency in public good service and quality of public goods. On the other hand, trust in the tax administration does not correlate with the decision to acquire goods or services for a lower price by not paying taxes. The study contributes to the current shadow economy research by showing that the tax morale on the demand side is not driven exclusively by material deprivation. Policies that simultaneously address effective public spending and focus on poverty reduction have the potential to limit the demand side of the shadow economy

**Keywords:** tax morale, shadow economy, public policy

**JEL Classification:** H26; O17.

## Introduction

While there has been extensive research on the supply side of the shadow economy, i.e., employment and entrepreneurship activities (Crnogorac & Lago-Peñas, 2020; Feige, 1998; Kaufmann & Kaliberda, 1996; Martinez-Vazquez & McNab, 2000; Putniņš & Sauka, 2015; Sauka & Putniņš, 2021; Schneider & Enste, 2013; The World Bank, 1993; Thießen, 2003), relatively few studies have focused on the demand side. However, when it comes to tax morale, there is presumably much more freedom and flexibility for obtaining goods and services either in a formal or shadow economy than doing undeclared work (Packard, 2007).

The few studies investigating the demand side of the shadow economy have focused on consumption patterns, the price and quality of the products, and household wealth (Böhme & Thiele, 2012; Fortin et al., 2000; Merella, 2006; Reilly et al., 2006). Less is known about the institutional and social factors influencing the decision to acquire goods and services in the shadow economy.

This study tends to fill this gap by exploring the characteristics of the shadow economy from the demand side at the individual level.

## Theoretical Background

Despite state interventions to limit its scale, the demand side of the shadow economy continues to exist in a close and complementary relationship with the formal economy (Banerji & Jain, 2007; Chiarini & Marzano, 2006; Schneider, 2008). There exist two competing theoretical explanations for what motivates individuals to pay taxes. One is the so-called deterrence approach, stemming from the standard model of tax evasion. It predicts that tax compliance is based on the tax rate, audit probability, penalty rate and income. To explore the characteristics of individuals' willingness to engage in the shadow economy, this study focuses on the aspects that have been found to determine the supply side of the shadow economy from both theoretical explanations, which are not self-exclusive but rather complementary.

According to the rational choice approach, the shadow economy is brought to a minimum when the tax rate is optimal, audits are carried out, and non-compliance is punished (Allingham & Sandmo, 1972; Srinivasan, 1973). Another factor that influences tax-compliant behaviour is wealth. Lower-income individuals are more likely to acquire goods in the shadow economy (Böhme & Thiele, 2012). Likewise, the tax burden strongly determines the shadow economy (Crnogorac & Lago-Peñas, 2020).

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Next to the rational choice approach, a broad array of research has found that tax compliance is based on broader propositions than pure rationality (Dasgupta, 1990; Fehr & Fischbacher, 2006; Górecki & Letki, 2021). Tax morale is related to the perception of the institutional quality and level of corruption (Alon & Hageman, 2013; Cooray et al., 2017; Feige & Ott, 2019; Takacs Haynes & Rašković, 2021; Uslander, 2010). When the collected tax is believed to be spent effectively, it increases tax compliance (Alm et al., 1993; Becker et al., 1987; Bodea & LeBas, 2016; Frey & Torgler, 2007; Pommerehne et al., 1994). Trust in state institutions is another factor that has been found to positively affect tax morale (Alm et al., 2006; Kucher & Götte, 1998; Mickiewicz et al., 2019; Muehlbacher et al., 2011; Slemrod, 2003; Torgler, 2003; Uslander, 2010).

### Methodology

The data analysed in this paper has been collected in a research project, "Researching the Shadow Economy in Latvia (RE:SHADE)" (2020-2022). It is a representative public opinion survey with 1,001 respondents carried out at their residence by the Baltic International Centre for Economic Policy Studies in cooperation with a survey company "Latvijas Fakti".

The analysis is done by fitting a linear probability model using ordinary least squares regression. The binary dependent variable, demand, measures the willingness to acquire goods and services without declaring the activity to the state institutions in exchange for a lower price. In the sample, the level (48%) of willingness to accept such a deal is much higher than the respondent's reported undeclared employment (10%) or an acceptance of such behaviour in general.

Variables of interest included in the Model 1 are the perceived likelihood of being caught (risk), tax burden (tax), income level (income), working in the shadow economy (undeclared), quality of public institutions (efficiency), assessment of public good delivery (public good), assessment of corruption level (corruption), trust in the State Revenue Service (trust). Individuals who refused to answer these questions or chose "Hard to say" were excluded from the analysis. As a result, the final sample consists of 509 individuals (see Table 1 for descriptive statistics of the sample).<sup>1</sup>

Model 2 includes control variables of age, gender, education, ethnicity and region and delivers a higher adjusted R<sup>2</sup>. Although much variance is left unexplained, the model with control variables delivers the best possible insights on the demand side of the shadow economy and is used in the next section.

Table 1. Descriptive statistics of the variables

Variable	N	Mean	Std. dev.	Min	Max
demand	509	0.52	0.50	0	1
risk	509	2.49	0.85	1	4
tax	509	1.97	0.59	0	3
income	509	3.96	1.71	1	6
undeclared	509	1.98	0.51	1	3
efficiency	509	0.21	0.49	0	2
public good	509	1.05	0.84	0	2
corruption	509	0.60	0.80	0	2
trust	509	5.10	2.57	0	10
age	509	45.43	15.88	18	74
gender	509	0.51	0.50	0	1
education	509	1.22	0.65	0	2
ethnicity	509	0.30	0.46	0	1
region	509	3.22	1.95	1	6

<sup>1</sup> As a robustness check, we compared the sample used in the analysis with the sample of excluded respondents by running the OLS linear regression with age, gender, education, ethnicity and region included as the variables of interest. The regression results indicate that women and individuals with primary education are more likely to refuse or provide "Hard to say" answers, as well as there are regional differences (regression results are available upon request).

## Results

Looking at the determinants from the rational choice approach, the risk of being caught is the only aspect that influences the demand side of the shadow economy (see Table 2). In other words, the increased perception of the likelihood of being caught decreases willingness to undertake activity without paying taxes. The tax burden does not correlate with the intention to acquire goods and services without declaring it to the tax authorities. At the marginal level ( $p < 0.1$ ), individuals earning less than €600 on each household member are more likely to demand goods and services in the shadow economy. It suggests that material deprivation is one of the reasons for the existence of the demand in the shadow economy.

Regarding tax morale issues, there is a close relationship between the demand for the shadow economy and the perception of how the tax money is spent. The same is true regarding evaluating the tax system's ability to deliver public good for most citizens. The more critical is the individual, the higher the demand for goods and services on which the taxes are not paid. At the same time, there are no differences between the most trustful citizens towards the tax administration and the most distrustful ones

Table 2. OLS regression results: dependent variable demand for goods and services from the shadow economy

Model	(1)	(2)
<b>Risk</b>	0.0892*** (0.0265)	0.0791*** (0.0284)
<b>Tax</b>	0.0677* (0.0381)	0.0448 (0.0400)
<b>Income (baseline: less than 250 EUR)</b>		
251 - 330 EUR	-0.0604 (0.0834)	-0.0803 (0.0830)
331 - 450 EUR	-0.105 (0.0811)	-0.127 (0.0813)
451 - 600 EUR	-0.0488 (0.0868)	-0.0681 (0.0900)
More than 601 EUR	-0.154* (0.0870)	-0.159* (0.0918)
Don't know/NA	-0.152** (0.0754)	-0.146* (0.0815)
Undeclared	-0.0592 (0.0419)	-0.0572 (0.0419)
Efficiency	-0.0729 (0.0447)	-0.0804* (0.0463)
Public good	-0.0956*** (0.0271)	-0.0963*** (0.0279)
Corruption	-0.0520* (0.0291)	-0.0274 (0.0298)
Trust	-0.00946 (0.00921)	-0.00913 (0.00979)
Age		-0.000288

		(0.00150)
Gender		0.0371 (0.0459)
<b>Education (baseline: primary)</b>		
Secondary		0.0379 (0.0715)
Higher		-0.127 (0.0809)
<b>Ethnicity</b>		-0.0471 (0.0508)
<b>Region (baseline: Riga)</b>		
Vidzeme		-0.0144 (0.0794)
Kurzeme		-0.114 (0.0739)
Zemgale		- 0.238*** (0.0838)
Latgale		0.0129 (0.0801)
Pierīga		-0.0340 (0.0645)
<b>Constant</b>	0.578*** (0.164)	0.715*** (0.206)
<b>Observations</b>	509	509
<b>R-squared</b>	0.123	0.159

Robust standard errors in  
parentheses

\*\*\* p<0.01, \*\* p<0.05, \* p<0.1

## Conclusions and discussion

The results suggest that the perceived risk and financial constraints are important when there is a trade-off between price and compliance. However, this is only one part of the story. Inefficient government spending negatively affects tax compliance and makes individuals more likely to acquire goods and services in the shadow economy. At the same time, trust in the State Revenue Service and assessment of corruption level are not important factors in decreasing the demand for the shadow economy goods and services.

This study has a substantive limitation, as it looks at the determinants of the demand side of the shadow economy among the respondents that decided to answer the questions related to trust, corruption level etc.

Not being able or refusing to answer questions can be an active choice demonstrating an individual's understanding of the economy and state. Citizens within their daily activities might not question their attitudes or trust level towards various state institutions or the quality of its provided services and consider the state to exist by default (Sedlenieks, 2012). Therefore, the findings should be interpreted with caution, and the selection bias of the results should be acknowledged.

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# THE ROLE OF DATA MINING TECHNIQUES AND BUSINESS INTELLIGENCE IN E-COMMERCE

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## Introduction

The online retail industry is one of the world's largest and fastest growing industries of the modern times, occupying a huge amount of electronic sales data. Businesses around the world are becoming increasingly aware of the importance of extracting this data and integrating business intelligence into their digital strategic planning. A variety of different approaches and architectures have been applied to data mining (DM) and business intelligence (BI) in e-commerce. DM has evolved into a tool for managing many complicated business challenges and possibilities, proving to be an applicable and effective approach in a variety of fields, (Feliu, 2021). This would allow firms to reach their objectives and improve decision making process. Nonetheless, it is difficult and complex to identify customer behavior and the factors that encourage purchasing, for that purpose, DM techniques have become the focus of such analyses (Hernandez, Alvarez, Fabra, Ezpeleta 2017).

## Theoretical Background

Therefore, this study pursues the follow three objectives. The first objective is to review the different techniques of DM and to improve data quality with real data collection from ecommerce clients. The second objective is to explore an effective customer targeting process through DM with generation of predicted models using real data from five business sectors (Online Education –

Fashion & Apparel – Electronics – Beauty & Personal Care - Entertainment). Finally, the third objective is the ways in which BI empowers businesses with a marketing advantage over the rest of the market, improving the competition of enterprises. The proposed model is to collect real data, filter it and then transform with association, clustering, classification and the metrics will be used for the evaluation of the results.

## Methodology

The techniques that I am going to use in DM are the following:

### 1) Association Rules

Association rule mining is among the most important methods of DM. The essence of this method is extracting, interesting, correlation and association among sets of items in the transactional databases or other data pools. Association rules are used extensively in various areas. A typical association rule has an implication of the form  $A \rightarrow B$  where A is an item set and B is an item set that contains only a single atomic condition, (Kamba & Hang 2006). One Example I can give, are Customers who buy a new TV almost always buy a new HDMI Cable. So, it is a direct connection between two products and one can use it for product placement after putting a TV into the cart.

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## 2) Clustering

This is the organization and separation of data into classes, which refer to a collection of objects based on common attributes. Clustering easily means to get more samples of data which is similar are nearly the same, inside the same cluster and use this cluster data for further analysis (Kamba & Hang 2006).

## 3) Classification

The Classification Technique. It aims to establish the general characteristics for a specific group with common properties. These characteristics can be used to classify the newly added data item in the data base. Classification can help the merchants find out one commerce website's customers' contour feature on the basis of demographic information of visitors and the visiting patterns of visitors. After this, we can find the potential clients and hold the commercial activities accordingly. So, classification is more a stamp that you give on data, like pattern analysis.

## 4) Prediction

Prediction has attracted substantial attention given the possible consequences of successful forecasting in a business context. We called this Association Analysis but prediction is only one part of Association since data can be already there or is predicted. There are two types of predictions. The first being the prediction of unavailable data values and the second being the pre-dictation of class labels of the objects based on the attribute values of the object (Kamba & Hang 2006). Prediction is more often referred to the forecast of missing numerical values. It consists of constructing chains between information we have about the customer. AI is taught by already happened buys from other customers in the past.

Data Mining Techniques	Data Mining Suites
Classification	Rapidminer, Weka, Spiderminer, NLTK
Regression	Rapidminer, Weka, Spiderminer, NLTK
Clustering	Rapidminer, Weka, Spiderminer, NLTK
Prediction	Rapidminer, Weka, Spiderminer, NLTK

My five Steps for the DM process can be described like this:

1. Focus, Collect and Select real data that i think is relevant for my analysis.
2. Filter & Cleanup my input data.
3. Transform (Point 1,2 and 3) with Association, Clustering, Classification.
4. DM.
5. Evaluate my results and select the customers who meet my criteria i wanted to achieve for better ROI.
6. Metrics will be used for the evaluation of the results, such as the calculation of the prediction error with root mean square error.

## Results

The first experiment I did with original data was for a well-known educational group in Greece with online courses.

I have studied and adopted various Data Mining techniques. One of them is that we utilized demographic, geographical and behavioral data of ten years of the client, more specifically the following eight years original data in excel: Customer Id, Gender, Age, Email, Specialty, Academic Level, Region, City, Origin of Registration, Registration Period, Registration Cost, Device. To be able to achieve the following Project Goals:

- Segmenting customers
- Understanding customer lifetime value of Bachelors
- Sophisticated campaign performance optimization

So, through the Data Mining Tool, called RapidMiner Studio, we applied the following procedure for both predictions and clusters and we found that, the bachelor with the highest lifetime value, but also maximizing future revenues and profit, proved to be the Bachelor of Psychology.

### Profits

Profits from Model: -4,531      Profits for Best Option (BSc (Hons) Psychology Science): -3,111      Gain: -1,420

Knowing that the program with the highest lifetime value was BSc Psychology, we did sophisticated optimizations in Google and Social Ads and we achieved the following results:

#### Scaling YoY

01/01/22 until 28/05/22

- Online Leads + 350%
- Total Cost per program - 41%
- Conversion Rate + 97%

#### Conclusions and Discussion

The study aims to contribute to the literature on data mining techniques and business intelligence in ecommerce. Moreover, the findings of insightful data from five business sectors, offer practical implications for the research and development of the clients and companies and will narrow the gap between digital marketing agencies and niche digital markets. The purpose of this study aims to create a digital platform with insightful data for niche digital markets. A platform, that will help clients and companies in measuring all important metrics & thereby plan their strategies for better results.

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## **STRATEGIC LEADERSHIP CHARACTERISTICS FOR ADOPTING DIGITAL TECHNOLOGY AND ENSURING ORGANIZATIONAL RESILIENCE**

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**Purpose:** Creating organizational resilience and delivering social impact is becoming a must for all businesses. Based on the adoption of digital technologies, enterprises are enabled with dynamic approaches to address complex business- and societal challenges and opportunities. The purpose of the research is to identify the critical strategic leadership characteristics for adopting digital technology to build organizational resilience.

**Methodology:** Critical literature review.

**Findings:** Contextual ambidexterity, adoption and application of digital technology are seen to be a key driver in the societal question and tools to boost organizational resilience. Sensing, seizing and driving digital adoption agenda as well as digital transformation are critical and require unique leadership attributes such as dynamic capabilities.

**Research limitations/implications:** limited previous research studies. Further research is needed based on the empirical studies on the strategic leadership characteristics in different industries and contexts to ensure organizational resilience.

**Practical implications:** The research results can be used for identifying which attributes strategic leaders must develop for adopting and applying social digital technology to generate both a profit and positive social impact while boosting organizational resilience.

**Originality/value:** The authors believe this will be the first scientific attempt to create a theoretical and practical foundation by bridging the research gap in strategic leadership, digital technologies, social impact, and organizational resilience.

**Keywords:** digital technology, resilience, social impact, shared value, sustainability, strategic leadership.

## 1.0 Introduction

Creating organizational resilience and delivering social impact is becoming a must for all businesses. Based on the adoption of digital technologies, enterprises are enabled with agile and innovative approaches to address complex societal challenges and opportunities. The purpose of the research is to identify the critical strategic leadership attributes for adopting and applying social digital technology.

## 2.0 Theoretical background

### 2.1 Organizational resilience

This paper presents definitions which define organizational resilience as a heterogeneous phenomenon with two main forms, strategic resilience and operational resilience. Each with different focus areas for strategic leaders (Hepfer & Lawrence, 2022).

Organizational resilience is the ability of a company to respond to disruptions, adversity and to recover from both internal and external shocks (Vidal, et al., 2014). Belalcázar (2017) defines organizational resilience as the unique characteristic of an organization that allows it to successfully cope with internal and external changes and events. It is the ability of systems to return to a normal state after an event of fault or disturbance (Belalcázar, et al., 2017). It is important to notice that according to scholars, organizational resilience consists of two parts. One being strategic resilience where focus is on anticipating, planning and preparing for potential disruptions. The other part being operational resilience which focuses on withstanding and rebounding from any disruption, shock or disturbance due to internal or external circumstances (Hepfer & Lawrence, 2022).

### 2.2 Strategic leadership

Strategic leadership is viewed upon as the foundation for the successful performance of any organization operating in the constantly changing and complex environment of the 21st century (Jaleha & Machuki, 2018). Hitt et al. (1998) and Ireland and Hitt (1999) described the capabilities

needed for effective strategic leadership in the new competitive landscape expected for the 21st century.

Hambrick & Quigley (2014) continues by pointing out that “scholars are yet to agree on the conceptualization and operationalization of contextual conditions strategic leaders face”. There is no common understanding among researchers of the conditions and factors impacting the operations of strategic leaders (Graffin & Quigley, 2016).

Development of strategic leadership, it is clear that early stages there was a more narrow focus and strategic leaders' main priority was to make decisions and create financial results. Later, Teece et al. identified firms, markets and environment as dynamic, hence the role of strategic leaders became broader with focus on how to build unique capabilities to ensure a competitive advantage. The dynamic capability view posits that a firm's success is largely driven by its ability to adapt to a changing environment to secure value-creating potential and thus achieve a competitive advantage (J. Teece, 2018). Moreover, dynamic capability is driving innovation and is closely connected with ambidexterity (Birkinshaw & Gibson, 2004) (Schoemaker, et al., 2018). With this, developments in transformational strategic leadership also promote ambidexterity where strategic leaders are focusing on the internal resources of the firm and how to exploit those, while at the same time exploring new opportunities and trends in the market (O'Reilly & Tushman, 2007). Most recently, focus on the societal aspect has been increasing, requesting leaders to create a positive social impact while creating financial value (Burgelman, et al., 2017) (Kramer, 2018).

## 3.0 Methodology

This section was carried out by using relevant aspects of the methodology of the systematic literature review proposed by Kitchenham (Kitchenham, 2009).

Being able to access the knowledge produced about a certain subject is essential for the development of quality research. In this case the certain subjects are “strategic leadership” and

“organizational resilience”. Therefore, to be efficient in searching the electronic data base, two search strings are identified: “strategic leadership”, “organizational resilience” (Nobre, 2007). The selected search strings were executed in the electronic database Scopus.

Scopus was selected as it’s the largest abstract and citation database of peer-reviewed literature (Scopus, 2020) From the database, the selection of the publications was conducted through a three stage process. First, exclusion criteria (EC), then inclusion criteria (IC) and lastly a validation of the quality criteria were applied (QC). The definition and order of the EC are EC1: studies published before year 2000 and after year 2021. This has been selected to ensure a range of data that can identify trends and the to exclude studies published after 2021 is to avoid the data from being skewed due to only half of 2022 has passed. EC2: studies published in other languages than English. EC3: studies which are not available as “open access” publications.

Analysis will follow two stage analysis process. Scopus Analysis will be applied to understand trends. Second, a bibliometric analysis will be conducted by using VOSviewer (VOSviewer, 2021).

**4.0 Discussion**

**4.1 Organizational resilience**

The search string “organizational resilience” returned 610 publications in total with 138 being published in 2021.

The key here is that, it is not only the quantity of

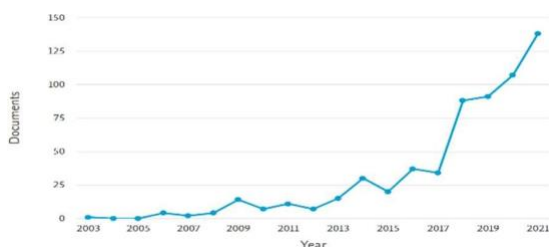


Figure 1 Organizational resilience documents per year

Source: Scopus

articles, but the diverse areas of which scholars are researching and publishing on strategic leadership.

Three clusters for organizational resilience, is a bibliometric analysis conducted to identify directions.

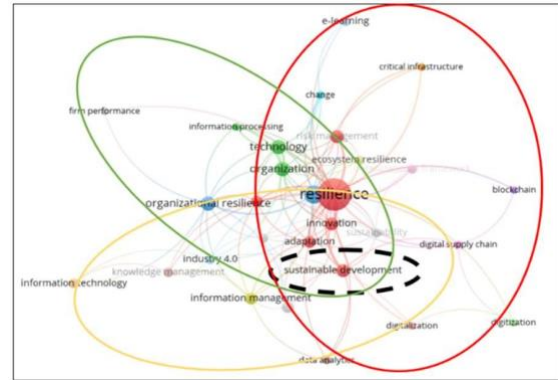


Figure 2 Resilience Bibliometric analysis

Source: VOSviewer

The first cluster, digital technology, marked with red is focusing on both exploring trends and developments as well as adoption of digital technologies to build resilient processes (Heinz, et al., 2021). The strategic leadership cluster, marked with green is focusing on the role of the leader when anticipating and withstanding disruptions. Key here is that more recently, resilience, technology and firm performance has been shown to be correlated. The data cluster, marked with yellow focuses on the move away from big data, to focus on quality data and moving away from data silos to have data lakes (He, et al., 2022).

## 4.2 Strategic leadership

The search string “strategic leadership” returned 657 publications in total with 111 being published in 2021.

This indicates a significant interest in the topic by researchers and with the past four years accounting for nearly half of all publications, this is a trending research topic. The key here is also

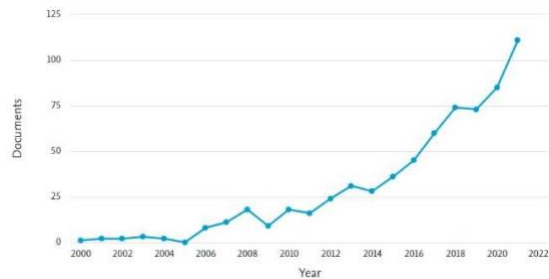


Figure 2 Strategic leadership, documents per year

Source: Scopus 2021

that, it is not only the quantity of articles, but the diverse areas of which scholars are publishing.

From the bibliometric analysis, seen in the figure 4 below, it has been divided into the three research clusters.

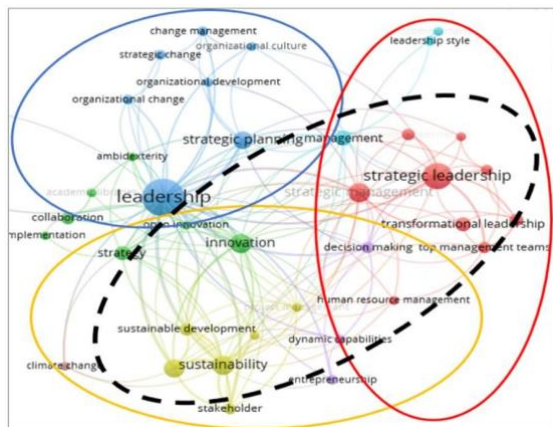


Figure 4 Strategic leadership Bibliometric analysis

Source: VOSviewer

Marked with blue, the Performance Strategic leadership cluster plays a predominant role in the financial performance and strategic planning of a firm (Hiller, et al., 2011).

Transformational strategic leadership cluster marked with red (Bass, 1999) focuses on inspiration, motivation and empowerment of employees.

Dynamic Strategic leadership theory cluster, marked with yellow, has a great focus on how leaders ensure that the firm is socially responsible (Fernandes, et al., 2022). Predominant factors are sustainability of the firm and its surroundings related to Environmental, Social and Economic. Moreover, the dynamic strategic leader focuses on exploring trends in the market and how digital adoption can support the firm, its employees and external stakeholders

With increased automation and the move to a digital economy, organizational resources’ leadership and strategic use are of critical significance (Fernandes et. al, 2022). Moreover, Changes in fundamental industry dynamics, technologies, and strategies that create opportunities to develop new visions, create new strategies, and move their organizations in new directions (Burgelman & Grove, 2007).

Transformational strategic leadership also promotes ambidexterity were strategic leader are focusing on the internal resources of the firm and how to exploit those, while at the same time explores new opportunities and trends in the market 3 (O’Reilly & Tushman, 2007). 3. Dynamic Strategic Leadership has the social issues and sustainability as a fundamental element of doing business. The strategic leader is focused on adopting digital technology to amplify the social and financial impact. Dynamic capabilities are supporting this view that sensing, seizing and transforming businesses towards a specific directing is key (Fitzgerald, et al., 2013).

Based on the literature review and bibliometric analysis the key findings are as follows.

Ambidexterity is identified as a main characteristic of strategic leadership and in this regard can be identified under contextual ambidexterity where strategic leaders on one side exploit resources of the enterprise and thereby decrease variance, creating resilient operations, while delivering financial value.

On the other hand, the ambidextrous strategic leader is focused on explore trends within their sector and beyond. With exploration, strategic leaders increase variance in an attempt to sense and seize new opportunities, preparing on a strategic level for disturbances, opportunities and shocks – that is, strategic resilience. Another characteristic is driving transformation. Sensing and seizing emerging opportunities will translate into a transformation, hence the strategic leader will be driving the transformation. Success transformation is initiated by the strategic leader, but must be executed by employees on a tactical and operational level.

Hence, empowering employees is another characteristic of strategic leaders. For the employee to have the skills to use the power given from the strategic leader, the strategic leader must develop internal knowledge, that is bringing in what was explored, adding to internal resources. Performance strategic leadership cluster, identified that, engaging with internal- and external stakeholders. This showed to be especially important when the enterprise promised to create social value.

The exploration part from the ambidextrous leader and connected with sensing from dynamic capabilities, strategic resilience is created. Exploitation related to seizing and transforming is connected to operational resilience.

Transformation is in the intersection between exploring and exploiting, and will eventually translate new resources into operational resilience.

Digital technology adoption is moderating the relationship. This indicates the enterprise ability to assess and adopt digital technology which will help strategic leaders build resilience while creating both financial and social value.

## 5.0 Conclusion

The authors believe this will be the first scientific attempt to bridge research streams in strategic leadership, digital technologies, social impact, and organizational resilience.

The role of the strategic leader has evolved from focusing on decision making and financial performance, to including wellbeing, motivation and upskilling of employees and most recently, ensure the firm is making a positive social impact. The interchange between three theoretical directions was identified as being a critical area for a future research agenda. Therefore, strategic leaders must maintain focusing on internal as well as external areas.

Explore the market, the trends and stakeholder ecosystems, then to exploit new knowledge gained during exploration.

Hence, sustainable development, ambidexterity and digital technology are all acting as critical areas for any enterprise aiming to build organizational resilience and eventually deliver above-average financial returns while creating a positive social impact.

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# CHALLENGES TO CREDIT RISK MANAGEMENT IN THE CONTEXT OF GROWING MACROECONOMIC INSTABILITY IN THE BALTIC STATES CAUSED BY COVID-19

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## Abstract.

The deterioration of the economic situation during Covid-19 has raised the issue of the quality of banks' assets and, in particular, the growth of non-performing loans (NPL). This is a topical issue not only for banks which, in this context, incur additional costs for allowances and capital requirements but also for society as a whole, as credit availability is likely to be reduced. The Baltic states experienced a particularly severe financial crisis in 2008-2009, resulting in a rapid increase in NPLs. This paper analyses the factors affecting NPLs in the Baltic States, using information available from IMF, Eurostat and applying relevant econometric modelling methods.

The results of the study show that credit risk management in the Baltic States has significantly improved compared to the period before the GFC, the capitalization of credit institutions is one of the highest in the EU, banks are liquid and profitable. Lending recovered from the downturn in the first phase of the pandemic, and credit institutions have taken advantage of the ECB's long-term funding program ITRMO III to improve the liquidity outlook.

Although the credit quality of commercial banks has not deteriorated, as the exposures of credit institutions in the most affected sectors are insignificant and governments have provided fiscal support to businesses and households, some challenges remain. The increase in credit risk is expected due to rising production prices, as well as the rebuilding of disrupted supply chains. The findings allow conclusions to be drawn on the necessary actions to mitigate credit risk of the banking sector.

**Keywords:** Credit Risk Management, Macroeconomic Instability, Econometric Modelling

**JEL Classification:** G21, O16, C53.

## Introduction

The Covid-19 pandemic has posed significant challenges to economies and financial markets around the world, and the Baltic States are no exception. It is worth remembering that during the global financial crisis (GFC), the Baltic States were among those that received one of the worst shocks in 2008-2010, cumulative GDP decline in Estonia was -17.3%, Latvia -21.9% and Lithuania -10.5% (IMF, 2022). Although the impact of the pandemic on the macroeconomic situation was significantly milder, all three Baltic countries experienced declining GDP in 2020 and the deterioration in banks' asset quality. Consequently, lower profitability may limit the ability to absorb higher credit losses in the future and reduce the capacity to provide the necessary financing for economic development (Colak & Ozterkin, 2021; Czech & Puszer, 2021; Dursun- de Neef & Schandlbauer, 2021; Teresiene et al, 2021). In addition, the pandemic has created new challenges, especially in the context of rising inflation starting second half of 2021, which will have an impact on customers' ability to repay their

loans. Therefore, it is very important for bank supervisors, monetary and fiscal authorities to get a clear picture of the size and quality of banks' assets in different development scenarios when planning the necessary response and possible support measures. In this paper, these considerations are supported by a simulation analysis that estimates the potential growth of banks' NPLs using a variety of assumptions. The article also examines the future impact on banks' capital adequacy and discusses whether policy responses may be needed to address declining asset quality and capital buffers.

Over the last ten years, the banking sector has significantly improved its risk management policies and practices, increased capital ratios on its balance sheets, and created risk reserves (Anginer et al, 2021; Clichici, 2021). IMF data confirm that by the end of 2019, the quality of banking sector assets, capital adequacy and liquidity had improved significantly. However, during this period, the economic environment did not pose significant challenges, and it was only with the onset of the pandemic in 2020 that the issue of the sector's risk resilience came to the fore again. Therefore, it is important to

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understand whether the significant changes introduced in the regulation of the financial sector and the reforms carried out have significantly improved resilience and contributed to the sustainability of society and the financial sector. Taking into account the specifics of the activity, the risk structure of the Baltic commercial banks is strongly dominated by credit risk, accounting for more than 88% of total risk-weighted assets, and thus the main focus of this article is on credit risk management challenges.

## 1. Theoretical Background

The COVID-19 pandemic and related constraints affected different sectors differently (Kozak, 2021) and thus the macroeconomic situation in 2020-2021 differed significantly from that observed during the GFC. In addition, it should be noted that the companies affected were provided with significant monetary and fiscal support to stabilize their financial situation in 2020 and 2021 (Demirgüç-Kunt et al, 2020). Both direct support from governments for companies affected by restrictions, loan guarantees, a moratorium on loan repayments and other fiscal support instruments, played an important role (Giese & Haldane, 2020; Didier et al, 2021). Consequently, the liquidity support and assistance program for borrowers mitigated the negative effects of the pandemic, incl. reduced the cost of credit risk growth for commercial banks. On the other hand, the above solutions had an impact on banks' interest income and thus on profitability. In the long run, extending the credit repayment moratorium may accumulate credit risk and increase write-offs for credit risk according to IFRS 9 (Neisen & Schulte-Mattler, 2021). High uncertainty in macroeconomic development is an important reason why a scenario analysis approach should be used in

credit risk management (Apergis, 2022).

Non-performing loans ratio (NPLs) have traditionally been used to assess credit risk and macroeconomic indicators such as GDP growth (Ari et al., 2021; Apergis, 2022; Park et al, 2021; Spilbergs, 2022), unemployment (Ari et al., 2021; Spilbergs, 2022) and inflation rate (Ari et al., 2021; Park & Shin, 2021; Spilbergs, 2022) etc. are most often used as factors influencing NPLs.

Based on literature review the following hypotheses were formulated:

**Hypothesis 1.** There is a negative association between NPL level and GDP growth.

**Hypothesis 2.** There is a positive association between NPL and unemployment level.

**Hypothesis 3.** There is a positive association between NPL and inflation.

## 2. Data and methods

IMF Financial Soundness Indicators (IMF, 2022) data for Baltic states from 2001 to 2021 were used to test research hypotheses and regression analysis was used to investigate the effect of macroeconomic factors on the NPLs of the Baltic countries. The associations between the NPLs and macroeconomic factors can be described as follows:

$$NPL = \beta_0 + \beta_1 GDP + \beta_2 UPL + \beta_3 CPI + \varepsilon, (1)$$

where *NPL* – non-performing loans ratio,

$\beta_0$  – intercept;

$\beta_1, \beta_2, \beta_3$  – regression coefficients;

*GDP* – GDP growth;

*UPL* – unemployment level;

*CPI* – consumer price index;

$\varepsilon$  – sampling error.

R package was used to assess the impact of macroeconomic factors on NPLs, as well to test regression models and parameters (R Core Team, 2022).

The stability of the calibrated regression models was evaluated applying *F*-test and the regression coefficients assessed using a *t*-test at a confidence level of  $\alpha = 0.05$ . The Breusch-Pagan test and the Shapiro-Wilk test were used to test the assumptions of the regression models and the variance inflation factor (*vif*) was used to quantify the effect of collinearity on the variance of regression estimates. In order to assess the impact of NPL changes on the capital adequacy of commercial banks in the Baltic States, the following regression model was calibrated:

$$TIC = \beta'_0 + \beta'_1 NPL + \varepsilon', (2)$$

where *TIC* - Tier1 capital to risk weighted assets,

$\beta'_0$  - intercept;

$\beta'_1$  - regression coefficient;

$\varepsilon'$  - sampling error.

As economic development is characterized by high uncertainty, two possible development scenarios for the next three years have been developed in order to estimate possible outcomes:

1) Baseline scenarios based on the IMF financial soundness indicators forecast (IMF, 2022);

2) worse case scenario (one in twenty years), based on macroeconomic indicators volatilities 2001 – 2021 in Baltic states.

### 3. Results

*F*-test results indicate high statistical stability of the model. Adjusted R-squared suggests that 81.9% of the variation in NPL can be explained by the factors included in the model.

Table 1. Regression model estimates

Adj. <i>R</i> <sup>2</sup>	<i>F</i> -stat	<i>df</i> <sub>1</sub>	<i>df</i> <sub>2</sub>	<i>p</i> -value
0.8191	36.08	8	54	<2.2e-16

Source: Author calculations

Homoscedasticity test results with Breusch-Pagan (BP) and Shapiro-Wilk (W) gives evidence to not reject the null of homoscedasticity.

Table 2. Regression model normality test results

<i>BP</i>	<i>p</i> -value	<i>W</i>	<i>p</i> -value
12.2840	0.1390	0.9784	0.3316

Source: Author calculations

As the *vif* estimates for all three factors are less than 5, it can be concluded that we do not have significant issues with multicollinearity.

Table 3. Regression coefficients collinearity test results

GDP	UPL	CPI
1.9778	2.8519	3.9914

Source: Author calculations

The following table summarizes the results of the regression coefficient tests.

Table 4. Regression coefficients estimates

Factor	Estimate	St.Error	<i>t</i> -stat	<i>p</i> -value
GDP	-0.3034	0.0778	-3.901	0.0003
UPL	1.3570	0.1365	9.943	8.373e-14
CPI	0.3109	0.0436	7.131	2.52e-09
Intercept	-19.8436	4.6037	-7.310	6.95e-05

Source: Author calculations

As can be seen, for all regression coefficients signs are as expected and statistically significant at the confidence level < 0.001 and thereof can be safely interpreted and applied.

The results of the simulation analysis according to the prepared scenarios regarding the expected dynamics of NPLs are as follows: in the baseline scenario the largest relative increase in NPLs is expected in Lithuania 2.5-3.0 times, in Estonia 1.9-2.3 times and in Latvia 1.3-1.7 times compared to the end of 2021 result. In the coming years, the NPL baseline scenario should gradually

decline in all three Baltic States. In the worst case scenario NPL is also expected to increase the most 6-7 times in Lithuania, 4-5 times in Estonia and 3.5-4.5 times in Latvia. The relatively higher growth of NPLs in Lithuania and partly also in Estonia can be explained by a relatively lower level at the end of 2021.

The results of the simulation analysis according to the prepared scenarios regarding the expected dynamics of Tier 1 capital to RWA (T1C) are as follows: in the baseline scenario a larger decrease in T1C is expected in Estonia 15-20%, Lithuania 10-15% and Latvia 8-12%, compared 2021 year-end results. In the coming years, the T1C in baseline scenario is expected to increase gradually in all three Baltic States. Also in the worst case scenario, the largest decrease in T1C is expected in Estonia by 25-30%, in Lithuania by 20-25%, but in Latvia by 18-23%. The relatively larger decrease in T1C in Estonia can be explained by the relatively higher level of T1C at the end of 2021.

### Conclusions

The effects of COVID-19 on the macroeconomic situation differed significantly from those observed during the GFC. The restrictions caused by the pandemic necessitated liquidity support in sectors directly related to customer service, disrupted supply chains and, consequently, increased credit risk in banks' loan portfolios in related segments.

Fiscal support provided by governments significantly reduced the negative impact of the pandemic on both corporate solvency and unemployment. In turn, the liquidity support provided by central banks enabled commercial banks not to reduce the supply of credit in the financial market.

Calibrate regression models and tests performed show that rising unemployment and inflation lead to increase of NPLs, while GDP growth contributes to declining NPLs. Taking into account the current macroeconomic trends, especially the rapid increase of inflation, it is important for the managers of the Baltic commercial banks to be aware that an increase in the inflation index by one point causes an increase in the NPL by 0.31 basis points and increase of unemployment level by 1% causes increase by 1.36%.

The results of the simulation modelling confirm that the commercial banks of the Baltic States have significantly improved their credit risk

management after the GFC and strengthened their capital positions, which allows absorbing even 5-6 times the increase in NPLs and related credit losses. However, this conclusion applies only to the Baltic commercial banking system as a whole in each country, but not to each individual bank, as the study used aggregated data available from the IMF (IMF, 2022).

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# ANTECEDENTS OF THE SHADOW ECONOMY: QUALITATIVE INSIGHT INTO THE STORIES BEHIND THE SHADOWS

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## Abstract.

- Outline: Despite shadow economy being a topic of significant interest both among developed and developing economies, there are major gaps in understanding of constituent and antecedent factors on micro-level. The aim of the reported study is to offer qualitative insight into why individuals enter, partake and leave (or don't) shadow economy in Latvia.
- Methods: Data was collected using interviews that emphasized in-depth storytelling. 30 individuals representing three sectors of the economy most affected by shadow economy in Latvia – construction, retail, and services – were interviewed.
- Findings: Our findings highlight the role of historical and transactional factors, in addition to the structural factors the research on which comprises the bulk of extant literature. With respect to reduction of shadow economic activity, we report on the negative role of institutional memory, and on the positive role of job specific skills and qualifications.
- Research limitations: the nature and scope of the study does not allow for generalization. Also, only three sectors of the economy were targeted in a single country.
- Practical implications: the study has practical implications for tax aversion policy by shedding light on the stories behind the statistics
- Originality/value: To the best of authors' knowledge, this is the first study on the topic designed using the process-based epistemology. We argue that application of process-based perspectives and methods shows potential for interesting research in this field of study.

**Keywords:** shadow economy, process studies, qualitative research

**JEL Classification:** O17

## Introduction

While extant literature on shadow economy highlights a great deal of valuable macro-level insights about how individuals and groups conceal their economic activity from the state, very little is to be found about intentions and stories – ie. qualitative insight – of those participating, entering, or leaving the shadow economy. Acknowledging intentionality is an important step towards developing a more refined understanding of why individuals and organizations choose to misreport their economic activity to state authorities. There are, in essence, two ways to think about intentionality – First, following Durkheim (1898), as shaped and governed by collective trends and forces external to the individual actor, and, Second, following

Weber (1922), as informed by societal norms and expectations that are perceived, and acted upon, by the individual actor. In the case of the former, the paradigm is that individual economic actors are compelled to go along with the will of the collective, even if their personal convictions are incommensurable with it, while in the case of the latter, individual economic actors shape their decisions based on what they perceive the norms and expectations of society to be towards them. Because traditional models of tax evasion are based around the primacy of such structural conditions as tax and income rate, probability of audit, penalties for non-compliance, adding intentionality into the mix helps open the doors for less straightforward explanations centred around tax morale, social norms, and willingness of economic actors to contribute to the public good.

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In order to gain novel insight into why individuals participate in the shadow economy, we conducted a series of qualitative interviews with individuals working in three different industries most affected by shadow economy in Latvia – construction, retail, and services (Sauka & Putniņš, 2019).

While exploratory in nature, our work points at a potentially valuable paradigms and directions for further research not currently developed by scholars of shadow economy.

## 1. Theoretical Background

A common thread that distinguishes shadow economy from, for example, the broader ‘non-observable economy’ which encapsulates illegal and undetected activities (see Adair, 2018 for an overview), is that shadow economy is concerned with legal market activities that go unreported to tax authorities (Castells and Portes, 1989; Venkatesh, 2006; LaPorta and Schleifer, 2008; Williams, 2011). The current prevailing paradigm in the literature is that while the shadow economy and tax evasion are not congruent, in most cases activities in the shadow economy imply the evasion of direct or indirect taxes, such that the factors determining tax evasion will most certainly also affect the shadow economy (Schneider, 2014). Accordingly, vast majority of extant research is focused on taxation and other aspects of macro-economic policy, complemented by adjacent stream of research on tax morale and intrinsic motivation (Feld and Frey, 2007; Posner, 2000), as well as certain institutional arrangements (see Scheinder (2014) for an overview).

Our work takes cue from Sandberg and Alvesson (2020) to attempt a problematization of existing literature by means of, in this case, empirically grounded paradigmatic problematization. In essence, we set out to scrutinise the underpinning assumptions about participation in the shadow economy by trading quantitative breadth in for qualitative depth.

## 2. Methodology

In so far as resource and time constraints surrounding the study allowed, our research was designed to elicit spanning, rich narratives of

individual experiences that would allow us to engage in inductive analysis based around the general principles of grounded theory. To this end, we conducted 30 in-depth qualitative interviews which were then analysed using Gioia methodology (a suitable analytical framework developed from grounded theory but more readily applicable to smaller, exploratory studies such as ours) (Gioia et al., 2013).

The sensitive nature of our research question compounded by the chosen data collection instrument made recruiting the sample highly challenging. For this reason, we resorted to judgement sampling, aiming to recruit an approximate 10 respondents per industry (construction, retail, services). Based on the research question at hand, intra-industry sample was deemed homogenous enough to apply the guiding quantity of 6-7 interviews (Guest et al., 2020). Indeed, we found that, in most cases, data saturation in our sample was achieved at about 8-9 interviews. All respondent data was anonymised.

## 3. Results

### 3.1. Services sector

In Latvia, services comprise 64.7% of GDP and employ 70% of economically active population. The share of shadow economy in the services sector is estimated at 20.7% (Sauka & Putniņš, 2019).

We found that employees and employers in this sector displayed rather creative ways of evading state tax authorities, using such mechanisms as: use of special tax regimes, re-routing of money, use of foreign accounts and organizations (real or fictional), remuneration concealed as work trip money, payments in cryptocurrency, dividends, as well as employment without contract.

The most common explanation for such behaviour on behalf of employers was the tax wedge – it was perceived to not be commercially viable to pay full salary with all the necessary taxes, or, alternatively, doing so would render firms non-competitive. As a result, service organizations tend to do one of two things – either pay salaries in cash or conceal work.

The trend of paying in cash (“envelope pay”) has a long history that dates back to the collapse of the Soviet Union and the subsequent, rapid liberalization of the economy coupled with, at the

time, weak state institutions. In that environment, availability of cash and weak oversight provided little incentive to follow administrative procedures for tax compliance. Our interviews suggested that old habits die hard and, where there is still an abundance of cash transactions, employers simply continue the practice. Where, on the other hand, quantity of cash decreased, organizations found ways to exit the shadow economy and adopt the necessary administrative procedures. This is an example of 'pressure from above' having a positive effect on reducing the shadow economy.

We also observed effects of 'pressure from below', where employers were pushed by their employees to exit the shadow economy because employees wanted to make use of financial instruments (loans, mortgages, leases, etc.) that are not available to them in absence of traceable records of income. Respondents reiterated the theme that while in recent past banks would, unofficially, consider undeclared income in their lending decisions, this is no longer the case. The situation is similar with respect to such mechanisms as routing pay via foreign accounts or companies, or payments in cryptocurrencies.

Still, pressure from below is only an emerging trait and employers who wish to evade taxes retain a significant amount of bargaining power in majority of cases. Thus, there is a mutual understanding that undeclared, or partially declared, wage is a necessary compromise for employers to remain competitive and for employees to secure employment. We did observe a persistent trend where employees with higher relative bargaining power (ie higher qualified, more difficult to replace employees) reduced the share of shadow economy, whereas employees with low bargaining power increased or sustained it.

### **3.2. Construction**

While construction sector only comprises 6.5% of Latvian GDP, it is the sector most affected by shadow economy, estimated at 33,3% (Sauka & Putniņš, 2019).

While there are major similarities with the services sector in the methods and reasons for tax avoidance, the presence of electronic oversight system (EDLUS), reduction in availability of cash, and pressure from below (especially among the higher skilled and professional workers) does generate different dynamics in the sector.

Payment of fully not-declared wages is common for low skilled workers, and payment of partially-declared wages is common for junior professional and high-skilled workers. In some cases, wages are withheld from low-skilled workers altogether. This is done under the guise of health and safety – by applying a range of fines for various health and safety violations that add up to consume the wage amount thus removing the need to pay tax on labour. Use of special tax regimes is widespread.

When it comes to smaller companies, an added factor is pressure to engage in shadow economy from the client side. Due to relatively high cost of materials and relatively low levels of purchasing power, smaller or private clients regularly demand to pay for labour in cash, avoiding tax wedge. Interviewees reported that refusal to do so invariably leads to loss of business as clients take their business elsewhere.

### **3.3. Retail**

According to Sauka & Putniņš (2019), shadow economy in the retail sector accounts for 27.7%. We found that, in comparison to construction and services, tax evasion practices in the retail sector are significantly more aggressive. This is due to a variety of institutional factors, but primarily due to the interchangeability of low-skilled workforce, who have relatively low bargaining power vis a vis employers. Much like in other sectors, smaller firms argue that there are unable to compete without at least some degree of participation in the shadow economy. This is not the case with larger employers, where evasive practices appear to be largely absent.

## **Conclusions and Discussion**

The aim of our study was to generate more nuanced, qualitative understanding of why individuals, whether employees or employers, participate in the shadow economy. While we confirmed that tax policy has a significant role to play, our study also highlighted the importance of relative bargaining power between employees and employers. We found sustained proliferation of shadow economy and poor work practices in sectors reliant on low-skilled, interchangeable workforce. In contrast, sectors with specialised, highly-qualified workforce displayed a preponderance of examples where employees push themselves, and their employers, out of the shadow economy by virtue of having higher degree of bargaining power. In both cases, tax morale alone appeared to have very little to do with the process.

Based on our exploratory findings, further research should engage with larger samples and more contexts in order to validate and build upon the qualitative perspective on shadow economy.

### Acknowledgements

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## OPEN INNOVATION AND BUSINESS INCUBATION - MAIN RESULTS OF POSTDOCTORAL PROJECT "OPEN INNOVATION"

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**Abstract.** The open innovation (OI) is the actual framework for exploiting external resources and wider networks in doing innovation instead of just operating with in-house resources (Vanhaverbke et al., 2018). Business incubators are defined as a tool “to help small start-ups overcome liabilities of newness and smallness” (Vanderstraeten et al., 2020). Instead of playing a mere passive role, incubators now facilitate OI for their inhabitants by providing relevant services (Grama-Vigouroux and Royer, 2020). In the current, highly competitive business environment, outside-in open innovation (OI) has become a popular phenomenon (Ringel, Taylor, & Zablitz, 2017). Outside-in OI consists of purposefully bringing external knowledge (i.e., insights and ideas of external partners) into internal innovation processes (Bagherzadeh, Markovic, Cheng, & Vanhaverbeke, 2020). Accessing relevant external knowledge, and integrating it internally, is likely to enhance a firm’s innovation outcomes (Markovic et al., 2020). This research paper presents the main results of postdoctoral research project “Open Innovation” (2020- 2022) exploring the Open Innovation Paradigm in business incubation in order to improve the National Innovation Support System and business incubation scene. The following qualitative and quantitative research methods were applied – 1) national innovation expert interviews, 2) international business incubation and entrepreneurship support expert from Estonia and Finland interviews and best practice exchange during online mobility, 3) literature review on business incubation and Open Innovation, Sustainable value creation and Business modelling 4) national Latvia business incubators’ tenants survey, 5) national business incubation expert interviews. The main results proved the assumption that Latvia business incubator tenants utilize the OI outbound activities, whereas, OI inbound activities are less common in tenant performance. The pandemic facilitated changes in the national incubation system, promoting online co-creation, co-petition and collaboration in the business incubation field offering online nature services to tenants. The novelty of research is the attempt to rethink and redesign innovation support systems based on the Open Innovation Paradigm in order to promote the values and recognition of co-creation and collaboration in business incubation.

**Keywords:** open innovation; open innovation strategies; business incubation, business incubators, nascent entrepreneurs, innovation eco system

**JEL Classification:** 036; M13; O31

### Introduction

The Open innovation (OI) is the actual framework for exploiting external resources and wider networks in doing innovation instead of just operating with in-house resources (Vanhaverbke et al., 2018). Business incubators (BIs) are defined as a tool “to help small start-ups overcome liabilities of newness and smallness” (Vanderstraeten et al., 2020). This research paper presents the main results of postdoctoral research project “Open Innovation” conducted in Latvia in 2020 - 2022 exploring the Open Innovation Paradigm in business incubation in order to improve the National Innovation Support System. The novelty of research stems from the attempt to rethink and redesign innovation support systems based on the

Open Innovation Paradigm in order to promote the values and recognition of co-creation and collaboration, particularly, in the national business incubation

The project results proved the assumption that Latvia business incubator tenants utilize the OI outbound activities, whereas, OI inbound activities are less common in tenant performance. The pandemic facilitated changes in the national incubation system, promoting online co-creation, co-petition and collaboration in the business incubation field offering online nature services to tenants. External online expertise, as well as online mentoring support, were the OI outside-in strategy activities offered to tenants. The expert interviews proved the crucial role of pandemic in overall

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co-creation and collaboration between various quadruple stakeholders from business, academia, public and civil society. National business incubators' service offer analyses through Open Innovation approach proved that the current services are promoting the OI outside-in approach as defined by OI researchers. These findings were presented at eight international conferences, online expert panels and resulted in a practical "Business incubation guidelines" development in Latvian and English languages. These guidelines could be useful for business incubation practitioners and entrepreneurship support policy makers as are based on the international literature review, national and international expert interviews and best practice exchange from Finland and Estonia as project collaboration countries. Guideline structure was validated with national business incubation experts and incubator tenants.

## Theoretical Background

Business incubation and incubators are the core research object. The OI, Sustainability, Tenants performance and Incubator Services were selected as the research related dimensions. OI was the core concept of the initial theoretical framework, whereas, Sustainability and shared value creation and Institutional Theory were recognized as important theoretical framework components. The literature review reveals the main findings about actual trends in business incubation through the Open innovation approach. The following trends were identified - 1) incubators as OI Partners (e.g., Grama-Vigouroux & Royer, 2020; Carayannis et al., 2021); 2) networking as important inside-out and outside-in OI strategies (e.g., Klofsten et al., 2020; Barile et al., 2020); 3) tenant OI competences, motivation, partners, difficulties (e.g., Vanhaverbeke et al., 2018; Du Chatenier, et al., 2010); 4) Globalization and Internationalization facilitated by OI strategies/ activities/ actors/ artifacts (Tsai et al., 2009; Zykiene et al., 2021); 5) Sustainability and shared value creation promoted through OI (e.g., Hull et al., 2021; Barile et al., 2020), particularly recently promoted by the green course of EU agenda (European Commission, 2019) and Sustainable Development Goals globally (Halkos & Gkampoura, 2021).

Instead of playing a mere passive role, incubators now facilitate OI for their inhabitants by providing relevant services (Grama-Vigouroux and Royer, 2020). In the current, highly competitive business environment, outside-in open innovation (OI) has become a popular phenomenon (e.g., Ringel, Taylor, & Zablitz, 2017). Outside-in OI consists of purposefully bringing external knowledge (i.e., insights and ideas of external partners) into internal innovation processes (Bagherzadeh, Markovic, Cheng, & Vanhaverbeke, 2020). Accessing relevant external knowledge, and integrating it internally, is likely to enhance a firm's innovation outcomes (Markovic et al., 2020).

## Methodology

In order to achieve project results the following qualitative and quantitative research methods were applied – 1) national innovation expert interviews, 2) international business incubation and entrepreneurship support expert from Estonia and Finland interviews and best practice exchange during online mobility, 3) literature review on business incubation and Open Innovation, Sustainable value creation and Business modelling 4) national Latvia business incubators' tenants survey, 5) national business incubation expert interviews. The research dimensions were Open Innovation, Sustainability, Tenants Performance and Incubator Services. The Figure 1 below presents the project research logic, activities and intellectual results.

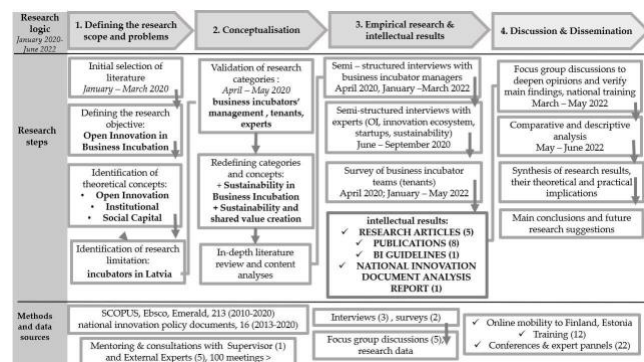


Figure 1. Project research logic, activities and intellectual results, author, 2022

## Results

The analysis of preliminary data proved the assumption that Latvia business incubator tenants utilize the OI outbound activities, whereas, OI inbound activities are less common in tenant performance. The pandemic facilitated changes in the national incubation system, promoting online co-creation, co-petition and collaboration in the business incubation field offering online nature services to tenants. External online expertise, as well as online mentoring support, were the OI outside-in strategy activities offered to tenants. The expert interviews proved the crucial role of pandemic in overall co-creation and collaboration between various quadruple stakeholders from business, academia, public and civil society. National business incubators' service offer analyses through Open Innovation approach proved that the current services are promoting the OI outside-in approach as defined by OI researchers. OI outside-in approach is mainly promoted through business consultancy and infrastructure service, whereas, inside-out approach is observed through networking services, such as 1) participation in Latvia's largest new business community and 2) free participation in the joint stand of business incubators in industry fairs, pop-up stalls. This finding corresponds to the crucial role of networking services now-a-days mentioned in the literature review as networking is both knowledge sharing and bringing. Dominance of OI outside-in approach in business incubation programme is beneficial to tenants as they seek new knowledge in innovation process, thus, external partners such as business consultants, mentors, experts, other companies and external network participants may serve as knowledge and inspiration source.

The "Business Incubation and Open Innovation ABC" as the guidelines for business incubators are one of intellectual results. The inclusion of Open Innovation paradigm as co-creation and collaboration approach and Sustainability related dimensions in business incubation proposal is the practical implication suggested by this research. National business incubators' service offer improvements through Open Innovation approach is practical novelty of this project.

Firstly, the main conclusions from literature review are related to the trends in business incubation through the Open innovation approach. Business incubators now-a-day serve as OI Partners providing access to networking as important inside-out and outside-in OI strategies as stated by Klofsten et al., 2020 and Barile et al., 2020.

Secondly, based on the empirical research (expert interviews and tenants focus group discussion) as well as tenants survey preliminary data analysis, tenants mostly tend to apply the OI outbound activities by attracting external knowledge, whereas, OI inbound (knowledge sharing) activities are less common in tenant performance. This could be explained by the first conclusion on business incubators and services providing mainly access to external resources. These findings are in line with Vanhaverbeke et al., 2020 and Markovic et al., 2020 proposing that in the current, highly competitive business environment, outside-in OI has become a popular phenomenon, outside-in OI consists of purposefully bringing external knowledge (i.e., insights and ideas of external partners) into internal innovation processes. Accessing relevant external knowledge, and integrating it internally, is likely to enhance a firm's innovation outcomes.

Finally, based on expert interviews and tenant focus group analyses, the pandemic facilitated changes in the national incubation system, promoting online co-creation, co-petition and collaboration in the business incubation field offering online nature services to tenants. Interviews proved the crucial role of pandemic in overall co-creation and collaboration between various quadruple stakeholders from business, academia, public and civil society. This conclusion could be a novelty and specific to national business incubation area and should be re-validated in other countries.

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**DIGITAL HEALTHCARE INNOVATIONS AND IDEA MANAGEMENT:  
DEMAND AND FUNDING TRENDS ANALYSIS**

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**Abstract.**

- Purpose : The aim of the paper is to analyse the global demand development and funding of digital healthcare innovations and also characterise idea management trends in the digital healthcare context.
- Design/ methodology/ approach: By analysing statistical data and case studies to reveal answers to the main questions identified in literature:
  1. How has the collecting of health-related information changed over the last three years?
  2. Has a pandemic boosted the demand for telemedicine?
  3. Has an increased demand for digital medical services been supported by the growing funding in these areas?
  4. Have some regions been supporting digital medical services by funding more than others? Is this approach data-driven?
  5. How could the demand boost new innovations in healthcare by web-based idea management systems?
- Findings: The changes in search habits for health information over the last three years have become statistically significant. The growth of funding volumes has followed these changes because both digital healthcare and digital therapeutics have increased much faster during pandemic times than before. The growth in 2020 compared to 2019 reached 53.9%, but in 2021 compared to 2020 it even accounted 74.7%. The Asian region and Europe have also seen a sharp increase in the leverage over the past two years, but pre-pandemic levels were significantly lower than in the United States. Average annual volumes of investments in digital health have increased by about 4.2 Bn\$ per year in the USA, by about 1.2 Bn\$ per year in Asia, by about 0.83Bn\$ per year in Europe and by about 0.15 Bn\$ per year in other regions. Such demand and funding could boost new innovations in healthcare with web-based idea management systems by internal, external, and mixed approaches in organisations with active and passive IMS. Plus, IMS could become a tool to create innovations in product or organisational innovation.
- Practical implications: The paper provides theoretical and practical insights into digital healthcare information that could be relevant for the public and private sectors to follow the demand and funding based on data-driven conclusions.

**Keywords:** digital healthcare innovations; idea management; funding analysis; digital healthcare innovations; web-based idea management systems; digital medicine

**JEL Classification:** I11; I15; O31; O32; O33

**Introduction**

The COVID-19 pandemic has triggered a paradigm shift – it is also referred to as the sense of urgency — for accelerating digital healthcare and well-being innovations, although not all new innovations are directly related to COVID-19. Many of the topical innovations have to do with

new findings related to Artificial intelligence (AI) solutions. For example, scanning healthcare images for the signs of additional conditions or AI-powered mental health apps, the innovation that combines health data with a personalized remote neurofeedback training to improve sleep or an app that enables at-home hormonemonitoring in real-time (Springwise, 2022). These are just few digital healthcare innovations

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which have been launched recently. The AI business platform model is virtually in affluence with the cloud SaaS model – it concerns AI solutions that can work together on the top layer of other digital systems (Mishra & Tripathi, 2021). One of the key questions is whether the growth in public-private funding followed these changes, and how web-based idea management systems (IMS) may support the ongoing digital healthcare innovations.

A digital healthcare innovation ecosystem has been researched by many researchers and has been highlighted as a very important one (Kuo, 2011; Laurenza, 2018; Raghupathi, 2009; Serbanati, 2011; Kouroubali, 2021; Nimmagadda, 2019; Oderanti, 2021; Ramadi, 2021; Regan, 2009; Segers & Gaile-Sarakne, 2021).

However, in this paper the authors will try to link it with a web-based idea management system potential. Web-based idea management systems (IMS) fall in line with the growing importance of information communication technologies, the spread of open innovation and co-innovation, etc. Especially systems based on the Internet during COVID-19 have become important tools in all sectors. Plus, over the last few years the changes related to digital healthcare have taken place and now in this context the questions have been raised. How could they be linked with a web-based IMS? What are digital healthcare innovation demands and funding trends?

To fill these gaps, the aim of the paper is to analyse the global demand development and funding for digital healthcare innovations and characterise idea management trends in digital healthcare context.

By analysing statistical data and case studies to reveal answers to main questions identified in literature:

1. How has the collecting of health-related information changed over the last three years?
2. Has a pandemic boosted the demand for telemedicine?
3. Has an increased demand for digital medical services been supported by the growing funding in these areas?
4. Have some regions been supporting digital medical services by funding more than others? Is this approach data-driven?
5. How could the demand boost new innovations in healthcare by web-based idea management systems?

The paper provides theoretical and practical insights into digital healthcare information that could be relevant for the public and private sectors to follow the demand and funding based on data-driven conclusions.

## Results

Leading countries in the search for health information online in this field, such as Finland (80%), the Netherlands (77%), Norway (77%), etc. are considerably ahead of Bulgaria (36%) and Romania (40%). At the same time, there has been variant progress over the last three years

In the European Union, telemedicine services were also developing rapidly during a pandemic. Eurofound data shows a different level of development of this service, in countries such as Finland, Slovenia, Poland, Ireland, and Lithuania accounting for more than 50%, while Malta, Germany, and France significantly below 30% (Eurofound, 2021).

The intensity of investments in the United States is significantly higher than in the rest of the world, but the development trend is markedly increasing both in the Asian region and in Europe.

The volumes of attracting digital medicine funding in the United States show a particularly rapid increase during a pandemic - the growth in 2020 compared to 2019 reached 53.9%, but in 2021 compared to 2020 even grew to 74.7%. The Asian region and Europe have also seen a sharp increase in leverage over the past two years, but pre-pandemic levels were significantly lower than in the United States.

Since  $\chi^2$ - statistic (69.08) is significantly greater than  $\chi^2$ - critical (43.77) at confidence level 0.95, we can conclude that changes in search habits for health information during the last three years have been statistically significant and, since  $\chi^2$ - statistic (135.06) is significantly greater than  $\chi^2$ - critical (38.89) at confidence level 0.95, we can conclude that changes in online health care services during the 2021 were statistically significant. These conclusions are supported by a low p-value (<0.001).

We can conclude that the average annual number of investments in digital health increased by about 176 transactions per year, but the number of investments in digital therapeutics - by 10 transactions on average per year.

The growth of funding volumes in both digital health care and digital therapeutics was increasing much faster during pandemic times than before.

The average annual number of investments in digital health grew by about 35 transactions per year in the USA, by about 64 transactions per year in Asia, by about 56 transactions per year in Europe, and by about 12 transactions per year in other regions.

The average annual volumes of investments in digital health rose by about 4.2 Bn\$ per year in the USA, by about 1.2 Bn\$ per year in Asia, by about 0.83 Bn\$ per year in Europe, and by about 0.15 Bn\$ per year in other regions.

Apps are the most common digital innovation created in health and well-being. More specific technologies that are commonly used are artificial innovations, biotech, the Internet of things, sensors, 3D printing, material science technologies. The most common topics that these cases are related to Coronavirus was one of the main topics for innovations – 191 innovations have been created in relation to this innovation.

To collect more ideas, it is important to involve different idea sources, that are, internal, external, and, also sometimes to use mixed IMS approaches. After source selection organisations should be selected if they would like to define a specific task.

## **Conclusions and Discussion**

Academic contribution. The authors of the paper have concentrated their attention on the COVID-19 period that was the time of changes in healthcare and have described the demand changes during that period by answering to the research questions. In this paper, the authors have tried to link it with a web-based idea management system potential. Most common technologies and topics for healthcare innovations have been reviewed.

Regression models were calibrated to determine trends in the intensity of digital health care funding and the parameters. The parameters of calibrated regression models to determine trends in the volumes of digital health care funding have been analysed. The parameters of calibrated regression models to determine trends in the intensity of digital health care funding by regions have been researched. The parameters of calibrated regression models to determine trends in the volumes of digital health care funding by regions have been summarized.

Practical contribution. The paper widens the understanding about funding and demand, which could practically help organisations to understand the existing demand and the supply of innovations to create new digital healthcare innovations.

Future research studies should deal with the limitations of innovation databases analysed - more databases should be included and compared.

At the moment, the research has highlighted overall technology and topic trends in healthcare innovations, but these elements should be researched in detail. Each part could be a separate research, for example, sensors, drones in healthcare or sustainability from a topic perspective.

In the paper, the authors have included only 5 cases but there are more cases, and they should be studied in detail because there is available information that could lead to the more detailed results about the supply of digital healthcare innovations.

There is limited information about web-based IMS applications in the healthcare industry publicly, so future research studies should use different methods to gain more in-depth information.

In the paper, the authors have not included detailed information about a web-based IMS as a potential process innovation in an organisation itself, but the future studies could focus on this aspect what organisational and process innovations these systems could provide.

There is so much happening so fast in this space embracing - Big Data, AI, Machine Learning, Genetics/Genomics and Multi-Omics – together with clinical science and technology and human expertise and motivation. It is rich indeed for exploration and research and especially in terms of choices which will need to be made about resource allocation for future focus and resource allocation.

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PhD, PostDoc researcher Elina Mikelsone is the founder of Idea Innovation Institute, also she is a researcher, a lecturer, and an entrepreneur. All areas of the author's life are related to innovation and idea management, at academic, professional, and personal levels. The author regularly presents scientific research or/and keynotes at various international scientific conferences and publishes articles in international scientific journals. The author has created a non-formal learning module, namely the Fitness of Ideas for enterprises, where more than 2000 participants have been engaged in it over the last 3 years. The author is a lecturer and a researcher at several organisations and universities,

for example, at Riga Technical University, at BA School of Business and Finance, at Riga Stradiņš University, at RISEBA, and at Business Management College. In 2016, the author established an Idea and Innovation Institute to promote innovation and the introduction of a new technology in organisations. In 2021, the author initiated a PostDoc project on idea management as a field expert/a researcher in Horizon2020 project Cities2030. Over the last 10 years, the author has consulted more than 400 enterprises on innovation and idea management. Elina is the author of more than 30 scientific articles, several book chapters, and a reviewer in several scientific journals. The author possesses more than 5 years of practical experience within a web-based IMS, as well as she is an expert at the Latvian Council of Science.

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Alan Barrell has spent almost 30 years in senior executive positions in technology-based industries and has become one of Cambridge's most articulate promoters of entrepreneurship. He was a founder shareholder in Library House Ltd and now is an Entrepreneur in Residence at the University's Centre for Entrepreneurial Learning and Visiting Professor of Enterprise at the University of Bedfordshire School of Graduate Business Studies. He is also Distinguished Guest Professor at Xiamen University, Visiting Professor at Shanghai College of Science and Technology and at the Fujian International School of Economics and Business, Fuzhou, all in China. He has taught at Tsinghua University Beijing, Fudan University in Shanghai, and Minjiang University, Fuzhou City. He acts as a Consultant to the China (Shanghai) Public Practising Base for Entrepreneurs. His interest in China, its history, people, and culture has become a significant feature of his life and work. Other appointments include Senior Enterprise Fellow, the University of Essex, International Fellow, Anglia Ruskin University Cambridge, and International

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# A BIBLIOMETRIC REVIEW OF AGILE LEADERSHIP: PUBLICATION TRENDS IN THE LAST DECADE

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**Abstract.** The dynamic political and business environment nowadays is pushing organizations towards adaptation of their existing business models, strategies, and structures as well exerting pressure on their leadership. Hence, the search for “alpha” is still ongoing and organizations are constantly progressing with their findings, thus pushing development further. The purpose of the study is to cover the main contributors to the development in the study field on the agile leadership and explore their different views.

This study offers a comprehensive overview on the scientific publications on agile leadership that have appeared in the last 10 years (2012-2022) in terms of subject areas, keywords, authors, and countries, thus proposing a comprehensive overview of the evolution of agile leadership as a postmodern leadership style.

To proceed with the study in a most accurate manner, bibliometric indicators from the Scopus database have been used. To accompany this study more granularly, VOS viewer software tool has been used.

The results show increasing interest on the agile leadership with rising trend in publications. Since European researchers are still underrepresented, there is a potential to establish a blueprint while providing insights on the European business.

Alluring, there is a trend shift in the subject area which could be explained by the COVID-19 pandemics affecting broader business areas. Thus, the applicability and impact of agile leadership in the other -than the IT - sectors is still to be evaluated.

To summarize, there is continued interest for both – the academics and practitioners – on the field of agile leadership and further implications on the impact of this leadership style are to be expected. There is a potential to set a new foundation on the academic discourse while studying agile leadership more broadly.

**Keywords:** bibliometric review, agile leadership, keywords, publication trends, leading authors

**JEL Classification:** M 12, M 54

## Introduction

Rigorous research involves a good theoretical base and a carefully thought-out methodology. This study is based on the systematic literature review – an inherently used review methodology to alloy the existing literature overview in the specific field as it has been showed by Kraus et al (2020).

The data for the study is based on the findings within Scopus core collection database – the most reputed and the increasingly used source-neutral abstract and citations databases.

To accompany this study more granularly, VOS viewer software tool has been used in order to construct and visualize the co-occurrence networks of main terms extracted from the corpus of the scientific literature. This study is based on several approaches of bibliometric analysis such as co-citation analysis and bibliographic coupling. These

both approaches have been chosen in order to cover the research front in agile leadership by covering both sides: the purely citation-based approach and related-probability approach.

## Theoretical background

Regarding the rapidly changing environment, the agility has become increasingly important. As outlined by Alsudairy and Vasista (2014), business and profit-oriented organizations are showing great concern towards sustainable development and are seeking to become more flexible and adaptable.

The flexibility means to act agile and be able to adapt to changes effectively and efficiently, for economic, environmental, and social benefits as stated by Clark (2007).

In the literature, there is an absence of uniformity notable with no single commonly used meaning of agile leadership.

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According to Perker et al (2015), agile leader may ongoingly interact with the team, while guiding and influencing the team behavior by defining, spreading, and maintaining organizational vision. In the most recent studies, Rigby et al (2020) is underlying the importance of the seizing the agile principles in order to establish itself as a truly agile enterprise, fostering the top officers in the C-suite of the company to embrace these principles. To uniformize the further studies with focus on agile leadership, the understanding of the natural evolution of the topic is needed.

## Methodology

The quantitative study of publications (Broadus, 1987) and its tasks to provide evolutionary models of the scholarship (White & McCain, 1989) aim to support the importance of the synthesis of previous works and help to consolidate the scientific literature in a field of agile leadership.

The importance of the comprehensive overview of the leading trends in a specific topic (Hood and Wilson, 2001) is underlined by the understanding of holistic approach and is providing an objective view of the specific topic.

Agile leadership per se is a relatively new leadership style and needs to be investigated more properly, especially with regard to its development, current and potential future trends. This extensive study is proving a more complete understanding of the agile leadership and determine the qualitative and quantitative challenges that occur in the study field. Moreover, this study creates a qualitative grouping of the main research trends and highlight research gaps.

Bibliometrics enables the recognition not only of the grade of the interest on the specific field, but also the identification of the most relevant authors as well as providing a holistic view on the agile leadership.

To qualitatively support the evaluation of the bibliographic data, VOS viewer tool has been used (Van Eck & Waltman, 2010, 2014).

## Results

In the period 2012-2022, 518 documents indexed in Scopus in total on "agile leadership". These 518

documents encompass 250 articles, 158 conference papers, 52 book chapters, 21 stand-alone books, 18 conference reviews, 14 reviews, 3 notes, each 1 editorial and letter.

Notably, 11 articles are still in the press and will be excluded for this study.

Consequently, only already published articles in Journals, in English and German will be further evaluated for the terms to provide more accurate picture on the field. Thus, 229 publications in total will be analyzed.<sup>1</sup>

Figure 1 represents the publication trends representing the last 10 years, showing a clear positive increasing trend in the topic itself. The current year 2022 is showing a slight decline in publication volume, however this could be explained that this study is conducted in Q3 2022, and 11 publications are still in the press, hence the year 2022 is not entirely representative for the study.

Notably to notice the rising publication trend starting with 2019 - shortly before the COVID-19 pandemics- while combining the data with the VOS viewer software tool data on network resulting from the co-citation analysis (overlay visualization), the researcher interest has been observed in the areas of organizational vision and objectives, leadership development and sustainable development, while shift of the researcher interest during and after the COVID-19 pandemics. The clear shift and the rising publication volume may be noticed during the 2020-2021, while main areas of the interest are covering transformational leadership, interpersonal communication, and human resources management. In addition, a clear shift in the subject areas has been recognized, while prior COVID-19 pandemics the core interest was laced on software development and project management and after and during COVID-19 pandemics, interest on health care prevailed.

<sup>1</sup> (TITLE-ABS-KEY ( agile AND leadership ) AND ( LIMIT-TO ( PUBYEAR , 2022 ) OR LIMIT-TO ( PUBYEAR , 2021 ) OR LIMIT-TO ( PUBYEAR , 2020 ) OR LIMIT-TO ( PUBYEAR , 2019 ) OR LIMIT-TO ( PUBYEAR , 2018 ) OR LIMIT-TO ( PUBYEAR , 2017 ) OR LIMIT-TO ( PUBYEAR , 2016 ) OR LIMIT-TO ( PUBYEAR , 2015 ) OR LIMIT-TO ( PUBYEAR ,

2014 ) OR LIMIT-TO ( PUBYEAR , 2013 ) OR LIMIT-TO ( PUBYEAR , 2012 ) ) AND ( LIMIT-TO ( PUBSTAGE , "final" ) ) AND ( LIMIT-TO ( DOCTYPE , "ar" ) ) AND ( LIMIT-TO ( LANGUAGE , "English" ) OR LIMIT-TO ( LANGUAGE , "German" ) ) AND ( LIMIT-TO ( SRCTYPE , "j" ) ) )

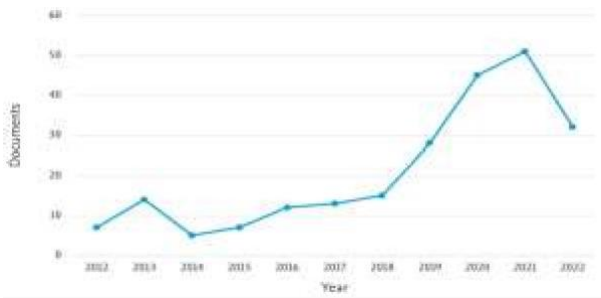


Figure 1 Publications on agile leadership by year

Figure 2 is representing the publications by country or territory while showing that majority of publications have been proved in the United States and the United Kingdom, following by Australia and India. The European countries are under-represented with only Germany being represented with 17 articles in total within the review period. Here, notably, that the peak for the publication in Germany has been reached in 2021 with 6 publications in total showing slowly interest of the European academics on the topic.

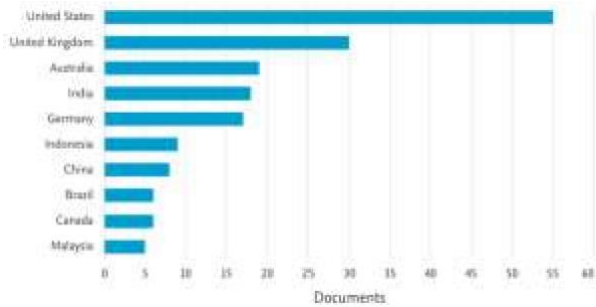


Figure 2 Publications on agile leadership by country or territory

Figure 3 lists the leading authors in terms of publication and its impact. To underline, that on the field of agile leadership Top-5 authors have reported only 11 articles in total, thus showing a general distribution of the knowledge and interest in the topic itself. Only one author out of Top-5 is showing single authorship of the publications,

producing publications in the years 2013, 2017 and 2018 accordingly. Instead, the clear trend on the co-authorship is notable on the topic of agile leadership in the last 3 years (2019-2022).

Notable, that the leading author on the field is proposing a new kind of management – agile one – to be fundamentally different on running organizations, that was the case until recently and this should not only be limited to a specific field such as software development and engineering, thus expanding the classic view on the agile leadership style (Denning, 2018).

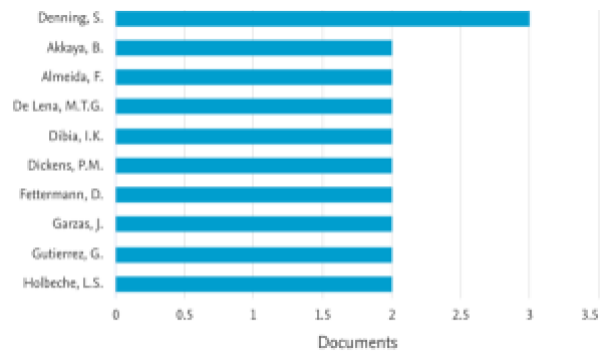


Figure 3 Publications on agile leadership by authors

In the next step, the overlay visualization has been created on bibliometric analysis of both keyword categories – defined by author and indexed (Figure 4). Based on keyword analysis (with the defined criterium - minimum number of items has been set with 5), main clusters dealing around the term’s “agile leadership” have been identified, namely: business performance, critical success factors, artificial intelligence, culture and transformation as well covid-19 have been identified.

Below the changes of the main keywords within the last 5 years (2017-2021) are also presented, while clearly indicating the trend towards human resources and culture.

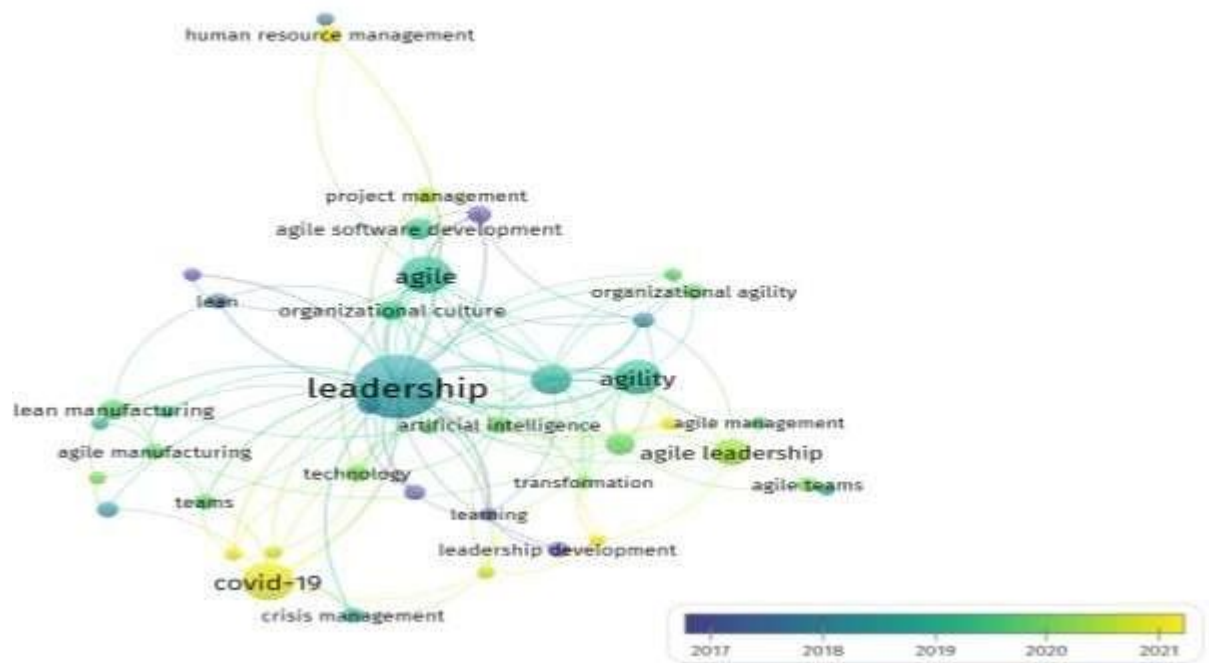


Figure 4 bibliometric analysis VOSviewer

## Conclusions

The results of the study show increasing interest on the agile leadership with rising trend in publications. However, it is to be mentioned that the majority of publications have been proceeded in the US and UK, hence European academic researchers have been underrepresented. However, there is a potential to establish a blueprint while providing insights on the European business.

Regarding the leading authors, it has been concluded that there is no clear concentration of the interest, while the trend on co-authorship is notable. Alluring, there is a trend shift in the subject area which could be explained by the COVID-19 pandemics affecting broader areas, which lead to the interest in the agile leadership coming from other-than the software- areas of interest. Thus, the applicability and impact of agile leadership in the other -than the IT - sectors is still to be evaluated. Although this study offers a comprehensive analysis of the publications on the agile leadership, it has some limitations. Thus, the study has been proceeded only on the publications since 2012 thus concentrated itself on the more recent development of the field. Furthermore, by its nature, the study is backward-oriented. It, for sure, observes the past publications, however the general trends and interests of the researchers are reflected and could

be emphasize in the future research on agile leadership.

To summarize, there is continued interest for both – the academics and practitioners – on the field of agile leadership and further implications on the impact of this leadership style are to be expected. There is a potential to set a new foundation on the academic discourse while studying agile leadership more broadly.

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# BETTER INVESTMENT DECISION THROUGH THE ESG INTEGRATION

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**Abstract.** There is a growing number of institutional investors willing to incorporate environmental, social, and governance (ESG) factors into their investment decisions, and they are led by various motivations (trend, mandate, etc.), however, some investors also believe that the ESG integration will lead to the higher levels of returns, but whether this is true or not is still being discussed. Moreover, how the ESG integration should be established is being debated. The research paper intends to contribute to the existing discussion by evaluating some of the integration techniques as well as examining how the ESG factors among other are influencing forecasted returns of the company. Moreover, the paper addresses the issue of value investing - that is considered to be the skill of purchasing stocks which trade at a significant discount to their intrinsic value - and how the conclusions regarding potential buying targets could be influenced through the ESG integration process. In order to achieve the objective, the following methods are used: a) literature analysis to discuss and evaluate ESG factors` integration techniques; b) Berger (2010) proposal of ESG incorporation in stock evaluation is used to determine the sustainability impact on company`s value. The results of the paper could be interesting for both private and institutional stock investors searching to incorporate the ESG factors into valuation and stock price forecast.

**Keywords:** stock valuation, ESG integration, value investing, sustainability

**JEL Classification:** G11, G32, Q01.

## Introduction

According to the number of studies there is a growing amount of institutional and private investors willing to include in the coming years or currently including the environmental, social, and governance (ESG) factors into investment decision process, asset allocation and portfolio management; while these investors are led by various motivations like trend, command and requirements, interest, etc., on the other hand, some of the investors also believe that the ESG integration will lead to the higher levels of returns; even though the last statement is still questionable. In the scientific research (e.g. Hastalona & Sadalia (2021); Di Simone et al. (2022)) and among the practitioners ESG is used as a synonym for sustainability, nevertheless the sustainability can be defined in the broad ways (Hallin et al. (2021); (Ruggerio (2021))). It is worth considering that an important question at this point is if the ESG-sensible behaviour of the companies pays off to the different kind of stockholders. In the case of the positive answer (and the author would like to believe in it; claiming that the findings by several scientists are true, e.g., Ahmad et al. (2021); Kim & Li (2021); Di Simone et al. (2022)), various kind of investors should recognise the added value while

putting their money into sustainability and sustainable projects and behaviour.

## 1. ESG integration in the financial decision-making and research purpose

Considering the potential positive impact of ESG sensibility on the investee company for investors the main concern is about the ESG integration opportunities in the decision-making process. Even though the ESG strategies could differ significantly as they are based on different viewpoints and values several rather well-defined investment strategies are based on ESG integration. In the framework of the current paper, it is necessary to provide an overview to these strategies that would allow further understanding of the issue (based on the research conducted by Hebb (2011); Van Duuren et al. (2016); Gasperini (2020); Folque et al. (2021)). The strategies include the following variants: a) **Exclusion** (in some sources also negative screening): exclusion from potential investment universe due to some specific ESG criteria levels; b) **Best-in-class screening** (in some sources also positive screening): inclusion into potential investment universe due to some specific ESG criteria`s levels compared to industry or sector peer-group; c) **ESG integration**: inclusion of the ESG criteria in the investee company valuation and financial analysis (this strategy is going to be

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considered in the further part of the research); d) **ESG thematic investing**: investment strategy includes one or several sustainability issues or goals to be achieved thanks to the investment; e) **Impact ESG investing** strategy includes one or several sustainability issues or goals to be achieved thanks to the investment (KPI or measurement parameters are determined and evaluated); f) **Engagement strategy**: the investor acts actively to influence/change the company's behavior considering the ESG factors and sustainability issues.

The strategies are defined nevertheless the analysis of the literature shows that investors do not have clear guidelines about the usage (and even more integration and engagement) of the strategies from the practical point of view. The research paper intends to contribute to the existing discussion by evaluating some of the integration techniques as well as examining how the ESG factors among other are influencing forecasted returns of the company. Moreover, the paper addresses the issue of value investing - that is the skill of purchasing stocks which trade at a significant discount to their intrinsic value – and how the conclusions regarding potential buying targets could be influenced through the ESG integration process. To achieve the objective, the following methods are used: a literature analysis to discuss and evaluate ESG factors' integration techniques; Berger's (2010) proposal of ESG incorporation in stock evaluation is used to determine the sustainability impact on company's value.

## 2. Results of the research

Based on the literature analysis one can conclude that concerning the ESG integration possibilities there are some proposals regarding the investment strategies in corporate bonds and sovereign's asset classes. The main conclusion that could be drawn out of the analysis: ESG is complementary to credit ratings in assessing credit quality of the investment objective, so that adjustment to the credit quality and rating based on the stand of ESG criteria. Further details could be found in Jang et al. (2020); Gratcheva et al. (2021); McCarthy (2021); Morgenstern et al. (2022). In the equity asset class, the proposal of the integration is construction of smart beta by integrating ESG factors and evaluating their performance. Further details could be found in Yasmine & Kooli (2022); Kaiser (2020); Austmo (2021). Moreover, it is worth considering that in both the cases the investor makes use of so-called traditional

accounting while using the fundamental data from profit & loss statement, the balance sheet and the cash flow statement, while the sustainable approach requires going one step further and analyzing the ESG impact (both positive and negative) on the financial statement related positions. Such an approach is less discussed in the scientific literature, but following the development of the European Taxonomy (and increasing the amount of Taxonomy-related data), one can expect the increasing interest in such an approach. As it was mentioned previously the current paper deals with Berger's proposal to include the ESG data as factors influencing the forecasted financial data in terms of direct costs (like energy, waste, water, and paper expenses; payments for sick leaves and employees' turnover costs); externality costs (like CO<sub>2</sub> compliance costs) and opportunity costs (ESG provisions; expenses for board compensations).

Table 1. Investment portfolio selection criteria (source: created by author)

Selected Screening Criteria	Matches
Security Universe	1603260
Trading Status: Active	548092
Security Attributes: Show Primary Security of company only	98145
Country/Territory of Domicile: Eastern Europe; Western Europe	26963
Top 15 Sequential Rank - Higher is Better (Current Market Cap [USD])	15
Current Price to Book Ratio	15
Current Price to Free Cash Flow	15
Current Price Earnings Ratio (P/E)	15
Current Periodic EV to Trailing 12M EBITDA	15
Current Periodic EV to Trailing 12M Sales	15
BF12M Best P/E Ratio	15

Table 2. Testing on Historical Data (Bloomberg Model) (source: created by author)

Brief Statistics (Back test on 2 year data performed on 21.05.2022)	
Total Return (%)	28,06
Mean Return (%)	13,36
Standard Deviation (%)	19,46
Sharpe Ratio	0,76
Jensen Alpha	4,1
Beta	0,8

To study the potential influence of such an approach, the author decided to use the value investing approach and select an investment portfolio consisting of 15 top value stocks. The selection criteria could be found in Table 1. Table

2 represents the results of such an investment portfolio. The tables above show just the classical approach of portfolio selection, as soon as the investor incorporates the ESG criteria and their impact on potential financial positions, the portfolio does not look potentially attractive, as the majority of the positions cannot be included due to ESG incorporation negative impact on forecasted EBITDA for the financial year 2022 and stock price. The results are presented in Table 3. The evaluation of ESG criteria impact is performed with green standing for positive impact; yellow – neutral impact and red – negative impact.

Table 3. ESG incorporation (Bloomberg Model) (source: created by author).

Name	EBITDA Impact (2022)	Share Valuation	E	S	G
SHELL PLC	-135,02%	-192,43%			
ASTRAZENECA PLC	30,93%	40,70%			
TOTALENERGIES SE	-0,33%	-0,47%			
SANOFI	-0,66%	-0,84%			
HSBC HOLDINGS PLC	less than 0%	-2,18%			
NOVARTIS AG-REG	0,39%	0,45%			
NOVO NORDISK A/S-B	-1,50%	-2,54%			
MEDTRONIC PLC	-8,06%	-9,60%			
NESTLE SA-REG	-32,46%	-38,12%			
LINDE PLC	-1,62%	-2,12%			
ROCHE HOLDING AG-GENUSSCHEIN	-10,05%	-14,78%			
LVMH MOET HENNESSY LOUIS VUI	-1,68%	-2,44%			
L'OREAL	-0,67%	-0,85%			
ASML HOLDING NV	-1,14%	-1,29%			
ACCENTURE PLC-CL A	-34,71%	-45,35%			

One can notice that integration of ESG factors into the evaluation process leads to the following results: first, due to the negative potential impact 5 companies out of 15 do not comply with value strategy anymore (negative impact on forecasted EBITDA and stock valuation); second, the positive impact is mainly coming from environmental

factors; while social factors contribute to major negative impact and governance are neutral.

### Conclusions and Discussion

Sustainability is not just a niche or an innovative product; it is a stable part of our everyday life and also investors have to care about the potential impact of their investment decision on sustainability. On the one hand, there is a growing interest in the topic, on the other hand, the lack of general standards and best practices, and developed methodologies do not allow to use of ESG integration in the financial decision-making process to the full extent.

The paper contributes to the topic, as it provides an overview of some integration approaches and discusses the idea of incorporating the ESG criteria into the stock valuation and portfolio management process. It is evident that the classical approach of value investing is not any more suitable as soon as an investor integrates the ESG criteria into the decision-making process.

In the coming papers, it is necessary to test the influence of ESG integration into financial data analysis for the broader investment universe and to evaluate portfolio performance within different market scenarios.

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# PRINCIPAL INDICATORS OF HEALTHCARE SYSTEM RESILIENCE

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## Abstract.

- **Purpose.** The term “healthcare system resilience” becomes topical in policy planning documents around the world. United Nations General Assembly has defined resilience as the ability of a system, community or society exposed to hazards to resist, absorb, accommodate, adapt to, transform and recover from the effects of a hazard in a timely and efficient manner, including through the preservation and restoration of its essential basic structures and functions through risk management. This research aimed to highlight the role of the contextual framework in the exploration of resilience and potential principal indicators of the healthcare system resilience.
- **Design/ methodology/ approach.** To achieve the aim of this research, the objectives were formulated as identification of the initial nature, classic domains, and indicators of healthcare resilience. The general literature review was performed, using PubMed, Web of Science, and Scopus databases. The theoretical scope of the paper was based on the contextual framework and measuring of the healthcare system resilience.
- **Findings.** The concept of resilience was introduced to the healthcare systems literature from the ecological sciences through an increased understanding of healthcare systems as complex adaptive systems. In this context, the idea of resilience can act as a useful tool to understand healthcare system dynamics. The ecological idea that strategies to enhance resilience can be based on absorptive, adaptive or transformative domains depending on the impact and intensity of the crisis has been particularly impactful in the healthcare system resilience discourse. Research efforts to clearly define the parameters of resilience and to determine measurable principal indicators remain at the level of theoretical discussions and several project proposals.
- **Originality/value.** This study identifies the research gap in practical measuring of the healthcare system resilience indicators and therefore provides suggestions for further research. The perception of the nature of the healthcare system in the context of systems theory, viewing it as a complex, dynamic part of the socio-economic system, operated in circumstances of high uncertainty, could strengthen future research. Measuring the resilience of a changing system is a significant methodological challenge, therefore the shift of approach from fragmentation to a holistic ecosystem scope could be considered.

**Keywords:** healthcare policy, contextual framework, complex adaptive system, ecological approach, resilience measuring

**JEL Classification:** P46

## Introduction

The issue of healthcare resilience became relevant and launched the discourse among healthcare system researchers in 2014, due to the onset of the Ebola outbreak in West Africa (Kieny et al., 2014, p. 850). Various policy planning documents were gradually prepared to strengthen the resilience of the healthcare system in disaster risk circumstances. United Nations (UN) General Assembly has defined resilience as “the ability of a system, community or society exposed to hazards to resist, absorb, accommodate, adapt to, transform and recover from the effects of a hazard in a timely and efficient manner, including through the preservation and restoration of its essential basic structures and functions through risk management” (United Nations [UN], 2016).

The topicality of the healthcare system resilience manifested in the light of the coronavirus disease caused by the SARS-CoV-2 virus (COVID-19) pandemic. One of the most recent documents is the World Health Organization (WHO) position paper “Building health systems resilience for universal health coverage and health security during the COVID-19 pandemic” which provides recommendations for building resilience and seeking integration between promoting Universal Health Coverage (UHC) and ensuring health security by the following means (World Health Organization [WHO], 2021):

- recovery and transformation of national health systems through investment in the essential public health functions and the foundations of the health system, with a focus on primary health care and the incorporation of health security;

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- all-hazards emergency risk management, to ensure and accelerate the sustainable implementation of the International Health Regulations (2005);
- whole-of-government approach to ensure community engagement and whole-of-society involvement.

Despite plenty of policy planning documents and discussion papers, the definition and exploration of resilience within healthcare systems research remains a source of scientific discourse. This research aimed to highlight the role of the contextual framework in the exploration of resilience and potential principal indicators of the healthcare system's resilience. To achieve the aim of this research, the objectives were formulated as identification of the initial nature, classic domains, and indicators of healthcare resilience.

## 1. Theoretical Background

Building of the theoretical background of this study was based on literature research on contextual issues of healthcare system resilience. Since the topicality of the term "healthcare system resilience" was arising in relatively recent years, healthcare researchers initially used the achievements of other fields in the exploration of this phenomenon. Healthcare researchers (incl. Blanchet et al., 2017, p. 432) used, as a basis for creating the conceptual framework of resilience in healthcare, the ecological model proposed by Label et al., whose publication "Governance and the capacity to manage resilience in regional social-ecological systems" (Lebel et al., 2006, p.19) has reached 704 citations on the Web of Science platform until July 2022.

Blanchet et al. emphasized that based on frameworks used in ecology, three domains of resilience can be applied to health systems: absorptive capacity, adaptive capacity and transformative capacity (Blanchet et al., 2017, p. 432). Additionally, the researchers extended existing frameworks from ecological science to the study of healthcare systems and proposed a modified conceptual framework. The four suggested dimensions consisted of understanding: (i) the mechanisms through which healthcare system actors collect, systematise, and interpret complex information, as well as the way this information feeds into complex decision-making processes; (ii) the strategies health system actors may use to manage uncertainty and surprises; (iii) the interdependence of health systems with other complex systems; and (iv) the approaches through which health systems develop socially and contextually-acceptable institutions and norms (Blanchet et al., 2017, p. 434).

At the same time, Barasa et al. reflected on criticisms of the concept of resilient healthcare systems, such as assuming that systems are apolitical, ignoring actor agency, promoting inaction, and requiring the acceptance and embracing of vulnerability, rather than striving for stronger and more responsive systems (Barasa et al., 2017, p. iii91). Researchers argued that the observed weaknesses of resilience thinking can be addressed by reframing and applying a resilience lens that is better suited to the attributes of healthcare systems as the Complex Adaptive Systems (CAS). Specifically, the researchers proposed that: (1) in addition to sudden shocks, health systems face the ongoing strain of multiple factors. Healthcare systems need the capacity to continue to deliver services of good quality and respond effectively to wider health challenges – to ensure "everyday resilience"; (2) healthcare system resilience entails more than bouncing back from shock. In CAS, resilience emerges from a combination of absorptive, adaptive, and transformative strategies; (3) nurturing the resilience of health systems requires understanding healthcare systems as comprising not only hardware elements (such as finances and infrastructure), but also software elements (such as leadership capacity, power relations, values, and appropriate organizational culture) (Barasa et al., 2017, p. iii91). These two conceptualizations of resilience successfully complemented each other – "top-down" (Blanchet et al., 2017, p. 434) and "bottom-up" (Barasa et al., 2017, p. iii91) approaches, which both acknowledge the importance of the context of the resilience process and the agency of actors involved. Great support in the achievement of the aim of the current research related to the contextual issues of healthcare system resilience, was provided also by the correspondence published in one of the world's oldest and best-known peer-reviewed general medical journals – The Lancet – in 2017. In this correspondence, Haldane et al. revealed that resilience is a concept loaded by its multidisciplinary context and the application of a narrow definition can be problematic. Resilience in healthcare systems research should accommodate myriad health systems' experiences, ranging from shocks such as infectious disease outbreaks and natural disasters to slow-burning challenges such as chronic diseases and rising healthcare costs. Furthermore, factors beyond the health system should be understood – resilience within communities and other systems, including financial and socio-political systems, which influence and underpin how health systems function (Haldane et al., 2017, p. 1513).

Subsequently, Haldane et al. noted that 21<sup>st</sup>-century healthcare systems will face simultaneous challenges, and the concept of resilience must be dynamic enough to reflect the complexity and change inherent in diverse health systems. A view of healthcare systems resilience should be grounded in the understanding that each healthcare system is unique, and influenced by context and circumstances. The meaning of resilience should then emerge from and be shaped by the context in which it is applied. The conceptualisation of resilience should therefore not be prescriptive, but have breadth and flexibility, recognise complexity, consider shocks and cumulative stresses, attempt to deal with disruptions, and anticipate future failures (Haldane et al., 2017, p. 1513).

Findings of Haldane et al. correspondence could discourage the idea to identify principal indicators of healthcare system resilience, due to its description as a concept with multidisciplinary context, unique, complex, dynamic, flexible, and influenced by inclusive systems. However, given the focus on the mentioned processes, such as shocks by infectious disease outbreaks, in which resilience abilities are particularly manifested, the continuation of the research was devoted to the characteristics of healthcare system resilience provided by researchers during the COVID-19 pandemic.

## 2. Methodology

In the scope of this research, the general literature review was performed to provide an overview of the healthcare system resilience concept, and measuring of resilience. The literature review was conducted, using PubMed, Web of Science, and Scopus databases. The following keywords were used in the search: “healthcare”, “system”, “resilience”, “measuring”, and “indicators”. Research had a period limit – from 2020 to 2022, in order to investigate the researchers’ findings during the period of the COVID-19 pandemic, assuming that crises are more revealing of systems resilience and research tendencies.

## 3. Results

Assuming that the empirical research can design a suitable base for the identification of potential indicators of resilience, the literature review provided by Biddle et al. was selected for the initial step. Researchers emphasized that while substantial

effort has gone into the conceptualization of health system resilience, there has been no review of how the concept has been operationalized in empirical studies. Findings were synthesized using descriptive quantitative analysis and by mapping aims, findings, underlying concepts and measurement approaches according to the resilience definition by Blanchet et al. (Biddle et al., 2020, p. 1084). Researchers identified 71 empirical studies on health system resilience from 2008 to 2019 (62% of studies published since 2017). Most studies addressed a specific crisis or challenge (82%), most notably infectious disease outbreaks (20%), natural disasters (15%), and climate change (11%). A large proportion of studies focused on service delivery (48%), while other health system building blocks were side-lined. Despite extensive theoretical work on the domains which constitute health system resilience, researchers found that most of the empirical literature only addressed particular aspects related to absorptive and adaptive capacities, with legitimacy of institutions and transformative resilience seldom addressed. The review showed that the way in which resilience was applied in the empirical literature did not match its theoretical foundations. The researchers suggested that knowledge from both quantitative and qualitative research traditions should be integrated in a comprehensive assessment framework, and only then will the theoretical ‘resilience idea’ be able to prove its usefulness for the research community (Biddle et al., 2020, p. 1084).

At the same time, the scoping review aimed to identify the descriptions and characteristics of health system resilience, provided by Fridell et al., identified that variation was observed on how resilience is described and to what depth it was explained in the existing literature. The descriptions of health system resilience primarily focus on major shocks. Leadership and governance were recognized as the most important building block for creating health system resilience. Adjustments to long-term changes and the element of learning should be considered for a better understating of health system resilience (Fridell et al., 2020, p. 6).

Researchers Fridell et al. collected the characteristics of health system resilience within each of the WHO six healthcare system building blocks (World Health Organization [WHO], 2007): leadership and governance, information, health workforce, financing, health technologies and service delivery. For instance, in the category “Leadership and governance” which was recognized as the most important building block for creating health system resilience, the following characteristics were

identified: ethics, system capacity, engagement, operationalisation, institutional design (Fridell et al., 2020, p. 13). However, the proposed indicators for each of the characteristics arise considerations of their measurability, for instance, “system capacity” intends “predict disturbances, respond to diverse challenges and adjust the system if needed”.

In one of the studies of 2021, Saulnier et al. concluded that the concept of “healthcare system resilience” is relatively new in health policy and systems research and the existing research remains mostly theoretical. Previous research viewed resilience as an outcome that can be measured through performance outcomes, as an ability of CAS that is derived from dynamic behaviour and interactions, or as both. However, there is little congruence on the theory and the existing frameworks have not been widely used, which as diluted the research applications for health system resilience (Saulnier et al., 2021, e006779).

Promising states of 2022 were defined in the publication of Lyng et al. on the study as a part of the first exploratory phase of the Resilience in Healthcare programme, with the overall aim at providing empirical and analytical indicators and different learning tools for Resilience in Healthcare across contextual settings and levels. The exploratory phase has focused on screening, synthesising, and validating results from existing empirical projects covering a variety of healthcare settings. Researchers emphasised that indicator development is not a straightforward matter, due to the difficulty in operationalizing different resilience concepts, the desire to avoid context specificity, and a lack of empirical investigations to test theoretical frameworks; however, the work of identifying leading indicators for resilience is nonetheless important (Lyng et al., 2022, p. 474).

## Conclusions and Discussion

The concept of resilience was introduced to the healthcare systems literature from the ecological sciences through an increased understanding of healthcare systems as complex adaptive systems. In this context, the idea of resilience can act as a useful tool to understand healthcare system dynamics. The ecological idea that strategies to enhance resilience can be based on absorptive, adaptive or transformative domains depending on the impact and intensity of the crisis has been particularly impactful in the healthcare system resilience discourse.

More active research on the healthcare system resilience is observed since 2017. In the pre-

COVID-19 period, the empirical studies on infectious disease outbreaks, as a causal factor inducing the necessity of resilience, accounted for only a fifth of all empirical studies. The present data would be expected to show a significantly different proportion and reinforce the importance of a contextual framework.

In the following period, research efforts to clearly define the parameters of resilience and to determine measurable principal indicators remain at the level of theoretical discussions and several project proposals. The results of this research identified the lack of scientific information on practical measuring of the defined indicators, and this obstacle provides suggestions for further research.

Simultaneously, the perception of the nature of the healthcare system in the context of systems theory, viewing it as a complex, dynamic part of the socio-economic system, operated in circumstances of high uncertainty, could strengthen future research. Measuring the resilience of a changing system is a significant methodological challenge, and presumably the shift of approach from fragmentation to a holistic ecosystem scope could be considered.

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# REDUCING THE SHADOW ECONOMY WITH INFORMATIONAL CUES: A NATURAL FIELD EXPERIMENT WITH FIRMS IN LATVIA

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**Abstract.** The goal of this study is to examine the effect of various messages on reducing the shadow economy. In cooperation with the State Revenue Service in Latvia, a natural field experiment with 3,813 firms examined the messages based on deterrence (increased audit probability), and non-deterrence (pro-social behaviour) approaches. The results of the experiment show that both kinds of messages are equally effective in raising tax revenues. The informational letter that includes only an informational cue on firm's relative standing is as effective as messages that include additional cues for audit probability or a prosocial text. On average, receiving a message increases the average salary by around five percentage points relative to firms that did not receive any message. The findings suggest that a significant increase in tax revenues can be achieved by using simple informational cues. At the policy level, the findings suggest that there is no necessity to increase audit probabilities and the capacity of the State Revenue Service to carry them out to increase the tax revenues among the specific group of firms.

**Keywords:** tax collection, shadow economy, pro-social behaviour, tax audits, field experiment

**JEL Classification:** H26, H71; H83

## Introduction

There exist two competing theoretical explanations for what motivates individuals to pay taxes. One is the so-called deterrence approach, stemming from the standard model of tax evasion (Allingham & Sandmo, 1972; Srinivasan, 1973). It predicts that tax compliance is based on the tax rate, audit probability, penalty rate and income.

Alternatively, a broad array of research has found that tax compliance is based on broader propositions than pure rationality (Dasgupta, 1990; Fehr & Fischbacher, 2006; Górecki & Letki, 2021). Individuals generally do not act selfishly but in an altruistic or reciprocal way (Ortega & Sanguinetti, 2013). For instance, trust in state institutions is one of the factors that has been found to positively affect tax morale (Alm et al., 2006; Kucher & Götte, 1998; Slemrod, 2003; Uslaner, 2010).

This study examines both approaches in a real-life setting using field experiment with firms in Latvia. The experimental results reveal that simple informational cues increase tax revenues and both approaches are equally effective. As such, there is no need for a tax authority to increase audit

probabilities or capacity to carry them out. Tax collection can be equally effective when based on the non-deterrence approach.

## 1. Theoretical background

There is a widespread belief that imposing fines or enacting audits – the so-called deterrence approach – effectively prevents tax evasion. Many tax authorities have adopted such a policy despite its high costs for enacting audits and monitoring taxpayers (Feld & Larsen, 2012). According to this so-called deterrence approach, the shadow economy is brought to a minimum when audits are carried out, and non-compliance is punished.

At the same time, tax compliance is based not only on the power of the tax authorities to carry out audits but also on trust in these institutions (Aktaş Güzel et al., 2019; Feld & Frey, 2002; Kirchler et al., 2008; Nurkholis et al., 2020). In other words, trust creates an intrinsic motivation to avoid dealings in the shadow economy (Cummings et al., 2009; Horodnic & Williams, 2022; Jimenez & Iyer, 2016). Mickiewicz et al. (2019) find that the trust in the tax authorities strongly relates to tax compliance among Latvian entrepreneurs.

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## 2. Data and methodology

In cooperation with the Latvian State Revenue Service, a natural field experiment with 3,813 firms was carried out in Fall 2021. Businesses were randomly assigned to receive one of seven behaviourally-informed messages based on either deterrence or non-deterrence approaches. The control group did not receive any message. The simple information group received the message that the average salary in the first half of 2021 was below 70% of the average in the region and sector where the firm operates. It asks to minimize these risks in future by considering raising the average salary in the next declarations submitted to the State Revenue Service. The additional six treatment messages include various additional information on top of the simple information template. Three treatment groups received information that the probability of being audited next year is either 5%, 33% or 66%. Additionally, other treatment messages included social norm on tax compliance, emphasized trust in the State Revenue Service and pointed to the state's successful reduction of the shadow economy.

The variable of interest is the average salary for the employees reported to the State Revenue Service after the intervention. Three consecutive months reported before the treatment (June-August 2021) and four tax declarations reported following the treatment (September-December 2021) are used to test the treatment effect using the difference-in-differences linear regression model.

## 3. Results

Table 1 depicts the results of the interventions based on the deterrence approach. After the intervention, i.e., in September, there is a significant increase in average salaries across all three treatment groups. The effect remains significant at the end of the observation period. On average, the deterrence approach increases the average salary by around €30. There are no statistically significant differences in the treatment effect regarding the audit probability level.

Table 1. Contrasts of predictive margins for the causal effect of the deterrence approach (baseline: No message)

Month	Average salary in the control group	5% audit	33% audit	66% audit
Jun	€479.67	-1.67	-6.32	1.99
		(8.07)	(8.4)	(7.98)
Jul	€507.38	1.53	-0.61	5.48
		(8.)	(8.18)	(7.87)

Aug	€519.18	3.92	1.24	4.69
		(8.63)	(8.8)	(8.59)
Sept	€515.13	20.58**	20.12**	28.78***
		(8.779)	(9.356)	(8.678)
Oct	€511.22	16.17*	19.80**	24.65***
		(9.382)	(9.377)	(9.142)
Nov	€511.95	23.56**	25.66**	27.30***
		(9.723)	(10.07)	(9.629)
Dec	€521.79	32.42***	28.06***	30.67***
		(10.42)	(10.04)	(10.62)

Notes: Coefficients from the linear regression model with control variables. Standard errors in parentheses; \*\*\* p<0.01, \*\* p<0.05, \* p<0.1

Non-deterrence approach also raises the average salary (see Table 2). However, simple information letter and the treatment group that received additional information on the fight with the shadow economy are not statistically significant (p>0.05) from the control group. On average, receiving a non-deterrence message increased the average salary by €20 from the baseline of €522.

Table 2. Contrasts of predictive margins for the causal effect of the deterrence approach (baseline: No message)

Month	Average salary in the control group	Simple info	Social norm	Trust in SRS	Fight with the shadow eco
Jun	€479.67	-5.54	-2.96	3.24	-14.73*
		(8.04)	(8.11)	(8.04)	(8.1)
Jul	€507.38	0.73	-0.43	2.78	-11.18
		(7.97)	(8.12)	(7.98)	(8.06)
Aug	€519.18	0.33	5.22	2.65	-10.2
		(8.79)	(8.58)	(8.66)	(8.78)
Sept	€515.13	19.28**	21.95**	23.03**	0.118
		(8.853)	(9.006)	(8.961)	(8.639)
Oct	€511.22	17.22*	17.92*	18.01*	-6.305
		(9.317)	(9.509)	(9.436)	(8.950)
Nov	€511.95	23.13**	22.05**	23.31**	1.623
		(9.554)	(9.636)	(9.877)	(9.707)
Dec	€521.79	18.72*	24.58**	28.15***	7.251
		(10.20)	(11.31)	(10.75)	(11.18)

Notes: Coefficients from the linear regression model with control variables. Standard errors in parentheses; \*\*\* p<0.01, \*\* p<0.05, \* p<0.1

Hence, both the deterrence and non-deterrence approach increases the average salary. There is no statistically significant difference in the intervention effect based on one or the other approach. In other words, it cannot be ruled out that both approaches are equally effective, and the observable effect is based on the fact of communication.

## Conclusions and discussion

Reduction of risks for shadow economy can be achieved by using simple informational cues informing on a firm's relative standings. On average, such an intervention increases the average salary by around 5% pts.

The experimental results show that there is no necessity to notify of a possible audit and increase the State Revenue Service's capacity to carry it out. Non-deterrence approach in tax collection is as effective as the deterrence approach.

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